BEYOND MODERNIZATION

European Perspectives on Rural Development

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Jan Douwe van der Ploeg • Gert van Dijk (Eds)

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The Impact of Endogenous Rural Development

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Is There Anything Beyond Modernization?

Gert van Dijk and Jan Douwe van der Ploeg

During recent decades a seemingly irresistable process has washed over Europe's countryside. Farming and green space have been thoroughly reshuffled. The modernization process has affected the remotest corners of the continent. Whilst markets and the supply of agricultural technologies became increasingly interwoven and standardized, farming itself was deliberately restructured to fit new economic and technological conditions. Market integration, technological change and structural development became key-words. The modernization process involved arrangements which encouraged actors in all domains (farm, national and supranational government, agribusiness, extension and research) to work closely together to keep 'agriculture moving'. And agriculture, understood as a range of interconnected activities and practices, was indeed reordered. European agriculture and the countryside were reshaped. Local specificity lost its relevance and global parameters, such as the common market, the newest technologies and the notion of entrepreneurship, became the guiding principles.

Entrepreneurs in agribusiness and farming derived their parameters largely from agricultural policies. The CAP in particular has strongly supported generic new technologies to enhance productivity. Achieving efficiency levels as realized by top-regions became the guiding principle.

Currently there is significant disagreement about several basic issues. Although the negative aspects of the modernization project can no longer be obscured, an overall evaluation of its outcomes has still to be made. A fundamental issue is whether or not modernization is to be regarded as an unavoidable process governing the development of our societies and that consequently determines the destiny of agriculture as well. This question is not just interesting from a theoretical and historical point of view, it has important implications for the future. In other words: does the development of Europe's agriculture have to follow the pattern and internal logic of modernization or are there alternatives?

This book is inspired by the search for such alternatives. It departs from the empirical finding that although modernization has swept over Europe as a globalizing tendency, its real scope and impact has depended on responses developed at grassroot level. The modernization model (intensi-

fication, scale-enlargement, specialization and integration into agribusiness chains) was as much internalized by some farmers as it was deconstructed and reshaped by others. Some groups have even actively taken distance from what seemed to be the dominant blueprint. The same holds for other actors involved via associated arrangements and networks. On closer inspection one has to conclude that modernization has resulted in differentiation too. The current and impressive heterogeneity of European agriculture shows that agricultural development is a many-sided and highly variable interaction between the local and the global. It is, we believe, in this rich heterogeneity that promising hypotheses for interesting alternatives can be found.

It follows that the 'local' remains a relevant point of reference and here we refer to just two episodes one concerning the issue of technology, the other of markets. From the Grand Narrative of Modernization these episodes seem, of course, ephimeral that is, destined to be consigned to the catogory reserved for 'anomalies' – the 'niche' category. We think, however, that these episodes are not anecdotal. There are many, many similar stories and they relate to a crucial element that cannot be understood by and theoretically integrated into the propositions and hypotheses that underpin the modernization project. This element is *the local as resource.*

The north of Portugal is densely covered by farmer-managed irrigation schemes that have been shaped over the course of centuries. Small irrigation channels run everywhere. They link sources and fields and in this way join and sometimes divide farmers. These same channels also link the past with the present for they are embedded in a complex matrix of rules for water distribution, a matrix that also governs and shapes, to some extent, today's practices and the possibilities and limitations they contain. These channels also link the present situation with the future: they make up a specific technological route. Development was and is moulded by these systems, but it is also true that the same irrigation systems are moulded and remoulded continously by the actors concerned. In synthesis: these irrigation systems emerge as a specific and socially regulated structuring of time and space.

Currently these small irrigation channels are the object of modernization programmes undertaken by the EU, the World Bank and the Portuguese state. Isolated from their context, they are indeed just small, clumsy grooves. Sometimes they are carved out from the rocks, sometimes they are earthy gutters running through the fields and hills. Assuming that farmers suffer from water shortages it seems obvious that water losses (leakages from these clumsy constructions) be avoided. Channels must be cemented, that is the way of modernization. Thus many, many kilometers of channel have been lined, made neater and better able to deliver more water to farmers, thus allowing them to produce more and improve their earnings. The reasoning behind these interventions is as robust as the

'law' that states water runs from the highest point to the lowest and if there are leakages between the higher sources and the low-lying fields, than lining the channels with cement will augment the water supply *e cosi via*.

There is a complication, however. Careful empirical research focussing on water flow measurements has shown that quite often the waterflow in the clumsy channels *increases* when the water goes from source to field. This is explained by subterranean sources that disgorge from the bottom of the channel. Hence, lining these channels turns out to be a highly counterproductive strategy (Marques and Portela 1993; van den Dries 1995).

The point of course is that research into such local 'unruliness' is hardly ever carried out. It is thought to be superfluous. Local realities are, as it were, re-cast in the context of global rules such as our example shows. The local becomes just another field for the application of general rules, procedures, solutions and development models. Through such an approach the 'locality as resource' is actively supressed. Building on the locality, its local knowledge and local irrigation systems would have made for other, more economic, more productive and more efficient solutions. But the very idea lies buried under a thick layer of cement.

The second instance refers to the interface between farming on the one hand and increasingly uniform and standardized markets controlled by large multinational enterprises, on the other. It is at this interface that different interlinkages are constructed, each set of interlinkages allowing for highly different farming styles. We referred earlier to the difference between dairy farming in Friesland and Emila Romagna – notable for the production of Parmezan cheese (van der Ploeg 1993; de Roest 1990). Both operate in the same dairy product 'market' and produce exactly the same regional quota. Yet Emilia Romagna has an employment level of 24,000 units generated in the primary dairy sector, whilst Friesland has only 7,000 units. Income levels are the same. But even when the price difference is integrated into standard neo-classical economic analysis (dairy farmers in Emilia obtain a milk price some 20 or 25 percent above the Friesian level) these substantial differences cannot be accounted for. What emerges, in fact, is the local as a highly valuable resource. It is only by a careful empirical analysis of the specificities of locally constructed farming patterns and of the specific ways in which the latter are linked to processing, marketing and consumption, that a proper understanding of the situation can be achieved.

We believe that two important observations follow from these 'anecdotes'. Both concern the local as resource. The first refers to practice, the second to theory. The first observation then is that in some local settings there are specific resources which form the gravitational centre of endogenous practices and the point of departure for promising endogenous development. The existence of these practices and points of departure

is *empirically* verifiable. They are created and reproduced through goal-oriented, strategic actions. Actors are interlinked through specific networks. Second, it is clear that these practices and prospects are 'hidden' to a considerable extent. At the moment we do not have well-developed theoretical approaches and methodologies that enable us to come to grips with the reality and the potential of what seem to be mere anomalies. During the epoch of modernization, it was the *practice of modernization* that became the central object of empirical enquiry and theoretical elaboration. Consequently, we know a great deal about how to spur modernization, or how to build the institutional arrangements required for modernization and how to solve the particular problems produced by modernization. Hindrances to modernization have also been well analyzed and elaborated. But together with the production of what now appears to be a strictly bounded body of knowledge, an impressive and growing *ignorance* was also created. Knowledge about the alternatives to the modernization model is insufficiently developed.

It is this belief which informs the structure of 'Beyond Modernization'. New theoretical approaches are required to go beyond modernization. Whereas neo-classical economics and structuralist analysis in sociology have lead us into ignorance as far as non-standardized behaviour of actors or non-modeled behaviour is concerned, it is the new approaches of transaction cost economics, neo-institutional analysis, district analysis and actor-network analysis that provide the building stones for a new theoretical and methodological approach. In the first chapter of this book Vito Saccomandi, who is a leading scholar in the application of neo-institutional analysis to agricultural production and marketing, sketches the outlines and the core ('make or buy') of the neo-institutional approach. In the second chapter Saccomandi and van der Ploeg link these general propositions to the analysis of endogenous development processes in agriculture and their potential impact. It is argued that in endogenous and exogenous development processes (the latter stemming from the modernization paradigm) there are structurally different balances between transaction and transformation costs on the one hand and management costs on the other. It is also argued that in this unique balance the comparative advantages of endogenous development processes are to be located and from this the potential impact is to be explained.

In the third chapter, Luciano Iacoponi, Gianluca Brunori and Michele Rovai develop this approach further, introducing the district concept which makes it possible to introduce the social construction of space into the analysis. It also allows for the analysis of specific levels of transaction and management costs as entailed in and produced by specific institutional arrangements.

Taken together the neo-institutional analysis and the more applied district approach allow, we believe, for a most promising intertwining and

cross-fertilization between economics, sociological analysis and research into rural development.

In Chapter 4 Gert van Dijk develops the theoretical debate on endogenous development further, by adding the political aspects of institutional and ecological dimensions to market issues and technology. In Chapter 5 Philip Lowe, Jonathan Murdoch and Neil Ward introduce the newly developed sociological actor-network analysis. This is particularly important as far as *localized control* is concerned. The similarity between their proposal and that of Iacoponi *et al.*, even though the two originate from different backgrounds, will be evident.

In the second half of the book the emphasis is on the assessment of the actual and potential impact of endogenous development processes. This brings us to the worldly pleasures of water and bread, meat and milk. Milk is central to any empirical exploration of the impact of current endogenous development tendencies in Dutch agriculture that counter the asphixiating 'structural involution' the Dutch dairy sector has suffered as a result of the modernization process. In this chapter it is argued that the ongoing process of decreasing employment levels might well be reversed. New institutional arrangements might even allow for a considerable increase in employment opportunities.

In the seventh chapter Flaminia Ventura and Hielke van der Meulen propose specific methods for strengthening endogenous development in the context of beef production in Umbria, and show the results that can be realized. They build on previous material (Ventura and van der Meulen, 1994) in which they identified specific actor networks build around the production, transformation and consumption of meat. This work is an excellent illustration of the actor-network analysis as proposed by Lowe *et al.* in this volume. Specific and socially embedded circuits, linking production and consumption are, in fact, central to Ventura and van der Meulen's analysis. The social definition of quality is one of the crucial elements that holds these circuits together. Through all this specific levels transaction costs are realized, levels which in themselves allow for an additional impact. It is interesting that most of the circuits discussed, especially the ones built on local resources, emerge as agro-districts characterized by considerable cohesion, coherence and dynamics (Iacoponi *et al.* in this volume).

Taken together the 'milk and meat' analysis demonstrates that 'beyond' modernization there exists considerable scope for reversing developmental tendencies. During recent years such a possibility has been demonstrated many times in a variety of situations and in respect of several new options. Ecological agriculture is probably the best known example. Ecological farming *requires* more labour, especially to guarantee the necessary adjustment between the local ecological setting and farming but also because the division of labour between industry and agriculture is quite different. The combination of an improved technical efficiency,

lower costs and higher prices also *allows* for the remuneration of more labour as has been demonstrated in a range of convincing empirical studies (Dubgaard 1990; Avilo Cano 1993; Vereijken 1986; Wijnands 1990 and Raley 1995). Changing trends, however, is not confined to ecological farming alone. In the 'milk and meat' chapters it is argued that promising trends within what is called 'conventional farming' tend to go in exactly the same direction. A reversal in the seemingly unavoidable fall in agrarian employment opportunites appear quite feasible.

It is precisely at this point that endogenous development becomes relevant. It allows for substantially more employment in a situation where the need for work is felt everywhere and is being explicitly sought for in the context of massive EU interventions such as the Objective 1 and 5b programmes. It is also through a more labour-based agriculture that targets such as quality production, nature and landscape preservation and a positive environmental contribution are to be achieved. In more general terms we would echo the contribution of Bernard Kayser: it is through farming styles based on the optimal use of local resources including labour, that Europe's countryside is to be safeguarded as precious 'cultural capital' (see Chapter 8).

In short going beyond modernization is no luxury and is not Utopian, it is an urgent need. Throughout this volume it is argued that there are indeed promising and realistic prospects and perspectives. The 'robustness' of our claim is further substantiated in the chapters by Adri van den Dries and José Portela (Chapter 9) and Flaminia Ventura (Chapter 10). The chapter of van den Dries and Portela centers on 'water'. The authors show that the current modernization of both agriculture and irrigation in northern Portugal, has produced a growing *counter-productivity*. Water is one of the principal 'limiting' factor in farming in the Trás-os-Montes area, and the modernization of irrigation and farming has resulted in decreasing levels of water-use efficiency. In endogenous practices some 1700 m^3 of water are required to obtain an average inome but in newly introduced exogenous patterns this amount exceeds 7,000 m^3. Under current conditions, modernization increasingly seems to be a form of 'structural involution', counter-productivity being one of its most dramatic expressions. The same is true for energy, which will be one of the limiting factors *par excellence* in the coming decade. In Chapter 10 Ventura compares several indexes for energy-use efficiency. It appears that the efficiency of energy use in more endogenous types of cattle breeding is superior to that of the highly modernized cattle breeding styles. The search for endogenous development is definitely not, as some people suggest, a *return* to the past and a longing for romanticism. It is a search for superiority.

In the last two chapters of this volume more emphasis is placed on social struggles and the search for new and necessary institutional arrangements. In Chapter 11 Han Wiskerke discusses 'bread' and explores the

struggle of arable farmers in Zeeland to distance themselves from arrangements established during the modernization period. Wiskerke also refers to impact. If new arrangements were generalized in wheat cultivation and in the subsequent process of bread-making, the now gloomy prospects for arable farming would be radically different. The same line of reasoning is followed by Rene de Bruin in the last chapter of the book. Like Han Wiskerke, he also stresses the importance of new farmers' initiatives. He is concerned with initiatives for a farmers' controlled management of nature, landscape and the environment, which is an increasingly important strategy being adopted by progressive and innovative farmers' associations. The most important aspect of the message of these closing chapters is that the strengthening and consolidation of new, promising endogenous solutions is very dependent on the socio-political struggle. As this book argues alternatives seem close at hand yet in reality they are quite far away. As long as the old-fashioned modernization paradigm governs policy and science, the future of European agriculture and the countryside will be a gloomy one and realistic alternatives will continue to be hidden by ignorance. If, however, new prospects are recognized within the realm of politics and new arrangements are allowed to prosper, then a new and brighter future is well within reach.

This volume has been made possible by the European Commission, who partly funded (through the CAMAR programme of DG VI) the research projects and the international seminars on which this book is based. The contributions of the Italian Ministery of Agriculture, of several Dutch provinces and regional farmers unions, of the Junta de Andalucia in Spain and of the University of Trás-os-Montes and Alto Douro in Vila Real in Portugal have been equally important. The Circle for Rural European Studies (CERES) hosted by Wageningen Agricultural University has also played an important role. Particular thanks, however, goes to the Centro di Sviluppo Agricolo e Rurale (CESAR) in Assisi and its director Vito Saccomandi for having created the necessary intellectual (and gastronomic) environment for the discussions which lead not only to this volume but to many stimulating and valuable ideas and insights. And a most special word of thanks for two beloved ladies: Ans van der Lande for the communicative, organizational and technical work associated with the production of this book and for Marilyn Minderhoud-Jones for her highly inspiring editorial work. If they wouldn't hammer us on our heads, we would also say that they represent and highlight the 'local as resource'.

Part I

Endogenous Development: New Theoretical Approaches

1 Neo-Institutionalism and the Agrarian Economy

Vito Saccomandi

Various definitions can be given to the word 'institution'. In economics the word 'institutionalism' is tied to the work of a major exponent of liberal political thinking, F. von Hayek (Hayek 1948). Hayek's work was, in essense, a critical study of the notion of ideal competition, a notion developed by the neoclassicists in their attempt to reassess Adam Smith's 'invisible hand'. His approach proceeded from the observation that ideal competition describes a state of affairs that is only possible when those conditions generated by the process itself are already in existence. In economics, however, what is more relevant is the competitive process itself. The idea of competition as a process, which is classical in its inception, led Hayek to affirm that both moral and economic progress in a society is not so much the result of planning or programming on the part of individuals as the product of the impersonal workings of an 'expanded' visible hand. This way of thinking became known as institutionalism because it emphasized the importance of studying the institutional context in which economic activity is seen to be the result of human activity rather than the workings of a plan.

During the 1930s and prior to Hayek, there had been contributions made to economic theory in the USA which had focused attention on the problem of institutions. Among these, J.R. Connor's 'Institutional Economics' (1934), and Ronald H. Coase's 'The Nature of the Firm' (1936), were particularly notable. Coase also began by considering the implications of Adam Smith's 'invisible hand' and the idea that all that was needed to make an economic system work was a system of pricing. Intervention on the part of the state and planned economic activity were unnecessary. The conclusion Coase reached was that it was easier to analyze the effects of the invisible hand if the cost of the pricing system itself was taken into consideration. This cost, later known as 'transaction cost', is generated by the market itself, for example, in the cost incurred in negotiations between buyers and sellers, the cost of drawing up contracts, analyzing stock and in legal disputes.

Later, Coase went further. In 'The Problem of Social Cost', published in 1960, he formulated a theory, now known as Coase's Theory, which maintains that in the presence of transaction costs, public economic inter-

vention is unable to secure better results than those obtained during negotiations between individuals. The theory was formulated by analyzing Pigou's famous assertion, that taxation should be used to discourage those who produce negative conditions.

Ronald Coase received the Nobel Prize in 1991. For many decades his work, like that of Connors, was very underestimated. It was not until the 1970s that a group of economists took up the concept of transaction cost again and set a new course in economic studies. Known as the New Institutional Economics, it is often referred to as NEI. However, NEI stands for a separate branch of industrial economics, known as New Industrial Economics and it is important to maintain the distinction between them in order to avoid confusion. The founding fathers of New Industrial Economics were active before Hayek and as Coase himself emphasises, the development of New Institutional Economics was largely due to the work of Oliver Williamson, Harold Demsetz and Steven Cheung (Coase 1992).

Williamson has recently tried to trace the development of New Institutional Economics and in his book he cites what he considers to be the most significant contributions (Williamson-Winter 1991). In this short paper we will attempt to summarize the theory of transaction cost in the light of Williamson's formula and to draw out those general economic implications which influence agricultural and political economics.

The Theory of Transaction Costs following Williamson

Williamson's theories can best be illustrated by pointing out the differences in the basic assumptions made in the notions of ideal competition and the economic climate in which the market bears transaction costs.

As we know, a competitive situation is built upon several assumptions: the existence of a large market of buyers and sellers, whose function is that of 'price-takers' (absence of power in the market place); equal entrepreneurial capability and access to technology and information; flexible resources and a consequent freedom of movement on the part of the buyers and sellers; a homogeneous product; absolutely rational exchange agreements; and the absence of transaction costs.

In Williamson's economic landscape, the market is complex because of uncertainties, vagueness and the interdependence of agents. One therefore operates under conditions of limited rationality and 'moral hazard'. 'Information impactedness' is prevalent among agents which means that, because of their intrinsic differences, there cannot be a homogeneous use of resources. A commercial enterprise is therefore perceived as an organization that confronts and resolves problems.

Having defined these differences, Williamson's formula can be briefly summarized as follows. The cost of using the market is generated by the

interaction between limited rationality and opportunism and the complications this produces. Because a commercial enterprise is perceived as an organization which confronts and resolves problems every time it operates in the market, one is automatically obliged to regard it in a hierarchical sense (as a company). For these reasons, to function in the market place means solving the problem of 'make or buy', in the sense that a company must constantly compare the cost of using the market (C_U) with the cost of internal organization (organization and change costs C_{OC}), deciding to use the market only if:

$$(1) C_U < C_{OC}$$

The conceptual 'make or buy' formula given us by Williamson is more sophisticated than this summary might suggest but Formula 1 is, in any case, a fair abstract of his transaction cost theory (Williamson 1981).[1]

In his example, William assumes a substantial difference between the total efficiency quotient of the company (technical and organizational efficiency) and the concept of the technical efficiency of neo-classical economics. It assumes that the operational context of a company is determined by the interaction between technology and property rights. It further affirms that the company will find efficiency only by minimizing both production costs and cost associated with the use of markets. Given a certain legal context (property rights), the 'make or buy' summarized in Formula 1 states that in order to be efficient a company must choose between a production process involving a choice of those market conditions to be internalized by the company and those conditions which should be left to the market.

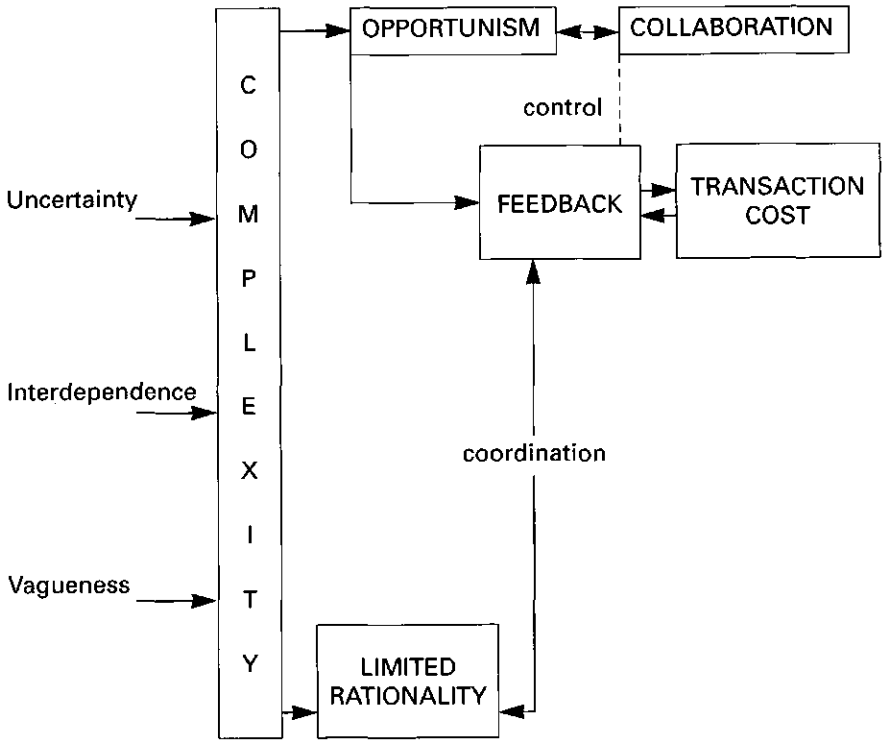
As we can see, Williamson converts concepts that belong to sociology, i.e. hierarchy, into legal concepts in one sense and anthropological ones in another. In the modern theory of commercial enterprise, the use of these concepts belongs to the economics of organization. In 'The Economics of Organization', Williamson ties his theory to other contributions, such as those of Hannan and Freeman on the 'genetics' of economic organizations, for example, and the work of Thomson on the concept of the organization as an instrument to lessen the costs incurred by limited rationality (Thomson 1967; Hannan-Freeman 1977).[2]

Thomson's 'principle' becomes very important in relation to this very kind of problem and can be expressed as follows. 'A government structure that offers the greatest possibility of saving on transaction costs will substitute, given the same conditions, the one which does not offer these possibilities' (Williamson 1981). This allows for a thorough interpretation which is consistent with the question of how and why very diverse forms are discernible. These forms are, in fact, very different from the 'spot' exchange and vertical integration analyzed in neo-classical theory.

In his speech at the Nobel Prize ceremony, Ronald Coase emphasized the fact that the starting point in the theory of transaction costs was the analysis of vertical integration, leading to a better understanding of the reasons behind the different types of organization to be found within companies. It is no exaggeration to say that many of the conclusions being examined by various neo-institutional economists tend, in fact, to increase our understanding of this issue.

An underestimated but very interesting contribution on this subject, was made by Butler in his attempt to redefine the criteria associated with increasing or decreasing transaction costs (Butler 1982). According to Butler, uncertainty, vagueness and interdependence are the factors that render transaction complex, although the greater or lesser cost of transaction also derives from additional factors, which in turn generate limited rationality and opportunism (Figure 1).

Figure 1 The Transactional Structure (Butler)



It is very difficult to reduce the effects of limited rationality although it is possible to reduce the inconveniences of opportunism. Opportunism tends to increase control costs. To the extent that it is possible to introduce

'feedback', one stimulates collaboration which, in reducing the need for control, also reduces the transaction cost. Since collaboration can be stimulated by instituting a hierarchical system, it is also possible that there exists a continuum of hierarchical situations, each of which corresponds to a different transaction cost. In the article mentioned above, Butler lists several solutions associated with hierarchy, which can lead to a reduction in transaction costs; these include, for example, the 'tout court' company, the family business, the club or the collaboration.

We can extract a paradigm of the 'organizational innovation cycle', from Butler's considerations. If the general considerations he adopted are true, then transaction essentially differentiates itself from the 'sic et simpliciter' exchange, becoming a 'soft' part representing the way in which the economic performers come into contact with each other. In this sense, exchange and transaction have a 'hard' element in common (goods exchanged and exchange agents), but the transaction also has the 'soft' element. In this sense, there must be a continuum of real transaction between the 'spot' in a competitive market and vertical integration in order for what we have defined as the organizational innovation cycle to exist.

General Considerations: Neo-Institutionalism and Economic Analysis

More or less coinciding with Coase's acceptance of the the Nobel Prize, came Herbert Simon's severe criticism of the neo-institutional apparatus which, in his brutal definition, was no more than the cottage industry of neoclassical economics (Simon 1991). This judgement by the economist to whom we owe the concept of limited rationality, would suggest one should be cautious in drawing conclusions from the work done on neo-institutionalism during the last thirty years. It is said that the person who discovered irrational numbers was condemned by the pythagoreans to throw himself into the sea in order to spare humanity his abominable discovery. When all is said and done, Simon's considerations, however acerbic they may be, are similar to those Hicks made many decades before about the modern theory of the commercial enterprise.[3]

A good article on the neo-institutional approach was written recently by the agrarian economist M. de Benedictis. De Benedictis emphasises the analytical relevance of this conceptual branch, which he considers closer to Marxist or structuralist thinking than to neoclassical thought. An example being the fundamental importance given in this type of analysis to the endowment of resources, which allows subjects to participate in the allocation mechanism of an economic system, and also to determine its efficiency (de Benedictis 1993). In fact, Marxist analysis has always likened society to a hierarchical sphere of conflict, postulating an unseverable link between technology and language and between institutions and property

rights. Nevertheless, 'mutatis mutandi', it is possible to read the supremacy of hierarchy as it relates to the market, in the same way as economic institutions have supremacy over the individual. In the neo-institutionalist frame of mind, this is a reminder of the corporative ghost that wandered through Europe from the 1920s to the 1940s.

Despite the macroeconomic extensions which can be provided by this neo-institutionalist concept, it is worth remembering that Coase constantly ties the transaction cost to the industrial organization in order to bring the theory of transaction cost into a microeconomic sphere. This attitude, which might possibly be defined as understatement is justifiable, given the dearth of analysis in today's thinking.

There is nothing new in affirming that the dominant philosophy of complexity, which is today very much in vogue, offers a way of hiding the present tendency of the sciences to explore the particular rather than the general. Just this year Jacques Darrida in his 'Spectres de Marx' decried the death of history and called out for a return to Marx. The collapse of Adam Smith's dream of finding the universal rules that sustain the economy is analogous and parallel to Newton's mechanical theories. As far as economics is concerned, the crisis in neoclassical orthodoxy is reflected in the increased importance given to microeconomics at the expense of macroeconomics.

What does the theory of transaction cost contribute to the new interest in the microeconomic sphere? To answer this question a premise is necessary. The renewed study of the forms present in the market which has led to a progressive abandonment of neoclassicism, has its origins in applied study of industrial economy. This has been directed, by definition, toward the possibility of finding an explanation for realistic behaviour within companies which could not be explained by traditional market structures. In 1982, Schmalensee used the term 'new industrial economy' to underline the transfer of this branch of economics from a vision known as 'structuralist' to one based on the use of the models and instruments of microeconomy which offered much richer implications. As Jacquemin says, the new course is special in that rather than looking for a model applicable to the greatest number of sectors (as was the case with the neoclassicists), one now tries to identify a series of models. From these one will eventually choose the one most appropriate for interpretting a specific market. In addition to identifying itself with this type of eclectic monism, the new industrial economics is characterized by its constant use of the concept of organization.

The progress made in introducing organization to the study of commercial enterprise is firmly linked to the birth and the consolidation of neo-institutionalist thinking. A good way of illustrating the progress made in the study of commercial enterprise from the point of view of transaction cost, has been worked out by Jacquemin (see Figure 2 in this chapter and Jacquemin 1987).

Figure 2 Areas of Study in Industrial Economics

Type / Level	Efficiency (E)	Strategy (S)
Production (P)	Production efficiency (EP)	Production strategy (SP)
Organization (O)	Organizational efficiency (EO)	Organizational strategy (SO)

If one analyses studies of the new industrial economy, one notices that the reasons given for the survival of large companies are consistently formulated in terms of the search for efficiency (minimizing of costs) and strategic employment (modification of the real or potential working environment of the competition). For a long time these factors were applied using production levels. With the introduction of the notion of market use, it has become possible to make use of the concept of organizational analysis.

Having introduced this last concept, Jacquemin believes that the way is now open for analyzing the existence, importance and potential survival of commercial enterprises. These studies are made possible by factoring in transaction costs, thereby permitting both the analysis of production and the analysis of organization. A cross reference can then be made between these factors and those of efficiency and strategy: that is to say the analysis of all sectors of the 2x2 matrix in Figure 2.

Among the four factors under consideration in Figure 2, SO can be regarded as the missing link in the modern theory of commercial enterprise. It is very probable that the neo-institutional concept will eventually lead to important results in this field. It is also probable that concepts such as that of the cycle of innovation mentioned above, will be integrated into the picture. A few of the models that can be integrated in the neo-institutional concept, given a particular configuration of property rights, have tried to redefine the function of production, assuming that the organization is a homogeneous endogenous variable (Jensen-Meckiling 1979). This work, as yet incomplete, underlines the great importance of neo-institutional analysis.

Neo-Institutionalism and Agrarian Economics

Given their unique characteristics, the neo-institutional approach represents one of the more important developments in the study of both the agrarian commercial enterprise and the agrarian economy. For example, what de Benedictis calls the 'Berkeley school of neo-institutionalism', has recently produced work which has succeeded in overcoming all incon-

veniences tied to the concept of the farmer as defined by Schultz and, more recently, Scott. One of the representatives of this school, Pranah Bardhan, has recently published a book which testifies to the progress made in the quality of work done on family businesses over the last decade (Bardhan 1989). Other interesting studies are those searching for a neo-institutional matrix following the lines of so-called 'Marxism of Rational choice' (de Benedictis 1993).

Another interesting concept that seems destined to develop from the momentum being achieved by neo-institutionalism emerges from the research being carried out into the effects of the organizational dominance to which agriculture is subjected because of its progressive openness to the market. CAMAR research falls within this approach which can be defined as being essentially a revision of the neoclassical concept of the declining importance of agriculture.[4]

Many years ago, in a pioneering study, Benvenuti formulated the TATE (Technological Administrative Task Environment) theory. He asserted that the institutions with which agriculture has to deal, exert influence through the processes of 'institutionalization' and 'incorporation'. Through those processes external institutions impose decisional dependence on farm enterprises (Benvenuti 1974, 1982). The effect of these pressures, as van der Ploeg suggests, is that the modernization of agriculture translates into a sort of obligation on the part of an agricultural enterprise to externalize its decisions and reproduction in response to an expanding process of organizational dependence (van der Ploeg 1990).

The first studies to empirically verify the significance of TATE and the ways in which it operates in agriculture have provided extremely interesting results. For example, a generalized analytical model of the evolution of agricultural enterprise tends to associate the modernization of agriculture with the proletarization of agricultural enterprises. According to van der Ploeg, however, modernization is essentially a process of specialization which has a disintegrating effect, not only technically but also on the decision-making process within agricultural companies. Referring to those cases, such as cattle raising firms, which defy the traditions that rule our perception of agricultural companies, van der Ploeg highlights the essential character of these companies not so much as the proletarinization of the endeavour, but its disintegration. The disintegrative effect forces companies to behave in a 'hit and run' fashion and as a result they loose strategic orientation becoming technical units of production governed from outside (van der Ploeg 1986, 1990). The empirical conclusions arrived at can be formalized into a neo-institutional form with interesting results (Saccomandi 1991 pp. 499+). These considerations can also be enlarged to include an analysis of local development as in the CAMAR research, giving rise to equally important results.

In a completely different area, but relative to the problem at hand, the econometric model – founded on the theory of cointegration – has pro-

vided the basis for an efficiency analysis and the study of organizations in the market (Palaskas 1992; Palaskas and Harris 1991). A look at the cereal industry allows us to investigate the concept of hierarchy in the open agricultural market, as in the Commodities Exchange. We can conclude that the community pricing system can, once the necessary specifications are made, consider itself economically efficient. There is also the possibility of a verification of the 'organizational innovation cycle' type solutions (Martino 1993) in the agricultural production market.

The implications of these analyses are very strong partly because they tend to emphasize the existence of institutionalization even in markets which have relatively little involvement with the processes of authorization and allocation.

Notes

1 Williamson argues that in choosing a particular organizational solution, one needs to keep in mind the difference between specific resources and polyvalent ones: the first are characterized by a low rate of renewal whereas the second have a rapid rate of renewal. For this reason, the first have a high transaction cost and the second a low cost.
Williamson argues the following. If S_G equals the degree of specificity of resources, it is possible to define two functions:
(1') $C_{OC}=f(S_G)$
(2') $C_U=g(S_G)$
So that for S_G diminishing to zero $C_{OC}<C_U$ and $f(S_G)<g'(S_G)$.
From (1') and (2') we can derive the following function:
(3')$G=f(S_G)-g(S_G)$
which measures the price differential between internal bureaucratic costs and the cost of market use. From the function (3'):
(4')$C_P=h(S_G)$
which differentiates acquisition costs and production cost.
Saying G-Cp=0 it is possible to determine the specific level g beyond which the enterprise is facilitated in internalizing production (Williamson 1975, 1981).

2 Limited rationality as defined by Simon is used by Williamson; that is behaviour 'intentionally but only limitedly rational'.

3 In *Price and Capital* the renowned economist pointed out that it is as useless an exercise to call into question the basic theoretical assumptions of neoclassical economics as to question the basic premises of mathematical theorems.

4 The author refers here to the research on endogenous development carried out in the context of the CAMAR programme of the EC/DG VI (eds).

2 On the Impact of Endogenous Development in Agriculture

Jan Douwe van der Ploeg and Vito Saccomandi

Endogenous development patterns are based mainly, but not exclusively, on locally available resources,[1] making full use of the ecology, labour force and knowledge of an area as well as those patterns which have developed locally to link production and consumption. Endogenous development can revitalize and provide a new dynamic to local resources that might otherwise become superfluous.[2] Endogenous development emerges as a 'self-oriented' process of growth and a relatively large part of the total value generated by this type of development is re-allocated in the region itself. The close dependency of endogenous development on local resources implies that this type of development can have a positive impact on local interests and perspectives. This potential is, however, dependent on a series of factors, which include the specific linkages between the locality and more global constellations such as markets and policy, for example.[3]

Trends within technology and the economy during recent years have caused agriculture to shift away from a reliance on local resources. Local eco-systems have lost their significance as the bases for local styles of farming and a similar process can be traced in the way locally-developed techniques, experience and knowledge of how to convert the resources of an area into (locally-specific) end products has gradually been lost. Simultaneously, a set of localized, albeit interdependent markets have been replaced by a generalized market at the European level. Policy-arrangements have been affected in the same way as the development of technologies.[4] Perhaps even more important, however, has been the wide-spread 'cultural offensive'[5] that made 'vanguard farming' appear to be a normative model which could be used to judge, to hierarchize *and to reorganize* the impressive heterogeneity of European farming.

Thus, agricultural development processes created a wide range of *disconnections* between farming as practice on the one hand and the locality and its resources on the other. A more general description and analysis of this phenomena can be found in van der Ploeg 1992b and Saccomandi 1991. At the same time it should be stressed that these processes and the consequent disconnections did not occur with the same intensity everywhere. In Europe, the degree to which agriculture is *resource-dependent*[6]

varies considerably and many variations can be found within the agricultural regions themselves. In this way new *styles of farming* have been emerging, each representing specific positions vis-à-vis the markets and technology depending on how external resources have been mobilized and the degree of dependence or independence on local knowledge and skills.[7] The relevance of this type of hetereogeneity has been highlighted in many contributions to the issues of sustainability (Lowe, Murdoch and Ward 1992), agro-ecological farming (Altieri 1987 and 1991; Vereyken 1990; Spiertz and Vereyken 1993; Goewie 1993) and developmental perspectives (Whatmore 1993; van der Ploeg 1993).

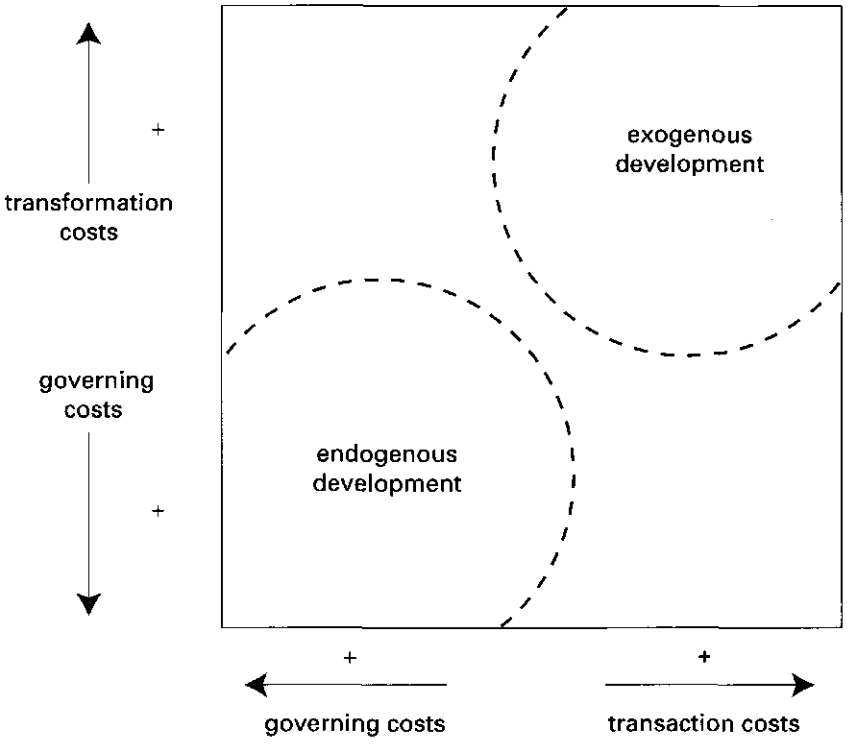
Confronted with the now dominant types of exogenous development, empirical forms of endogenous development cannot be reduced to simple remnants of the past or to residuals that are likely to disappear soon. In the first place it has to be recognized that in endogenous development there is as much dynamism and adaptation as in exogenous development patterns. The crucial point here being that the specific dynamics of the former differ significantly from those of the latter.[8] In the second place it is clear that endogenous development patterns are as much characterized by the dominant tendencies of markets and technological development as exogenous developments. However, whilst for exogenous development the *internalization* of new technological models and new market tendencies are the predominant characteristics, in endogenous development *distantiation* and active *re-construction* are the features which characterize its relations with markets and the supply of new technologies. Thirdly, there is the increasingly important fact that endogenous development is better able to respond to new ecological challenges than most exogenous development patterns.[9]

In the fourth place we suggest another, possibly very important difference between endogenous and exogenous development patterns namely that the interrelations that characterize transaction costs, transformation costs and management costs[10] are quite different in endogenous development from those in exogenous development. In theoretical terms the agricultural process of production consists of the mobilization of necessary resources and the interrelated conversion of these resources into the required values (see the discussion in van der Ploeg 1991). Both dimensions allow for a wide range of alternative solutions. The mobilization of resources might involve the reproduction of these resources through the process of production itself.[11] It is also possible, however, that most or nearly all of the resources required are mobilized through the market.[12] Consequently, the relationship between 'management costs' and 'transaction costs' will change. The same is true as far as the conversion of resources into the desired values is concerned. This conversion can be essentially 'skill-dependent' (we are paraphrasing here the concepts introduced by Bray 1986) or more 'technology-dependent'.[13] Again a richly chequered diversity can be encountered along this dimension, partly

because 'scientification' has only had limited success in agriculture (see, for example, Benvenuti 1988 and 1992). With the changes along this dimension the balance between management costs and transformation costs emerges as a crucial factor with regard to the changes along this dimension.

The general analytical scheme as it emerges here is represented in Figure 1. This figure graphically illustrates our main hypothesis, which is that *exogenous development is generally characterized by comparatively high levels of transaction- and transformation costs*[14], *whereas endogenous development, on the contrary, involves very low levels for the cost-categories concerned. Management costs, however, are comparatively high in endogenous development.* In this hypothesis one encounters the potentially 'self-oriented nature' of endogenous development[15] and the mystery of why 'less developed types of agriculture' might compete with 'more fully developed types' is unravelled: it is the balance between transaction- and transformation costs on the one hand and management costs on the other which turns out to be decisive.[16]

Figure 1 Schematic Representation of Costs Involved in Exogenous and Endogenous Development



Of course it is impossible to make an *a-priori* assessment of such an interrelation. This balance will not only be highly dependent on conjunctural changes but it is also sensitive to the many interventions of policy-making and agribusiness institutions.[17]

In previous research[18] it has been illustrated that within the overwhelming heterogeneity of European agriculture, specific patterns of endogenous development can be discerned. It has also been indicated that this identification reveals new potentials for (continued) endogenous development as well as specific methods which can be used to strengthen endogenous development patterns.

Is it possible to assess the impact of these endogenous development trends? We believe so. Before entering into the more general aspects of this question we will first present some case studies drawn from several different European regions. We do not aim at any methodological consistency with these illustrations, rather we wish to show the different settings and hence the different methods that can be used to specify more precisely the impact of endogenous development.

Frisia

Within dairy farming in Frisia, a province in the north of the Netherlands, several styles of farming can be distinguished. Each represents a specific structuration of the farm processes of production and development. For the sake of brevity[19] we will limit our discussion to two farming styles, first that of the 'economical farmers' and second the style of the 'huge farmers' (see also Figure 2, where the relative position of both styles vis-à-vis markets and technology is represented).[20]

Since these two styles contain a specific structuration of the process of production and therefore a different resource base, another composition of costs and their own particular gross margin, it is possible to outline the macro-consequences of each style under the assumption that the total provincial produce[21] would be produced by just one structuration of the production process. The results are summarized in Table 1[22]. This table clearly shows that a generalization of the more endogenous pattern, i.e. the one of the economical farmers, would not only allow for a considerably larger number of farms than would be the case if the exogenous approach were more generalized – it also shows that total rural employment would be significantly higher. This is not due to what has been called the 'distribution of poverty', but 'simply' to the different way in which farming is organized. Low external input agriculture combined with the relatively high level of technical efficiency of the 'economical farmers' produces gross margin levels (per hectare, per cow) that, even with lower total volume, allow for a higher labour input at equal levels of remuneration.

Figure 2 Markets and Technology as They Constitute Room for Manoeuvre

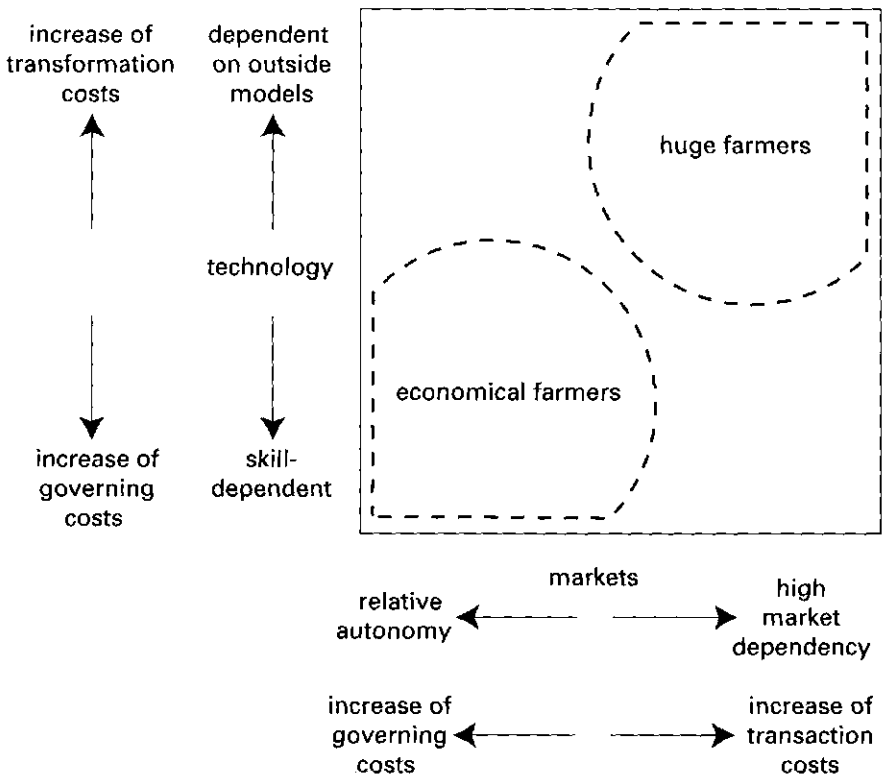


Table 1 Hypothetical Macro-consequences of Huge Farmer's Style and Economical Farmer's Style

	Huge farmers	Economical farmers
1 Quantity of milk, in litres, needed to realize an income of NLG 50,000 per labour unit	296,000	212,000
2 Number of farms needed to reach the Frisian quotum	6,000	8,800
3 Total regional agrarian income in millions of NLG	323	440
4 Total nitrogen losses for the whole region, in million kgs.	75.2	56.6

The practice of farming is *not* to be understood as a more or less uniliniar derivation of the 'logic' of the market or as a straightforward application of external technological designs. Markets and technology create a specific *room for manoeuvre* that allows for differential positions, such as those adopted by the economical and the huge farmers, for example. Here it is the *interaction* between the emerging styles and the outside interests and agencies, including policy, agro-industry and research and development which appears to be decisive for the economic validity of each of these styles.

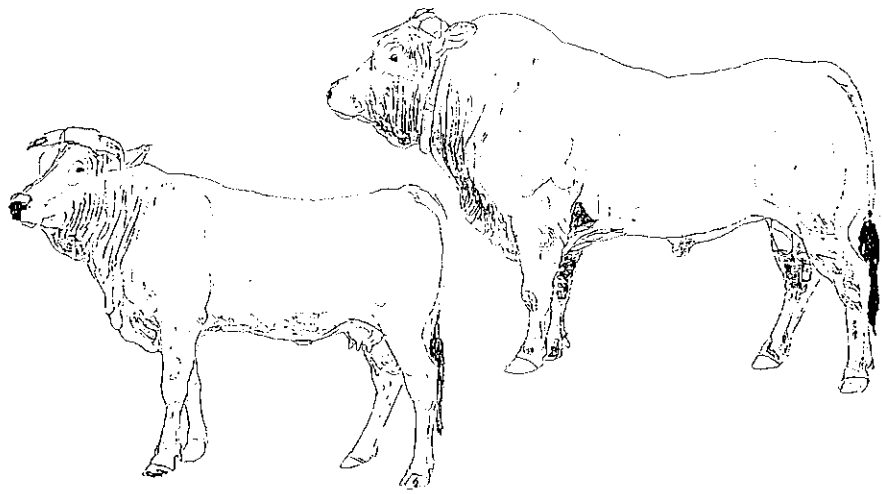
It might seem rather strange that practices, which not so long ago were classified as being redundant and perhaps too small in scale, are now offering agriculture interesting routes into the future. Nevertheless, as new scenario-studies show, it is in the coming decades that low external input practices involving high efficiency levels (due to the quantity and quality of labour) will score best both in terms of economic and ecological sustainability. For a variety of reasons, these practices are embedded in some of today's farming styles. Other farming styles may find themselves facing a painful process of transformation.

On the methodological level one cannot but indicate that the surprise this may generate comes from the fact that conventional analysis has neglected the interrelations between markets and technology, and the farming enterprises for far too long. In line with the neo-classical paradigm, the farming enterprise was represented as being at the 'meeting point' of market relations (Saccomandi 1991 and 1990). Hence, although changes in the *balance* between management costs on the one hand and transaction- and transformation costs on the other, might have strategic consequences for the farming styles discussed here, such changes and consequences remained largely concealed from traditional economists and sociologists (de Benedictis 1993).

In more concrete terms, the data from Frisia clearly show that those farming styles that incorporate a particular balance favouring internal management costs, whilst reducing transformation and transactional costs prove to be feasible both from a micro-economic and a macro-economic point of view. For those agricultural areas confronted by increasing ecological and economic constraints, these particular styles turn out to be the most viable, and at the level of regional economy it is this type of farming that results in the most positive multiplier effect.

It can be argued that the relatively endogenous type of farm development demonstrated by the 'economical farmers' style emerges, at least under the current conditions, as highly promising. In Table 1, it is illustrated that the practice of the 'economical farmers' has a positive impact. This relatively positive score could become even more important if environmental policies become more restrictive or the overall market situation becomes less favourable .

Figure 3 The Distinctive Characteristics fo the Chianina Breed



Andalusia

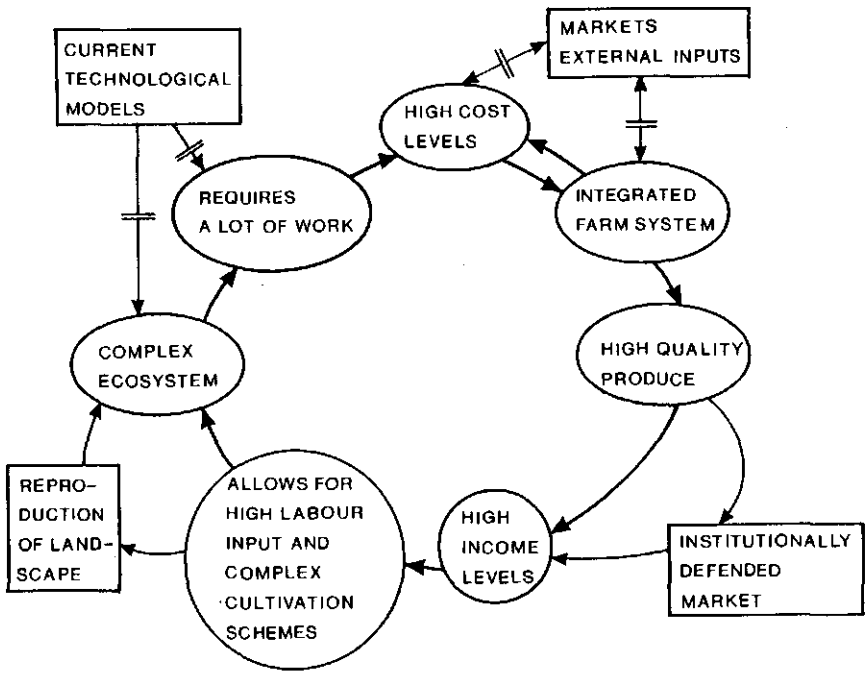
Preliminary calculations show that Gross Production Value (GPV) per year per hectare is twice as high in rural cooperatives practising ecological farming than in those run along industrial farming lines. More important, in the ecological cooperatives gross margin constitutes about 67 percent of GPV, whilst in the industrialized farming enterprises it is no more than 40 percent. This implies that the potential effect of ecological agriculture on rural employment will be considerably higher. As a matter of fact, some ecological cooperatives realize employment levels above one labour unit per hectare per year, whilst industrialized farming seldom goes beyond the 0.20 per hectare per year and normally oscillates around 0.05 labour units per hectare per year. These facts of course cannot be taken out of context and should not ignore the fact that the situation is dynamic and subject to abrupt changes and alterations. It would also be impossible to isolate the above from the fact that cooperatives still depend to a considerable degree of the 'paro', the Spanish payments to unemployed rural labourers. However, given the great need for new rural employment opportunities, ecological farming in rural cooperatives emerges as an interesting endogenous development possibility.

Umbria

One of the local styles of farming found in Umbria has developed around the production of Chianina meat (see Figure 3). For a variety of reasons the production of Chianina meat is dependent on feed and fodder grown on the farm itself (see Ventura and van der Meulen 1991 and 1992).

Animals are also bred on the farm. 'Self-sufficiency' is therefore relatively high. Application of new technological models, irrespective of type,[23] is blocked to some degree by the type of animal concerned. Hence the production of Chianina meat is characterized by low transaction- and transformation costs. Labour input is very high and management costs are also high. This local style is integrated in specific structures that link it to the consumption market (see also van der Meulen and Ventura). The short links imply a somewhat higher price at farm level as does the high quality of the meat and its genuineness.[24] In turn these higher prices allow for a higher labour input and consequently for the use and reproduction of the mountain ecology typical of Umbria (see also Figure 4).

Figure 4 Structure of Local Control, Autonomy and Redistribution of Income



One may wonder how the impact of this particular, endogenous style of farming can be assessed. In the calculations elaborated by van der Meulen, included in the Appendex to this chapter, an attempt is made to quantify the impact. The argument is as follows: to deliver a quantity of, say, 1000 fattened bullocks to the consumer market, 3.3 large-scale industrial feedlots[25] *or* 100 small-scale Chianina breeding farms are required.[26] The system of industrialized feed-lots create productive employment for 11.55 full-time labour units, producing a gross margin of 83,160 ECUs (7200 ECU per unit of labour force). Within the Chianina system, however,

producing 1000 bullocks would create employment for 150 people and generate a gross margin of 375,000 ECUs (2,500 ECU per person).[27] If the number of animals per Chianina farm were higher,[28] then income levels would be equal, although employment would be lower.[29] Taking into account other benefits such as the reproduction of landscapes, the revitalization of mountain areas, the maintenance of a local breed and the supply of locally known and historically-rooted products such as the '*bistecca fiorentina*', for example, the Chianina style of breeding stands out as very positive.[30]

Van der Meulen makes an additional step in his calculations. Suppose that *all* meat consumed in the Umbria region is produced in the region itself mainly through a style such as that outlined in Figure 4. At the moment this is rather an 'utopian thought' although Ventura and van der Meulen 1991 and 1992 outlined a well-elaborated chain of interventions that might stimulate such a development. As is shown in the appendix to this chapter, such a change would have considerable impact, including an increase in Gross Regional Product of about 4 percent! Positive ecological effects and the avoidance of the negative effects associated with industrialized cattle breeding as well as the multiplier effect on the rest of the regional economy have not been included in these calculations.

The potential to raise both employment and income generating capacity, is closely linked to the Chianina style of cattle breeding. Hence, the potential impact should be seen as quite substantial (see Appendix). The same is also true for the the actual impact. If the Chianina had disappeared from the regional scenery as was quite often suggested in the 1970s and 1980s, the empirical reality of the Umbrian countryside would be very different from what it actually is today.

By Way of Preliminary Conclusion

So far we have suggested particular ways of theoretically grounding the possible impact of endogenous development, and some technical approaches for the empirical assessment of such an impact. We are very well aware of the fact that our technical approaches in particular, as illustrated by our earlier examples, are still very limited. They consider the (potential) impact primarily in terms of employment, number of farms and income generating capacity at the level of primary production. We are sure that comparing adjacent regions (as suggested by Antonello and de Roest 1992) could, in particular situations, be a fairly good substitute for the approach suggested above. We also agree with Thomson (1992) who suggested the use of input-output (I/O) analysis for the empirical study of the impact of endogenous development. Techniques to assess social, cultural and political impacts are missing. This is also true as far as assessing another type of impact is concerned, that is, how can processes of endogenous development can 'auto-reproduce' themselves. Another important question concerns the cost-effectiveness of interventions that

build on existing resources, such as improving existing farmer-managed irrigation systems with the input of farmers' labour force and knowledge as opposed to introducing completely new schemes. One might also ask how the effectiveness of technology transfer that is limited to a small target group relates to the effectiveness and impact of more wide-spread programmes that reach larger groups of interested farmers. This is a question that is becoming increasingly important within the realm of integrated rural development programmes such as the PIM.[31]

It will be, we think, an important *theoretical* challenge to link some of the differences in impact to particular distributions of management-, transaction- and transformation costs. The more so since none of these three cost-categories are allocated exclusively in the farm enterprises as such. Their allocation is repeatedly based on the 'relevant whole', that is the specific circuit made up of particular styles of farming and networks for delivering transforming and distributing the end-products into which they are integrated. This is how particular 'agrarian districts' (in the Marshallian sense) are becoming crucially important to our analysis (see Iacoponi 1990).

On an empirical level of analysis, we are sure that it is not particularly difficult to assess a differential impact as far as endogenous and exogenous development patterns are concerned. The more so since a range of adequate methods have already been suggested (see Thomsom 1992, for example). The point is, however, to associate these potentially very important facts with an underlying rationale or explanation.

On the one hand it is clear that a comparative approach makes it possible to assess the actual and potential impact of endogenous development processes. Endogenous development is a *relational* concept. Its essence is situated in the contrast with exogenous development, hence, a *comparative approach* emerges as decisive. It is also clear that the analysis of the potential impact frequently results in a kind of 'working programme' or, as one could equally well argue, in a kind of 'political programme'. It is the analysis of the impact of endogenous development perspectives in particular that highlights its relevance and the many hindrances and obstacles involved. To put it bluntly, Why is it that in Frisia national policy favours the 'very large farmers' and the contained development pattern? Why is it that in Andalusia ecological farming and the cooperatives in particular receive hardly any support? Why is it that in Umbria styles other than those of the Chianina breeders receive more support? And, echoing the argument introduced earlier by Benvenuti, why are the styles of the huge farmers in Frisia, industrial farming in Andalusia and the feedlots in Umbria receiving far more attention in academic circles than others that contain promising endogenous development potentials?

APPENDIX

Some Calculations to Asses the Actual and Potential Impact of Chianina Breeding as Compared to Industrialized Breeding Techniques

The large profit the Umbrian economy can obtain from a reorganization of its beef producing sector will come first from:

A an increased local production of fattening bullocks to replace those imported from France;

B a higher beef production to counter imports from the Netherlands and other countries.

The question is not whether production must be augmented but how the increase in beef production can best be organized. For this a profound understanding of existing breeding practices is needed. Van der Ploeg and Long (1994) show an enormous diversity of breeding practices in Umbria. At the extremes, two opposing breeding strategies or styles can be observed: the small artisan farm and the large industrialized feedlot. These breeding styles work with completely different concepts as far as technological innovation, market relations, feeding and beef quality are concerned. This is expressed, among other things, in differing scores on technical parameters, as shown by the calculations presented below.

Some interesting conclusions can be drawn from the data.

- The difference in profit per bullock between the industrial feedlot and the artisan Chianina farm lies partly in a higher profit margin on fattening for the latter but most of all in the profit it draws from the production of its own up-breed, if done in the proper way. This immediately shows the feasibility of scenario a).
- Differences in labour income on the artisan farm and the industrial feedlot derive first and foremost from differences in scale, i.e. the number of animals per labour unit, and only then from differences in profit margin per fattening-bull.
- Nonetheless, the somewhat higher profit margin (excluding labour costs at 1993 prices) for artisan breeding methods becomes extremely relevant in times of market crisis. Indeed in 1990-1992 the profit margin in industrial breeding was slightly negative, turning scale advantages into a loss (actually beef prices were better, but the prices of imported bulls went up). In this way small differences in already narrow margins can mean the difference between going on or closing down. Another aspect of the competitiveness qua resistance of artisan breeding, is its relative independence of outside markets: interest on livestock-capital is considered to be a calculated cost not a real expense unlike industrial breeding, neither does it have to pay directly for most of the feed since this is produced on the farm.
- The survival chances for artisan breeders in Umbria are reinforced by their close relationship with local butchers, who are looking specifically for traditional quality beef. Industrial breeders, on the other hand, tend to lose their usual buyers as beef from abroad becomes cheaper and then get stuck in the 'traders' squeeze'.

Differential Cost Calculation Between Artisan and Industrial Beef Production

	Closed Chianina farm	Industrial feedlot
Labour units employed in stable and in fields	1.5	3.5
Fodder crops	2 ha corn 6 ha barley 3 ha lucerne	15 ha 'silo-maize'
Livestock	20 mother cows 3 heifers 10 fattening bulls	300 fattening bulls
Breed	Chianina (local)	Limousine&Charolaise
Dimension livestock	28.5 adult bovine units	240 units per lab. unit
Scale of breeding	19 units per labour unit	69 units p.p.
Initial live weight	250 kg (at 5.5 months)	250 kg (at 5 months)
Cost of a young bull	L. 1,210,000***	L. 1,500,000
Market price/kg	L. 6,500	L. 6,000
Market value	L. 1,625,000	L. 1,500,000
Daily weight increment	1.2 kg	1.05 kg
Weight after 11 months	645 kg	600 kg (=final weight)
Market price/kg	L. 4,600	L. 4,200**
Market value	L. 2,970,000	L. 2,520,000
Weight at 21 months	800 kg (=final weight)	
Market price	L. 4,300	
Market value	L. 3,520,000	
Dressing percentage	63%	63%
Slaughtered weight	504 kg	378 kg
Net dressing percentage	70%	72%
Weight of beef	353 kg	378 * 74% = 280 kg
Feed units/kg growth*	8.5 FU	10.5 FU
Feed self-sufficiency	80%	50%
Cost bought feed	L. 450/FE	L. 400/FE
Cost own fodder	L. 300/FE	L. 200/FE (silo-maize)
Mean cost of feed	L. 330/FE	L. 300/FE
Feedings costs/kg growth	L. 2,805	L. 3,150
Vet. costs/kg growth	L. 100	L. 100
Interest on livestock	5%	5%
Mean value of bull	L. 2,572,500	L. 2,010,000
Fatting period	1.21 year	0.92 year
Interest costs per bull	L. 155,000	L. 89,000
idem/kg growth	L. 282	L. 254
Fixed costs/kg growth	L. 600	L. 300
Labour revenue/kg growth	L. 4,300 (-2805-282-100-600 = 513);	L. 4,200(-3150-254-100-300 = 396);
Idem per bull per year	L. 241,000 (531 * 550 kg: 1.21 yr)	L. 151,000 (396 * 350:0,92 yr)
Idem incl. profit breeding	L. 656,000 (241,000+415,000)	L. 151,000
Idem for all bulls	L. 6,560,000 (10 * 656,000)	L. 45,300,000 (300 * 151,000)
Idem per labour unit	L. 4,500 = 2500 ECU****	L. 12,940,000=7,200 ECU

* The feed-conversion factors are calculated from our survey material (CESAR 1991) and from a study issued by the INEA-Umbria (1991). Feed conversion is rather high because this decreases as animals grow older. One feed unit (FE) equals 1 kg of barley.

** 90 percent of the animals are sold to regional butchers at a price of L.4,300 and the remaining 10 percent (left-over animals) to traders at L.3,500, making an average of L.4,200.

*** L.350,000 (5.5 month fodder costs per bull etc.) plus L.1,600,000 (maintenance 2 mother cows) plus 150,000 (maintenance 0.3 heifer for substitution) minus L.250,000 (sale 0.7 female calf) minus L.540,000 (sale 0.3 dismissed cow) plus L.100,000 (2x premium EC for mother cows). Two mother cows are needed to produce one male calf a year. Maintenance costs of a Chianina cow varies from 0.5 to 1.5 million lire (INEA 1991); presuming an efficiently led farm, costs are set at 0.8 million.

**** This is the difference between the market value of a young Chianina bull (L.1,6250,000) and its production costs (L.1,210,000 ; see footnote 1).

N.B.
The same Chianina farm with three times as many animals (100 ABU instead of 28.5) and 3.5 labour units would generate as much labour income as the industrial feedlot with its 300 animals (240 ABU). In other words: if Umbria would opt for traditional Chianina breeding in an upscaled form (ceteris paribus) instead of the industrialized version, the same number of beef cattle can be kept with twice as many persons employed. This is due partly to better technical results in the fattening phase, but most of all to the relatively high profits in the up-breeding phase.

Returning to the question of how future beef production in Umbria is to be reorganized we note that:

1 The last two arguments indicate that artisanal breeding, based on self-produced fodder and own up-breed, brings greater stability to the Umbrian economy and thus to less conjunctural destruction of capital than industrial breeding.
2 Moreover it is clear that artisanal breeding has the best chance of absorbing the increased regional production of fattening-bulls as suggested under a), just because it already does so. Eventually a specialization between ranches in the mountains and feedlots on the plains can take place. A general up-scaling of breeding is also needed. Both are, in fact, already in progress.
3 An increase in artisanal breeding will imply an increase in Chianina meat production and therefore a strengthening of the image of Umbria as a high-quality food producing region. If Chianina beef or beef produced with traditional fodder, becomes more appreciated and can fetch a higher price, a third scenario appears: increased price differentiation, stimulated ultimately by local quality hall-marks. This in turn will automatically support scenario's a) and b).

Putting the first two scenario's into economic terms:
Scenario a) means an extra production of some 35,000 young 250 kg bulls = 57 milliard lire = 31.7 million ECU. On top of this comes a production of 30,000 female calves plus 5,000 cutted mother cows, worth 10.5 + 9.0 milliard lire = 10.8 million ECU. All together about 42.5 million ECU, which can be translated in 2100 jobs divided over 700 substantial farms (100 cows plus 50 bullocks), which could be placed in the under-exploited marginal areas of Umbria. Should the planned farms be only half as large, employment will be about 50 percent higher, but

income would also be proportionately lower as well. Scenario b) means that, at the present level of regional self-sufficiency of 50 percent, an extra yearly beef production worth L.12,000 * 22 kg * 800,000 people = 210 milliard lire = 117 million ECU (25,000,000 heavy Chianina bulls). This would imply a doubling of employment in beef-cattle breeding (farm structure remaining unchanged) and an increase in the Gross Regional Product Bruto Regional Product of about four percent including the contribution of slaughtering, processing and distribution. A small proportion of the extra beef will become available under scenario a) because of the higher production of female beef involved.

Positive effects on the natural environment when the choice is for closed and self-sufficient farms are not expressed here in monetary terms, but are nonetheless very evident. 'Silo-maize' monocropping, as practised by industrial feedlots on the plain, inflicts considerable damage on ground water quality through the washing-out of fertilizers and herbicides and in this way dramatically increases the costs of drinking-water supply.

Notes

1 Generalizing on the results of their inquiry into endogenous and exogenous development patterns in northern Portugal, Cristóvão, Oostindie and Pereira conclude that these two concepts 'cannot be defined by using opposing ideal types, where one is founded mainly or exclusively on so-called 'external' elements, and the other on 'internal' elements. Such a [...] framework would miss the basic point that development always entails an articulation of both 'internal' and 'external' elements' (1992:112). From this consideration they propose that 'endogenous development can be defined as the preponderance of internal, or local elements which combined into a coherent model, constitute the point of departure for the interpretation, evaluation and selection of the external elements to be integrated, so as to enhance, consolidate and/or strengthen the set of internal elements' (ibid:113). In this paper we will follow this approach. 'Endogenous development', therefore, has – for the time being – the status of a heuristic concept, because theoretical position is still rather problematic (see Portela, 1991: 45-62 and Slee, 1992: 47-60). Further on in this paper we will develop some considerations that might help to consolidate this theoretical position.

2 As documented for the case of the *baldio* ecosystem in Portugal (Cristóvão, Oostindie and Perreira 1992), the *dehesa* ecosystem in Spain (Acosta Naranjo 1992), the *wet-peatlands* ecosystem in the Netherlands (Roep and de Bruin 1991). The same goes for local resources such as specific breeds (see *Chianina* cattle as described by Ventura and van der Meulen 1991), for local knowledge as contained in cheese making in the *Parmigiano-Reggiano* area, for example (Antonello and de Roest 1992), in manuring in Barroso (Portela 1992), in the management of farmers' managed irrigation systems (Portela and van den Dries 1992), and in the production of new innovations (Osti 1991). As far as the potential of local labour force is concerned, see Guzman and Vadillo 1991 as well as Remmers 1991 and Avila Cano 1991.

3 See Chania seminar on 'Strengthening of Endogenous Development Patterns in European Agriculture', and particularly the contributions by Picchi (1992), Huillet (1992) and, for a more detailed discussion, Portela and van den Dries (1992) and Cristóvão, Oostindie and Perreira (1992).

4 In this respect Griliches' analysis (1957) still holds: once new technologies enter the market as commodities, it becomes increasingly improbable that additional research, aiming at an adaptation for specific circumstances, will be carried out. See for a recent analysis of technological development in dairy farming; van der Ploeg 1990a. He shows how technology from north-west Europe is transferred to the Mediterranean area. This transfer is not characterized by a re-design of technologies so as to fit it better for the particular conditions of the south. Rather it is supposed that these conditions will be 'rebuild' in conformity with the technological blueprints.

5 Expressed and sustained by a multitude of extension-type activities, but equally through several intervention programmes at state and EC level. Most farmers unions also encourage this process.

6 We refer here to dependency on local resources.

7 See van der Ploeg 1992a and 1993 as well as Saccomandi 1991, particularly his final chapter.

8 See in this respect the analysis of differential growth patterns in Umbria by van der Ploeg, Saccomandi and Roep 1990.

9 This is at least the impression that emerges from empirical studies of farming styles in the Netherlands (see, for example, Roep and Roex 1992). A critical discussion of this interrelation, focussing especially on the social struggle over what 'sustainability' is supposed to be and therefore stressing the open outcome of such a struggle, is to be found in Miele 1993.

10 In an exchange economy, all productive activities are oriented towards the conversion of basic resources or factors of production into final products, that are considered as such if and only if they can be the object of exchange. Whenever such an exchange requires a specific action or a specific 'instrument' in order to be effective, the exchange becomes a transaction. Every transaction is composed of three elements: the object of exchange, the subjects (or actors) effecting the exchange and the complex of rules and acts governing the exchange. The need to dispose of specific 'instruments' or capabilities for effecting exchange, is the origin of the so-called *transaction cost* (or 'the cost involved in the use of the market'), whilst the totality of rules and acts governing the exchange as such can be identified as the 'organizational structure of the transactions'. When an enterprise, instead of producing a particular good or service within its own enterprise (understood as particular institution), prefers a transaction in order to obtain the required good or service, it will be confronted with the price as such *plus* the transaction cost. When, however, the enterprise decides to produce the good or service in the 'institution' itself, then it will be confronted with a) the production cost (generated by the conversion or transformation of the factors of production into the required good or service) and b) additional costs related to the management of the more complex process of production – we will refer here to this type of cost by using the concept of *management costs*. Just one simple example to illustrate these concepts: in dairy-farming it is possible to rear calves and heifers in order to replace milking cows when they become unproductive. Apart from the direct and material costs involved in the 'internal' production of heifers, there will be several additional costs, such as the need to develop and maintain a good knowledge of cattle-breeding and selection, the need to find the required sires and the risk of mistakes. All these elements could be defined as *management costs*, since they are directly related to the need to run a more complex enterprise. It is also possible to buy the required heifers on the 'cattle market'. This also implies additional costs apart from the

monetary value of the animals bought. One has to establish good trading relations with traders, one has to calculate the risk that 'other farmers never sell their best animals' as well as the risk that diseases may be brought into ones own farm. Time must also be dedicate to transactions, including time to make sure that one is not cheated and so on. We refer to all these elements as *transaction costs*. *Transformation costs* (or 'adaption costs') are those costs involved in the reorganization of the farm enterprise according to new technological models. Apart from the investment as such, there is the risk that new models will not function well inmediately and the superfluity (or obsolence) of required skills, capabilities and infrastructures. We include all this in the concept of *transformation costs*. These transformation costs emerge every time the enterprise has to adapt its internal technological or organizational structures to new transaction modalities. Although we have changed the wording of the concepts a little, we are sure that the definitions are in line with neo-institutional analysis as proposed by Williamson 1975 and Saccomandi 1991.

11 These resources are partly derived from the surrounding ecosystem, thus they enter production as non-commoditized resources, as use-values (see for a more detailed analysis Toledo 1992). Socially regulated exchange might play an equally important role (for a theoretical discussion see Georgescu-Roegen 1969 and for some empirical illustrations of the still considerable importance of this phenomenon Ventura and van der Meulen 1992.

12 As illustrated in van der Ploeg 1990c.

13 Following Dosi (1988) we would argue that in the process of technological innovation the use of selected scientific and technological knowledge is always 'coupled with the use and development of specific and often partly private heuristics and capabilities' (op cit: 224). This is especially so since 'significant amounts of innovations and improvements originate through 'learning-by-doing' and 'learning-by-using''. Where Dosi consequently argues that 'innovative activities are strongly *selective, finalized* in rather precise directions often *cumulative* activities' (emphasis added by Dosi), the link with styles of farming becomes quite evident. Styles of farming contain particular 'sets of heuristics' and particular 'capabilities', that indeed 'finalize' both the selection, the particular integration as well as the further development of technical artefacts and bodies of knowledge. Hence, we get, as Dosi argues, 'firms producing things *in ways that are differentiated technically*' (our emphasis) from the ways applied in other firms. 'Given [their] highly differentiated nature, firms will [...] seek to improve and diversify their technology by searching in zones that enable them to use and build upon their existing technological base. [...] What the firm can hope to do technologically in the future is heavily constrained by what it has been capable of doing in the past' (op cit:225). The search process for technological changes is not likely to be one where all farm enterprises survey the whole stock of available knowledge before making their choices. Instead it is through the differentiated nature of this process of search, selection and adaptation that differences in farming styles are continuously reproduced. This has been documented, for example, in empirical research for the case of genetic improvement of dairy cattle (Groen *et al.* 1993 and van der Ploeg 1993a), for environmental innovations (Roep and Roex 1992) as well as for technical input/output relations in grassland production (van der Ploeg *et al.* forthcoming). Dosi also refers to the 'untraded interdependences between sectors, technologies and firms', from which 'technological complementarities, 'synergies' and flow[s] of stimuli and constraints which do no entirely correspond to commodity flows' emerge (op cit: 226). Farming styles relate in differentiated ways to the network of institutions engaged in R&D and extension. Some farming styles tend to a quick and integral 'internalization' of new technological models – the organization of the labour process becomes 'technology dependent'. In other styles, farmers tend to be much more selective, using their own organizational model as a 'heuristic device' for the selection

of adequate innovations and their own skills (or 'capabilities' as Dosi would say) as matrix guiding the specific adaptation. The organization of the labour process is, therefore, more 'skill-dependent' and so is the technology they use. These farmers also use circuits other than the official extension services for the exchange and communication of knowledge, experiences and innovations (as documented, for example, by Leeuwis in Roep *et al.* 1991). Hence, different interrelations emerge between farming styles and the dominant system for R&D and extension in agriculture. These different interrelations then are in no way neutral. Those farmers opting for a more 'skill-dependent' technology cannot rely as heavily on the institutionalized system for R&D and extension. The careful search, evaluation, selection, experimentation and communication for those technical solutions fitting into their particular mode of production, will undoubtly raise their management costs. The latter are externalized to a considerable degree in those farming styles leaning towards the more external production, evaluation and selection of innovations as well on external prescriptions of the 'best way to apply them'. Simultaneously, however, the *transformation costs* will, we assume, be much higher. Technological development as realized by today's agrarian sciences (and R&D institutions), frequently claims that innovations are 'superior' (see for a further discussion Oasa 1981) to existing practices. Consequently, the produced innovations often involve a *rupture* with existing farming practices, implying therefore a profound and far-reaching reorganization of farming, which implies both new risks and the obsolence of existing equipment, capabilities and knowledge – that is higher transformation costs.

14 Since new technologies frequently suppose an ongoing *externalization* of sub-tasks, in the farm labour process to outside institutions and agencies, the increases in transaction costs and transformation costs happen to coincide to an increasing degree (see van der Ploeg 1990c). Hence, exogenous development is generally characterized by high levels of both transaction and transformation costs.

15 That is management or governing costs generally concern the input of labour and locally available management and networks. Compensating these costs contributes, therefore, directly to local income and local investment capacities.

16 In Saccomandi 1991, this is discussed under the heading of the activation/disactivation of the rural enterprises. A stimulating discussion of the same phenomenonon on the level of 'agrarian districts' is to be found in Iacoponi 1990.

17 Transformation costs can be mediated through subsidies on interests, for instance, and be mediated through cooperative regulation.

18 See the proceedings of the Vila Real seminar 1991 and the Chania seminar in 1992.

19 The interested reader is referred to de Bruin *et al.* 1991, van der Ploeg *et al.* 1992, de Bruin 1993.

20 Economical farmers represent the relatively endogenous type, since their process of production relies heavily on locally available resources as well as on the skills as embodied in the labour force; these two elements are reflected in a specific cost-structure (low level of external inputs) and in high internal efficiency levels.

21 Which is fixed through the quota system: for the year in question it was 1.8 billion tons of milk for the whole of the province of Frisia.

22 Derived from van der Ploeg *et al.* 1992.

23 Whether it is the use of stimulants for growth, the shortening of the inter-calf period, or new models for stables.

24 Although one could also argue that the price difference is not enough to remunerate the extra labour input, it would nonetheless be very interesting to interpret the differences in terms of different transaction costs on the level of the circuit as a whole.

25 Normally using imported young animals from France and depending heavily on acquired feed and fodder.

26 Van der Meulen uses the average sizes of feedlots and of Chianina breeding farms here. However, it should be pointed out that there are also Chianina breeding farms that have considerably more cattle (sometimes up to 50 or 60 fattening bulls). The point, however, is that the labour input on Chianina farms is, comparatively speaking, much higher than that of the feedlots, partly becasue they usually reproduce their own cattle and grow most of their own feed and fodder. In addition Chianina animals need more care.

27 This is somewhat of an underestimation since interests and costs for feed have been calculated equally for the Chianina farms. In feedlots, on the other hand, the time-dimension of the fattening process can be shortened considerably. This is impossible for the Chianina.

28 The problem of course is that national and regional policies as well as applied research have long been oriented to the creation and stimulation of feedlots whilst the small Chianina farms have been neglected.

29 Roughly speaking, with 30 fattening bulls, income per unit of labour force could be the same but even here employment would still be 50 as compared to the 11.55 in the feed-lot system.

30 Although the same reasoning makes perfectly clear the kind of hindrances that block such a positive impact.

31 The IRFATA institute in Bologna have produced interesting evaluations on corrent PIM that seem to emphasise some of the tentative conclusions drawn here (IRFATA 1990).

3 Endogenous Development and the Agroindustrial District

Luciano Iacoponi, Gianluca Brunori and Michele Rovai[1]

Introduction

Endogenous development 'includes the local determination of development options, local control over the development process and a retention of the benefits of development within the locale' (Slee 1992). Moreover endogenous development is locally determined and respects local values, while exogenous development is externally determined and tends to trample over local values (Slee 1992).

Endogenous development is not exclusively based on local resources, neither is exogenous development the product of purely external elements. Both are a balance of internal and external elements. As far as exogenous development patterns are concerned, outside or external elements represent the conceptual model against which the utility of local resources is judged. However, in the case of endogenous development, local resources, combined and developed in a local farming style 'are a yardstick in the evaluation of the utility of external elements' (van der Ploeg 1992). External elements may be used in a local style of farming after their 'deconstruction' and 'recomposition', 'so as to guarantee the maximum fit with local conditions, perspectives and interests' (van der Ploeg 1992).

Endogenous development is a self-centred and conservative process of growth (Robertson 1990) which utilizes locally developed techniques, experience and knowledge regarding the conversion of locally available resources into locally-specific end products (van der Ploeg 1992). Both endogenous and exogenous development patterns are affected by dominant tendencies in the development of market and technology. Nevertheless, in the first case production processes are more 'skill-dependent' and in the second, more 'technology-dependent' (Saccomandi and van der Ploeg 1993).

The new, institutional, economic paradigm introduces the concepts of transaction and management costs, which are explanatory variables for the nature of the firm. These variables may explain the persistence of both 'skill-dependent' agricultural processes and endogenous paths of development. We may argue that transaction and transformation costs are

higher for the farmers who adopt exogenous development, whereas management costs are higher for the farmers who still follow endogenous development paths (Saccomandi and van der Ploeg 1993).

We are in agreement as far as the above-mentioned opinions regarding the nature and explanatory variables of endogenous development are concerned. In this paper, we will suggest some ideas for a better definition and a more complete theoretical framework for endogenous development. Our suggestions relate to four critical points. First, the definition of endogenous development is not confined to the farm level, that is farm-oriented endogenous development, but can also be defined at agroindustrial district level. This is the level of the local system formed by farms, agroindustries and farm suppliers, who constitute local, system-oriented endogenous development. Second, the choice between exogenous and endogenous development, whether farm-oriented or local system-oriented, must not only consider transaction and management costs but information costs as well. Third, the dimension of information, transaction and management costs depends on the nature of the production process and hence these costs are linked to the time evolution of the process and depend on the firm's adoption of routine or innovative processes. Here transformation costs do not appear as specific variables because of the increase of information, transaction and management costs when a routine process is substituted by an innovative one. Finally, farm local system and market are alternative space-time dimensions of choice where the farmer can build up the information needed for the introduction of innovations which, in turn, lead to a more satisfactory income, by means of 'satisfactory behaviour'.

In the next paragraph, we will illustrate the nature of an agroindustrial district and we will discuss our proposals for a more complete theoretical framework for endogenous development. After that, a review of the main questions will reveal the starting point for building economic space for local firms. At last, we will discuss the initial results of an enquiry into the commercial relations of different kinds of farmers in an agricultural district.

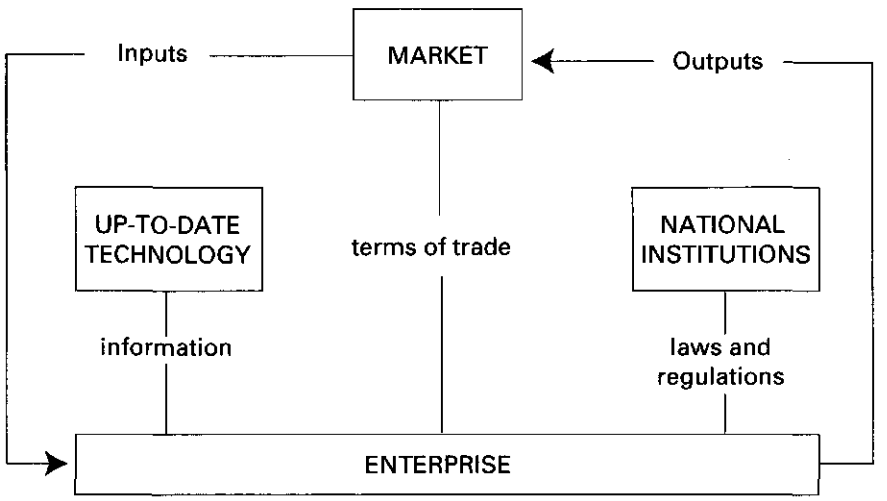
The Agroindustrial District: An Economic and Theoretical Framework for Endogenous Development Patterns

The New Institutional Economics Paradigm

The neo-classic economic model of enterprise will be discussed very briefly (see Figure 1). In this model the enterprise depends entirely on the information about trade and up-to-date technology produced by the scientific and technological system, that is information coming from the market. National institutions and information regarding laws and regulations also

appear in Figure 1, but in the neo-classic theory they are just a 'picture-frame'. In this theory the role of institutions is suppressed in favour of the view that 'firms have production functions and consumers utility functions'. The allocation of activity between alternative modes of organization is taken as given and optimizing is ubiquitous' (de Alessi 1983).

Figure 1 Enterprise Model According to Neo-Classical Economics Paradigm



This new, institutional, economic paradigm changes the three postulates of neoclassical economics: perfect knowledge, global rationality and profit maximization. On the grounds of perfect knowledge, the neo-classical theory assumes that using the market does not allow for costs, while the transactional approach (Coase 1937; Williamson 1985) suggests that using the market requires both 'ex-ante' and 'ex-post' transaction costs. The first are the costs of drafting, negotiating, and safeguarding agreements; the second include the maladaption costs incurred when transactions drift out of alignment, the haggling costs incurred if bilateral efforts are made to correct misalignments, the set-up and running costs associated with the governance structure to which disputes are referred and the bonding costs of ensuring secure commitments (Williamson 1985).

Revision of the neo-classical postulate of perfect knowledge can be approaches from two points of view. The first is represented by the conception of risk and uncertainty and by games theory that gives a rational solution to an entrepreneur's choices in uncertain conditions. This approach may be considered an important expansion of the neo-classical paradigm. The second is the conception of bounded rationality: an approach that could be seen as an attack directed at the heart of the neo-classical paradigm. This is merely simple and a quiet alteration of the

paradigm's protective belt, which is how many economists still regard the neo-institutional approach.

Bounded rationality substitutes global rationality when satisfactory economic behaviour is consistent with access to information and the possibility of computing the environments (Simon 1992). Williamson says that '*transaction cost economics characterize human nature as we known it by reference to bounded rationality and opportunism*' (Williamson 1985). Williamson also distinguishes three levels of rationality: 'the strong form contemplates maximization; bounded rationality is the semi-strong form and the weak form is organic rationality' (Williamson 1985). Williamson considers bounded rationality a semi-strong form because, as Simon says, '*economic actors are assumed as intendedly rational, but only limitedly so*' (Simon 1961). Yet we argue that Simon's conception of bounded rationality is really an organic conception: the socioeconomic institutions are the environments where economic men may have access to information and may show their computation ability. Every binomial 'organism environment' is subjected to evolution and thus also the binomial 'economic man-institution' may be studied by means of an economic evolutionary approach (Alchian 1950).

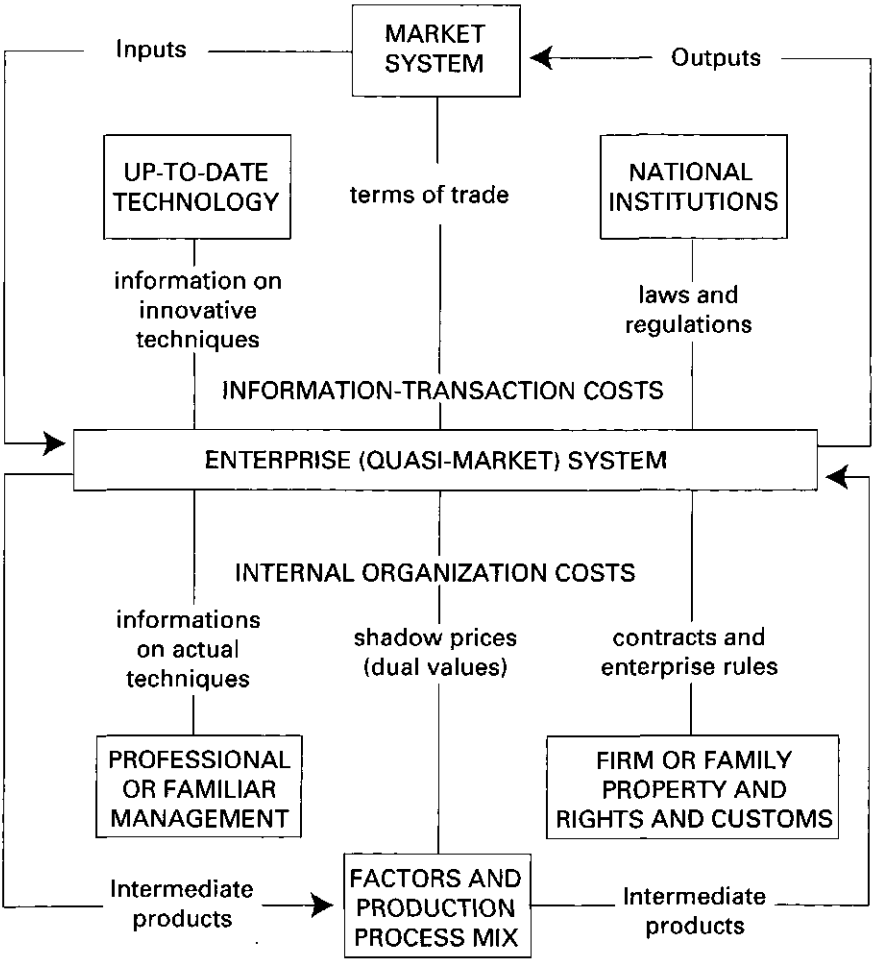
The managerial organization of an enterprise – that is the *firm*, according to the terminology used by Coase (Coase 1937), is the organism built by the entrepreneur to interact with the market system. The enterprise that can rely on a managerial organization is a *non-market system*, which allows entrepreneurs to provide much more satisfying solutions to problems than a single operator, faced with the market, could actually give (Figure 2). In other words, economic man may exist as a producer, if he has a 'brother' at his side: an administrative man (Simon 1992).

With Simon's behavioural theory we leave perfect knowledge, global rationality and profit maximizing conditions and we come to costly and limited information, bounded rationality and satisfactory conditions of income. The change is very profound because costly and limited information is not a condition that is achieved once and for all. It is a dynamic, moving interaction between managerial organization and market. Managerial organization produces and preserves costly self-governing information and the market (more precisely, market operators) produces and preserves costly external information. We call information and transaction costs (ITC) the costs of the assumption of external information related to up-to-date technology; market operators behaviour and internal organization costs (IOC), the costs of production and the cost of preservation of self-governing information and/or of watching firm operators' behaviour. Market and managerial organization are substitutes for each other and the substitution rate depends upon the relationship between internal organization costs and external information and transaction costs.

Internal organization costs are paid (or valued) according to managerial activities or functions which include information, the production process

mix, planning, single production process execution, technical and economic firm results, control and analysis and the supervision of contracts and transactions. In the big industries, top management is represented by the research and development division (R&D).

Figure 2 Enterprise Model According to New Institutional Economics Paradigm



In Figure 2, the organization of the farm enterprise is summarized: three main points about professional or family management, mix of factors and production process, and property rights and customs.

All the above-mentioned aspects of farm organization are closely linked. For many of the production processes, the entrepreneur must have many durable factors at his disposition and these depend on property rights and contracts (fixed capitals and hired labour) and/or upon family customs (variable capitals and family work). The management of many production

processes, the allocation of many durable factors (among many processes) and the regulation of many property rights, and/or of many contractual (formal) or non-contractual (informal) personal relations, are activities requiring specific capabilities that the entrepreneur (the farmer) may find in professional managers or in the professional aptitudes of members of his family. In other words we suggest a strong conceptual assumption: the entrepreneur is only able (or is requested) to make strategic choices i.e., long-term contracts, technological and economic course decisions and financial investments, while all other decisions – tactical choices – require the knowledge and capabilities of professional or family management.

We will comment on two main questions closely associated with endogenous development. The first concerns agricultural families who not only have the task of defining, an objective function, from a strategic point of view, but who must also preserve and transmit traditional managerial capabilities, through which information, planning, execution, control and analysis of firm activities can be conveyed to a family farm. In defining an objective function, their willingness to stay in the countryside to offer labour either to a family farm or to nearby or distant markets and their prospects for making investments and durable contracts are, from a lexicographic point of view, strong. Without these family capabilities, the will to stay in the countryside and the possibility of supplying work both inside and outside the farm, would not be enough to induce or preserve endogenous development.

The second question concerns the internal production of inputs. A farm's production of inputs and local industries' transformation of farm products – outputs for the farms but inputs for the whole local agribusiness system – strengthen endogenous development. Internal production of inputs requires managerial capabilities, either professional or more probably, family. The choice for the internal production of inputs, as opposed to purchasing the same inputs in the market is not only resolved by considering transactional costs, but also by considering production costs (Desmetz 1988). In turn, the internal production of inputs depends on the lowest transaction costs, on the one hand, and on the lowest production costs, that is upon the best technology, on the other. We may now affirm that the internal production of inputs depends, at farm level, upon a comparison between the external input variable costs – given purchased quantities per given market price – plus information and transaction costs, on the one hand, and the internal input production costs, plus internal organization costs, on the other. At a more general level, exogenous development does not depend merely on the technological capability of external enterprises to produce inputs at the lowest cost, but also on how possible it is for local enterprises to reach far market systems, where these external enterprises are working: Decentralization of input production therefore does not always lead to the substitution of the managerial organizations of the firm with the market system's co-ordination (terms

of trade co-ordination) but it may lead to the substitution of the managerial organization of a firm with managerial responsibility shared among a group of firms (Cozzi-Zamagni 1989).

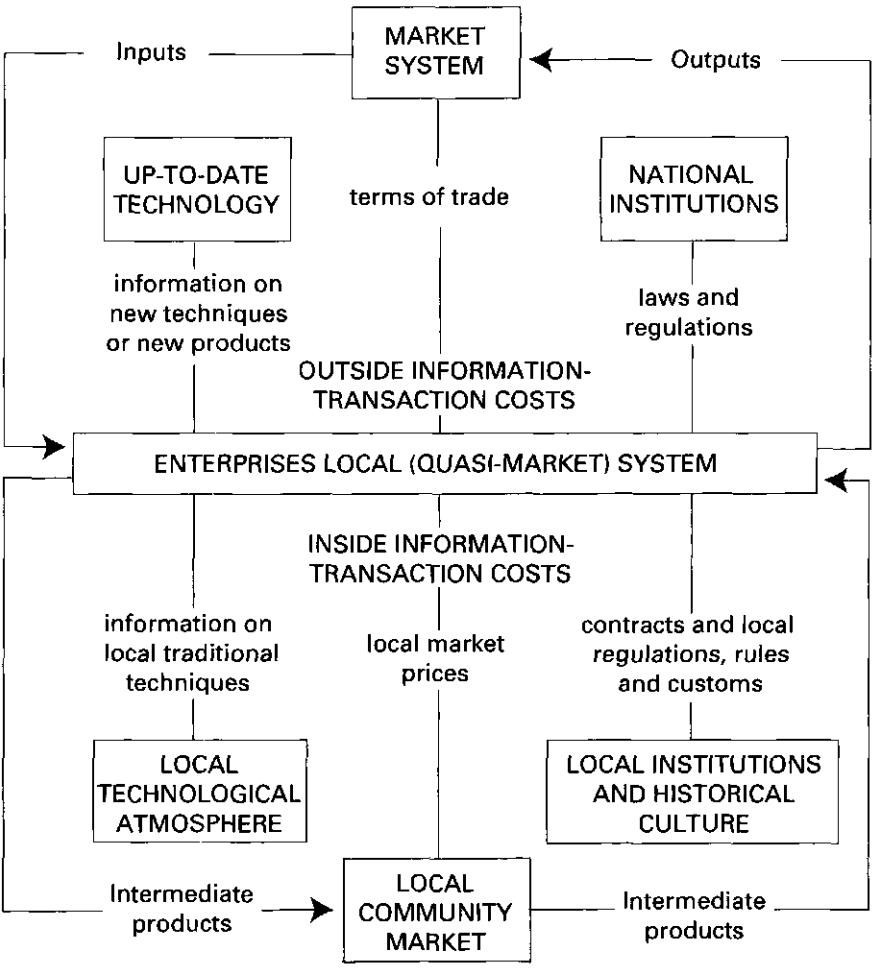
The Conceptualization of the Agroindustrial District

In Figure 3 we summarize a conceptual framework for the local system of firms or, more precisely, for the agroindustrial district. In economic literature, the term industrial district was first used by Marshall to describe a system of small industrial firms located in the same place and producing the same commodity – the Sheffield steel industry. The term industrial district has been re-discovered in recent years by industrial economists studying the local systems of small Italian industries, including the textile industrial district in Prato, Tuscany (Becattini 1987), and the ceramic industrial district in Sassuolo, Emilia (Giovannetti 1987). In farm economics, a similar term – agroindustrial district – is used with reference to the Parmesan cheese district (Bertolini 1988). More generally Iacoponi (Iacoponi 1990) refers to two kinds of districts. First, the agricultural district where a local system of enterprises is created by farms, and second farm supply firms such as the floriculture district in the Ligurian Riviera or the plant nursery district in Pistoia, Tuscany and the agroindustrial district where a local system of enterprises is formed by farms, farm supply firms and agroindustries that transform local agricultural products, for example the Parmesan cheese district or the Chianti wine district.

Every firm's local system is an intermediate form of managerial co-ordination between market and single firm organization and here we suggest the term *quasi-market system*. In a local system, the firms exchange semi-finished products with each other – the output of one firm is the input of another and here we can refer to a *collective production process*. At the beginning of the collective production process the market supplies the local system with external inputs; at the end of the collective production process the local system supplies the market with end outputs (Figure 3). During the collective production process, the local market is crossed by intermediate products which are exchanged between local firms, the transaction costs being very low and therefore the local system's market can be called *communitary market*. Technology employed in the collective production process is the same, or is very similar, in every firm. The local technology is well-known to everyone (no important information costs are incurred) because the local operators have been brought up 'since birth' in the local *technological atmosphere*. The relations between firms and persons in a local system are not only governed by national laws and regulations, but also by *local institutional regulations, rules and customs*, that are deeply rooted in the *local historical culture*. As Becattini says, the industrial district (and we think the agroindustrial-district too) is '..a local thickness of inter-industrial relations which is durable in time and forms

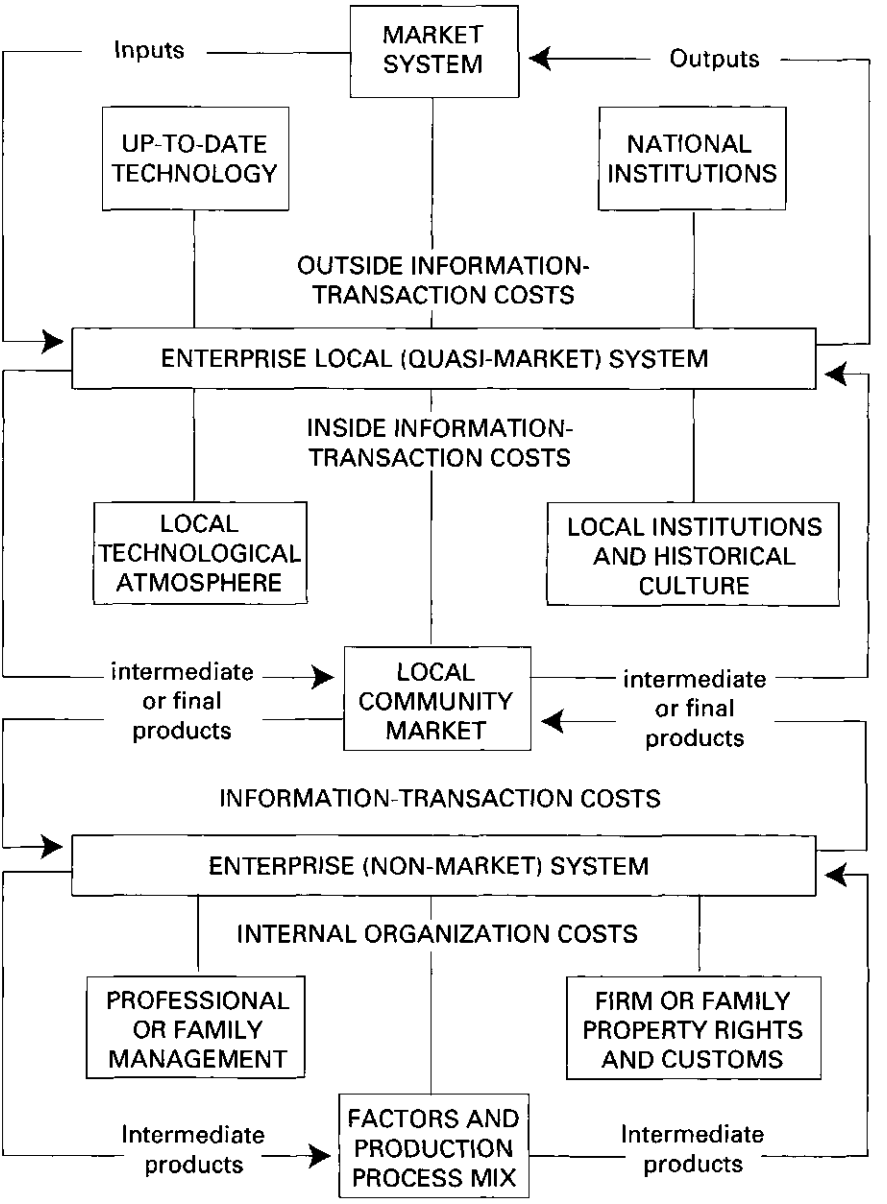
an inextricable network of positive and negative externalities (and) historical-cultural inheritances' (Becattini 1987).

Figure 3 Enterprise Local System Model According to New Institutional Economics Paradigm



There is a strict similarity in the form, but a deep difference in the substance of the market and quasi-market systems. Up-to-date technology is replaced or integrated by the local technological atmosphere and the outside market ('true' market) is replaced by or integrated into the local market. National institutions and laws are not replaced but reinforced and made specific by local institutions, regulations, commercial rules and life customs.

Figure 4 Integration Between Enterprise, Enterprise Local System and Market, According to New Institutional Economics Paradigm



Single firm organizations (non-market system) appear to be a traditional form of endogenous development. The local system of the firm (quasi-market system), even if deeply rooted in local history, appears to represent a more modern form of endogenous development that is a modern form

of collective managerial coordination. Figure 4 shows the dialectical interaction between exogenous development and the first and second form of endogenous development. In Figure 4 we see a firm (a farm-firm) that has chosen three options. First, farm-oriented endogenous development, based on professional or family management actors, production process mix and firm or family property rights; second, local system-oriented endogenous development based on the local technological atmosphere, local communitary market and local institutions, regulations, rules and customs and third, exogenous development, based on up-to-date technology, market terms of trade and national laws and regulations.

The entrepreneur's choice of one of the three options springs from a comparison of three kinds of costs: the organization costs of the firm; local system (inside) information and transaction costs; and market (outside) information and transaction cost. When we consider input production costs as well, we may formalize a micro-economic static model of choice of economic space, namely the space where it is convenient for the entrepreneur, in this case the farmer, to establish his firm's development paths (Figure 5, 6, 7, 8 and 9).

In Figure 5, the internal input, total costs' function is represented by the sum of the functions of fixed costs (FC), variable costs (VC) and internal organization costs (IOC). In Figure 6, the external input total costs function is represented by the sum of the functions of variable costs (quantities purchased per price) and information and transaction costs (ITC). In Figure 7, we see how the curve of total input total costs (TITC) changes according to the increase of purchased inputs. TITC function appears as a U-form curve.

Figure 8 shows how a local, system-oriented externalization of inputs may be preferred to a market-oriented externalization of inputs, if the lowest point of local system total input total costs curve (TITCls) is inferior to the lowest point of market total inputs total costs curve (TITCm).

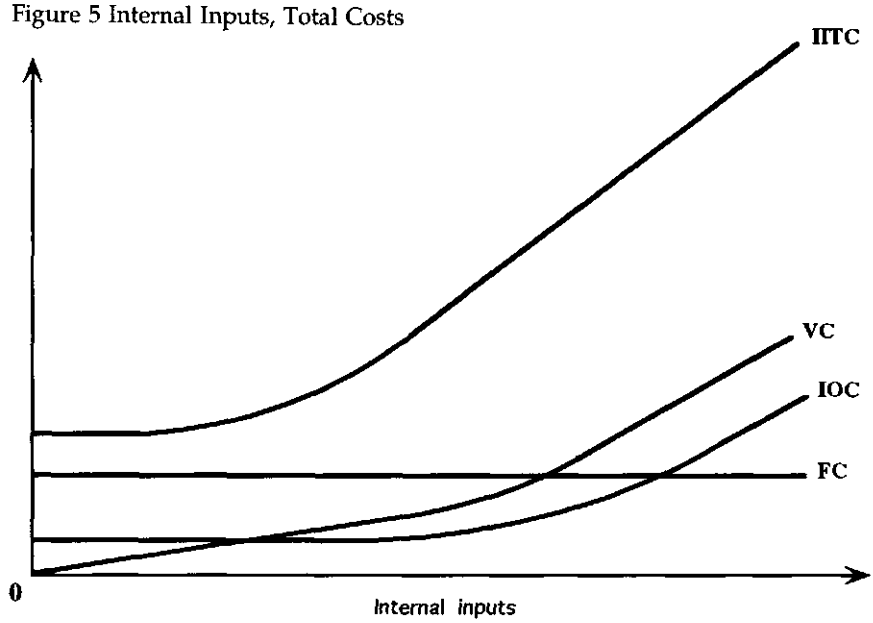
Figure 9 formalizes the micro-economic static model of the economic space of choice. When the minimum of TITC curve, either in the local system curve or in the market curve, is on the left side of abscissa axis, near to zero value, the choice is favourable for a firm-oriented endogenous development. When the minimum of TITC curves is on the right side of abscissa axis, far from the zero value, there are two possibilities. If the minimum of local system TITC curve is lower than the minimum of market TITC curve, the local system-oriented endogenous development is preferred to a farm-oriented endogenous development. If the minimum of market TITC curve is the lowest value, exogenous development is preferred.

The micro-economic static model of economic space choice is a very simplified model. The simplicity of this model is useful in introducing the theoretical question of whether neo-classic production theory can be linked with new institutional economics. In the next section we will stress the

possibility of linking non-neo-classic production process theories and new institutional economics.

As far as endogenous development is concerned, a more important question arises: the *modernity* of local system-oriented endogenous development is a very critical discussion point. Although we have said that the local system is based upon historical culture, it should also be favourable to a new or more modern style of farming. The modern economy shows a widespread decentralization inside and outside big industry. The first – inside decentralization – bases itself on the autonomy of single production units and marks the change from Fordist industry to a Toyotist one. The second – outside decentralization – bases itself on the externalization of personal and real-service production and marks the change from secondary sector development – the second industrial revolution – to tertiary sector development – the third industrial revolution.

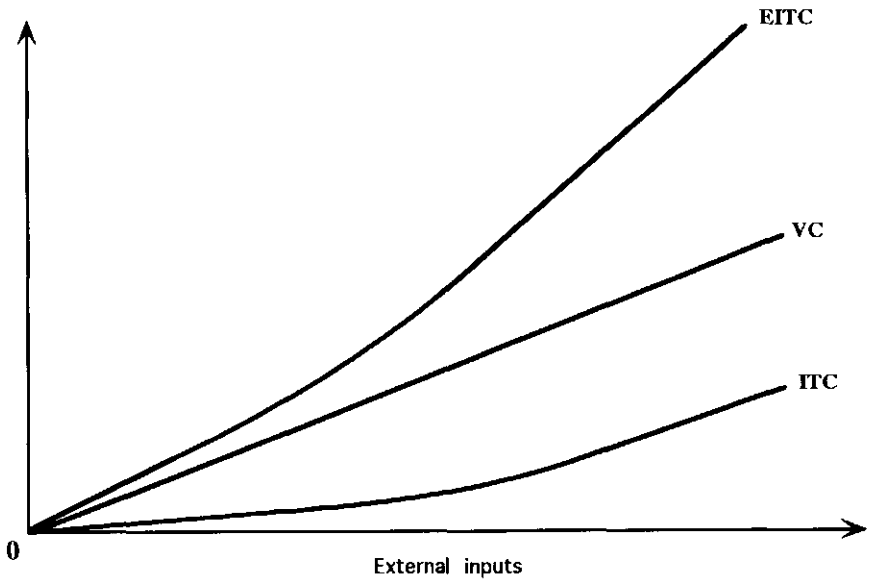
Figure 5 Internal Inputs, Total Costs



FC - fixed costs
VC - variable costs
IOC - internal organization costs
IITC - internal inputs' total costs

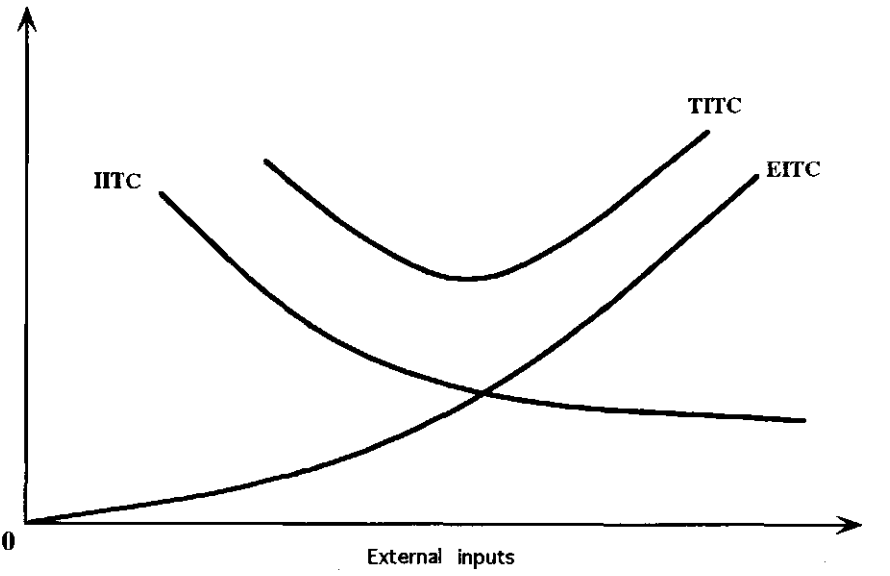
The agroindustrial district may have an *old heart* (historical culture) but should have a *modern head* (externalization of modern service production) if the firm's local system is to combine the local style of farming with up-to-date technology in the countryside.

Figure 6 External Inputs, Total Costs



VC - variable costs
ITC - information and transaction costs
EITC - external inputs' total costs

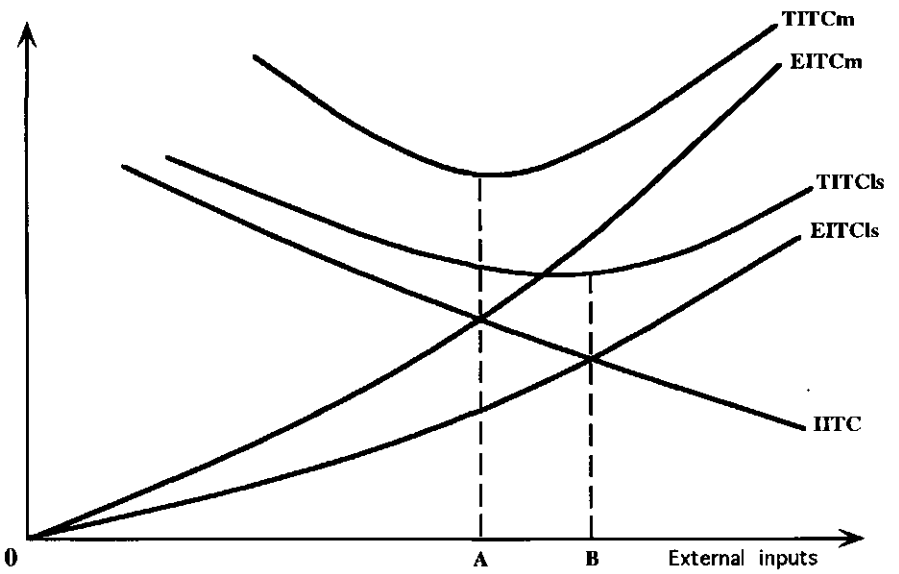
Figure 7 Total Inputs, Total Costs



IITC - internal inputs' total costs
EITC - external inputs' total costs
TITC - total inputs' total costs

Introduction of innovations is a topic that borders development and conservation. Without innovation, endogenous development is often endogenous preservation. Can a firm's local system perform the miracle of a marriage between a local style of farming and the innovations which are able to sustain endogenous development with time? How can this be done? We will deal with these questions after presenting the micro-economic dynamic model of the space-time dimension decision making.

Figure 8 External Inputs, Purchasables from Market or from Local System



IITC - internal inputs' total costs
EITCm - external inputs' total costs (market)
TITCm - total inputs' total costs (market)
EITCls - external inputs' total costs (local system)
TITCls - total inputs' total costs (local system)

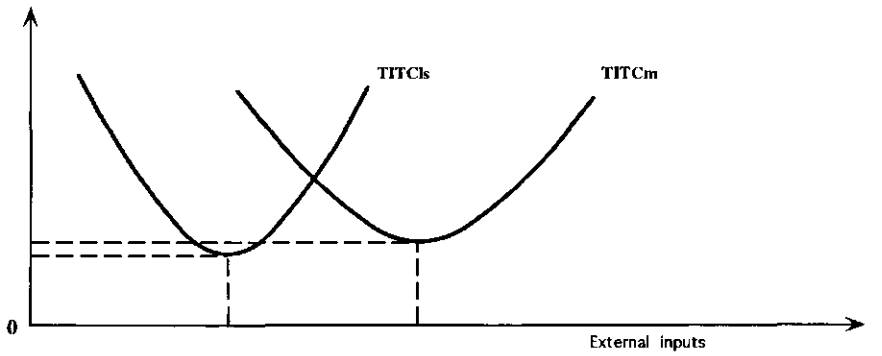
0A - external inputs' purchasables from market
0B - external inputs' purchasables from local system

The Link Between Production Process, Internal Organization Costs and Information and Transaction Costs

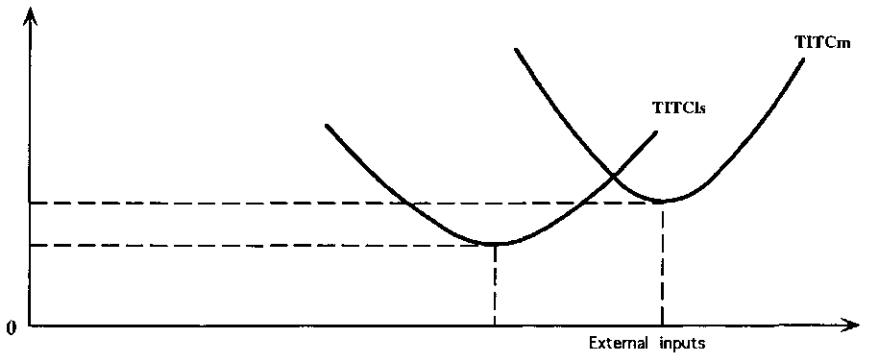
We wish to take a step forward in the direction of the interaction between the production process theories and the enterprise organization theories (between *hard* and *soft* production theories). The production process

theories are numerous: neo-classic production function, activity analysis, the funds and flows model and the neo-Austrian model. In the following discussion we have chosen the neo-Austrian model (Figure 10, 11 and 12).

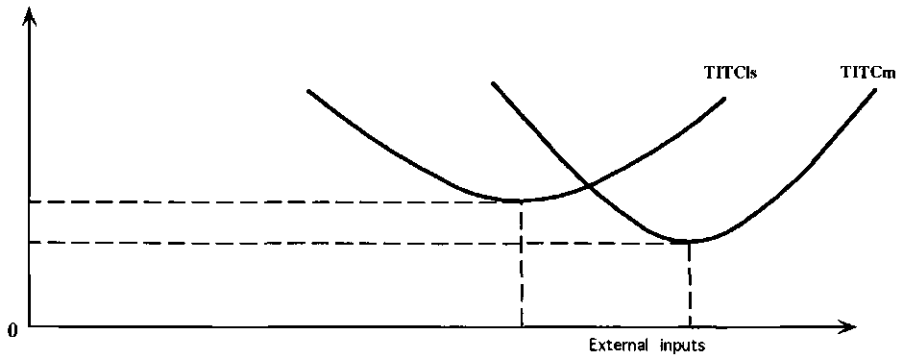
Figure 9 Different Kinds of Development Explained by Total Inputs, Total Costs Functions



A - ENDOGENOUS DEVELOPMENT (FARM ORIENTED)



B - ENDOGENOUS DEVELOPMENT (LOCAL SYSTEM ORIENTED)



C - EXOGENOUS DEVELOPMENT (MARKET ORIENTED)

In Figure 10 a space-time model of a routine production process is shown on the left of the origin of the axes and on the right-hand side the correlative volumes of exchanges, from and to market. The left side (beyond the axes' origin) is the internal space of production process and, if the farm has a single process, as we suppose, it is the internal space of the firm. The right side, by contrast, is the external space. Here we do not distinguish between local market or outside market because their difference is due only to intensity of information and transaction costs.

Time is represented on the second axis lying in the plane. To be more precise this is time that shifts from present to future. On the third vertical axis, the physical flows of inputs and outputs are represented. This axis, measures the sum of the quantities of purchased and employed inputs and of produced and sold outputs.

Figure 10 Space-Time Model of Routine Production Process and the Correlative Purchase and Sale Transactions

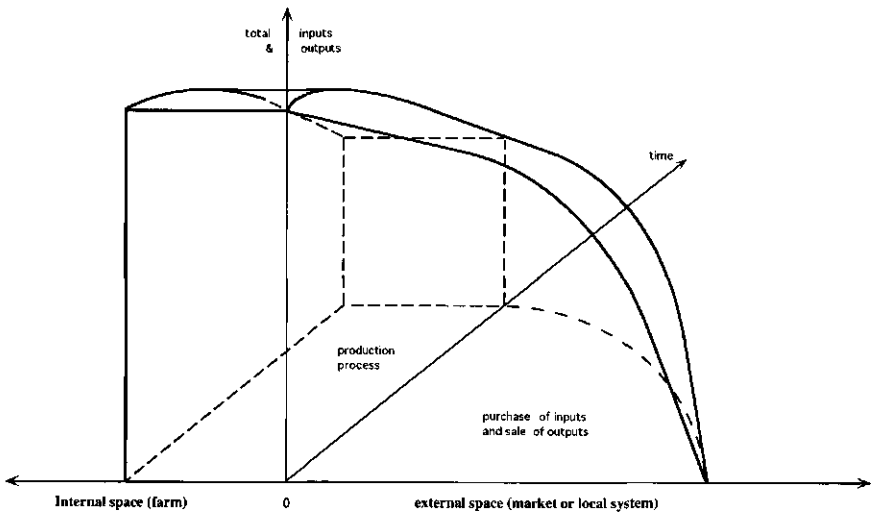
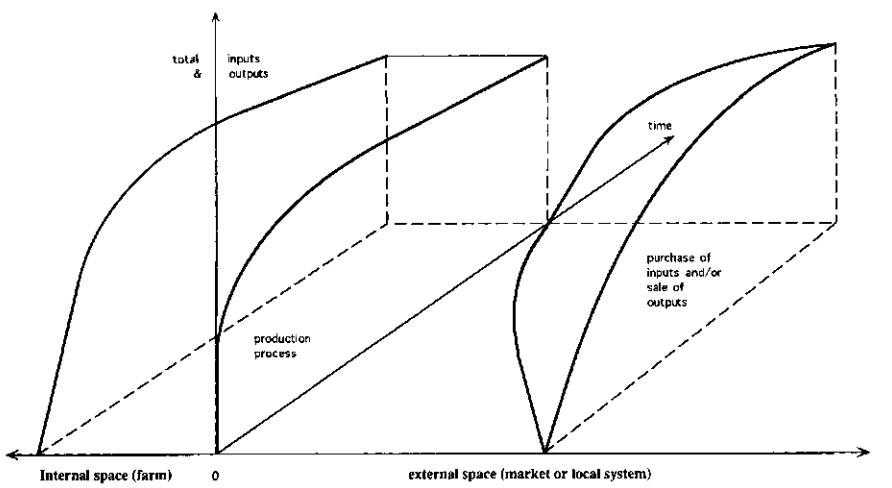


Figure 10 represents a routine production process. More precisely, it represents the future of the routine process, the past of the process being economically irrelevant. If the process is a routine one, its life is short and the entrepreneur has no expectations following its death (no renewal of the same process is foreseen). Input and output flows diminish with time together with volumes of exchanges from and to market. Similarly exchanges retreat from far or 'true' markets to near or local markets. The innovative production process, by contrast, presents a completely different scenario (Figure 11). In the figure this process is seen entirely as a projection into the future because it has no past. In the perspective of the future the quantities of inputs and outputs increase according to time and vol-

umes of exchanges. At the start of the innovative process, the inputs come to the firm from far-off markets, while in the future inputs may come from and outputs may go to local markets. The adoption of innovative processes requires information; production process management requires internal organization costs. Input purchases and output sales need external relations and so involve information and transaction costs. The economic values of internal organization costs and external information/transaction costs are represented on the vertical axis shown in Figure 12.

Figure 12 shows a crucial transition in the life of a production process and, therefore, in the life of a firm: the death of a routine process followed immediately by the birth of an innovative one. At this crucial point internal organization costs and external information and transaction costs suddenly increase. As Figure 12 shows, *information and transaction costs rise before the beginning of an innovative process: information and transaction costs are economic immaterial investments, namely payments in advance that every innovative process needs.*

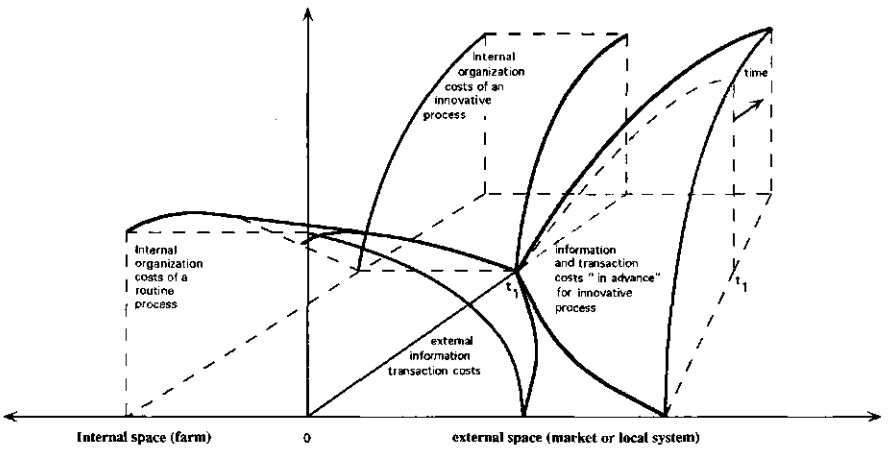
Figure 11 Space-Time Model of Innovative Production Process and the Correlative Purchase and Sale Transactions



At this crucial point, decreasing organization costs in the internal space of the firm and decreasing information and transaction cost in the external space of the firm, are followed by increasing costs of both kinds. The changes in the organization, information and transaction costs are called transformation costs (van der Ploeg and Saccomandi 1993). We do not think new terminology is necessary here, awareness of the differential nature of these costs and of their space-time dimension is enough. A similar breakage in organization and information/transaction cost space-

time dimension corresponds to innovation breakage in the production process space-time dimension.

Figure 12 Space-Time Model of Internal Organization Costs and of External Information and Transaction Costs in the Case of a Change in Production Process Technology



Towards a New Theoretical Framework of Endogenous Development Pattern

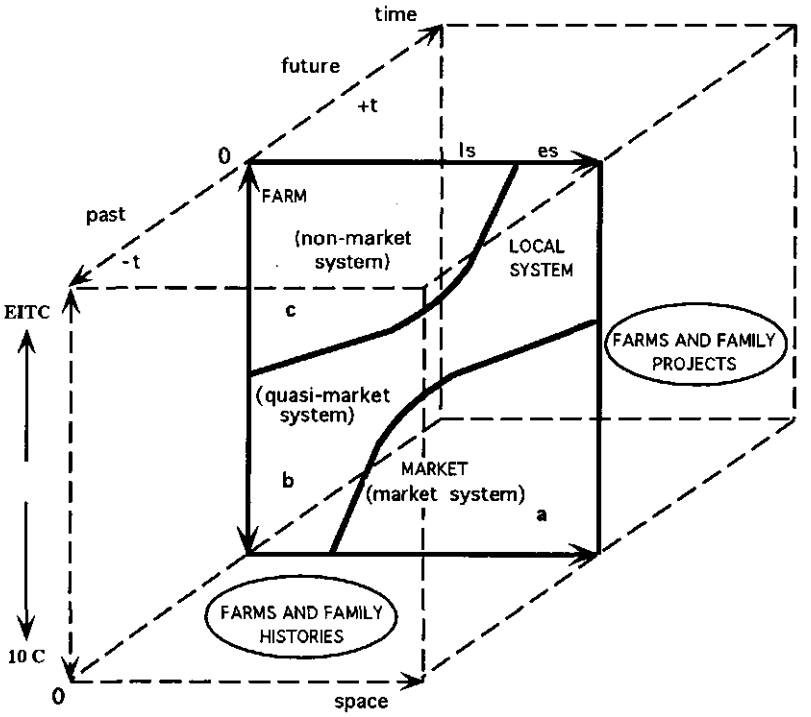
The first main assumption we have made is the double nature of endogenous development: it is farm-oriented and local-system oriented. The second main assumption we have made is that the choice of different development options not only depends on transaction and organization costs, but also on information costs. The third main assumption is that organization, transaction and information costs depend on the input and output flows of the production process which are stressed when innovative production processes substitute old routine ones. A related assumption is that organization, transaction and information costs have a space-time dimension.

Figure 13 shows every field we may encounter when studying endogenous development. We can consider three space fields – farm, local system and market – and three time fields – past, present and future. We must investigate the nature of the production-process, the innovative options, and the formal and informal relations that compose the hard core of the economy for every field. The history of firm-farms and farm families may be investigated and the actual structures and production processes that exist in the local system could even be photographed (farms, agroindustries and services or inputs suppliers). But what about the future? What are farmers, agroindustries and suppliers planning and how can their

projects be investigated? What is the relation between past and present farm structures and production processes and the firm-farm projects?

Normally we investigate past and present, namely the *appearance of economy*. The *substance of economy* is firm planning, or to be more precise, the predictions that economic men are currently making. Investigation of the projects of firm-farms and farm families should be the main goal in endogenous development studies.

Figure 13 Different Kinds of Development and their Study Fields

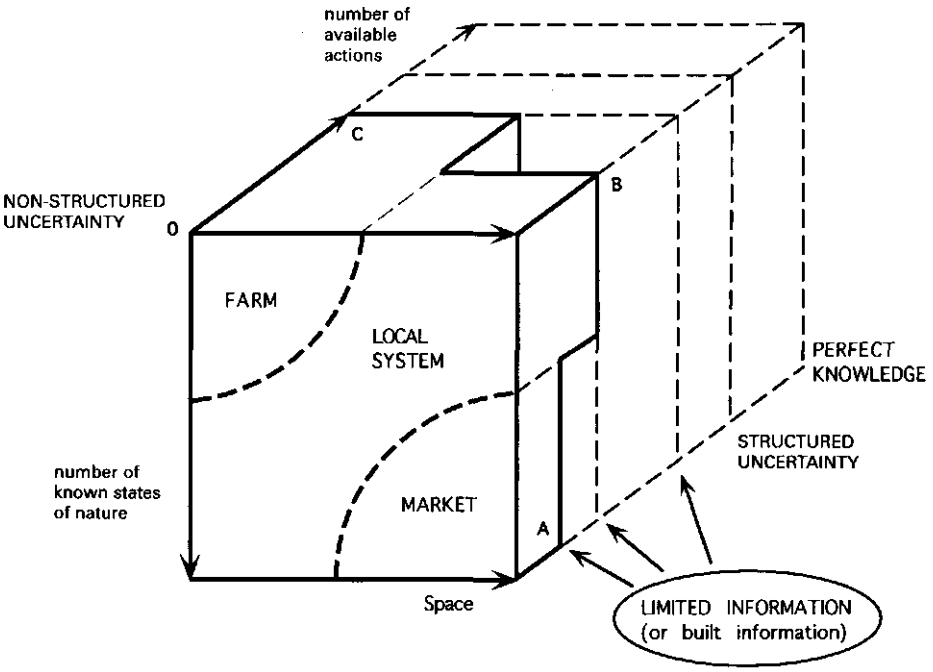


space-time dimensions of farmer's satisfying behaviour:

a = exogenous development (market oriented)
b = endogenous development (local system oriented)
c = endogenous development (farm oriented)

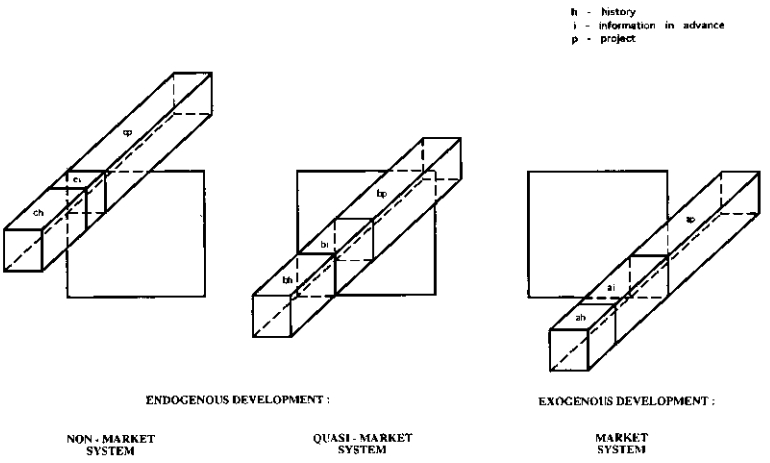
The possibilities for investigating the future depend on the possibility of drawing a *north-east shift* to join neo-classic with new institutional economics. A strict path is represented by the uncertainty theory. We might possibly obtain perfect knowledge in heaven when we, like the Saints 'go marching in'. Structured uncertainty, however, is a condition that Adam and Eve probably left behind when they came out of Paradise. It is a kind of uncertainty that requires knowledge of all states of nature and of all possible actions in each state.

Figure 14 Uncertainty and Space Dimension of Choice



h = history **i = information in advance** **p = project**

Figure 15 Past and Present Organization and Future Planning



Here, on earth, we can only obtain limited information and thus a bounded rationality. This limited information is a built information that is, the space-time dimension of choice that the firm's organization is able to build. In other words, the firm's organization is the tool that economic man utilizes to build a limited information space-time dimension, all other kinds of information space-time dimension being impossible to reach.

Organization is visible in past and present structures. Historical and current investigations into single firms or local-system firm structure may allow us to forecast development projects. The bigger and more efficient the firm or local-system organizations have been in the past or are today, the longer or richer the development planning capability. Easier studies on the appearance of the economy may help us to cope with more difficult studies on the substance of economy.

Figures 14 and 15 finally show our arrival point. The space-time dimension model of choice is based on built information. The figures show that, in the space-time dimension of firm, there are more states of nature and more actions to perform than there are in the local system space-time dimension. In the local system space-time dimension there are more states of nature and more actions to be carried out than in the market space-time dimension. Figure 15 shows that the entrepreneur naturally favours a firm-oriented endogenous development if the firm's organization has been or is strong. The favours local-system oriented endogenous development if the collective managerial organization of the local system has been or is strong. Exogenous development requires both weakness of firm and local system organization and strength of market organization. What is market organization? According to new institutional economics, market organization is formed by the bigger agroindustrial organizations. In the first case internal forces of the single enterprise are the principal determinant of development, exogenous forces may only colour the nature of the process. In the third case external forces are the principal determinant of development and endogenous forces may only colour the nature of the process. In the second case we may affirm that neither endogenous nor exogenous development are the 'skin' of the development process, but both may be recombined in the genetic code of a more sustainable endogenous development. Since the internal organization of firm-farms is usually very weak and naturally ancillary to bigger agroindustrial organizations, we suggest that a local system of firms should be the principal goal of an agricultural policy of endogenous development.

We face two main questions in endogenous development. First is it possible to predict endogenous development without innovations and is it possible to forecast innovation without organization? and second is the organization of family farms compatible with local system-oriented endogenous development?

The first two questions are very easy to answer. Innovation needs information and organization is the structure developed by the farmer to

build information. More information means more knowledge on the states of nature and further actions to be performed in each state. More organization means more possibilities of introducing innovative processes, using external elements in a local style of farming, after their deconstruction and recomposition (van der Ploeg 1992).

A farm-oriented organization does not carry out many innovations whereas a local system-oriented one does. Development agencies are dedicated to introducing innovations into the farm. Economists and sociologists have argued that development agencies are bearers of scientific or up-to-date technological innovations. We argue that this is true when a local system of firms is absent. However, when the latter is present, development agencies are inside the local system and represent an important widespread managerial techno-structure. In this case technology production and diffusion can be carried out by farmers and development agents together. Development agencies give a better widespread collective organization to a local system and therefore a better collective planning capability. This is the model of endogenous development we prefer, even if the idea may appear an old-fashion one. It could become a modern idea with the growing awareness that *net-work organizations* in quasi-market systems (*quasi-organizations*, as Benvenuti says) are, or may be at present (in agriculture as well in the other production sectors) more efficient than single organizations in non-market systems.

From Industrial Atmosphere to Structured Coherence

A great merit of the districtualists is their understanding of 'industrial atmosphere' as an emergent property, an externality of social and economic interaction which facilitates the birth and development of enterpreneurial activity and technical innovation.

The concept, in fact, offers a large range of opportunities to scholars who are involved in studies of local development, since it allows them to see, in an unitarian way, the relations betweem firms and their environment. Yet, the concept of industrial atmosphere cannot exhaust the set of elements necessary to trigger the development of a local system. Beyond the atmosphere which reduces transaction costs, a local system is also made of 'hard' factors such as soil, water, sun and infrastructures which constitute the 'built environment'.

Though agriculture has undergone a process of separation from natural conditions of production (van der Ploeg, Bye and Fonte), the importance of built environment is perhaps greater in an agroindustrial district than in an industrial district and its importance in this particular historical phase is greater when the marginality of the area in question is considerable as far as the centres of industrial and financial activity are concerned.

It has been shown (see among others Marsden, Cloke and Thrift), that rurality is subject, in the Western countries, to a process of restructuring that is changing the functions assigned to it in the past. The new phase we are living in is characterized by the possibility of the valorization of 'marginality' which, in the eyes of a growing group of consumers is far from an urban way of life. Marginality, in other words, becomes an opportunity that emerges during the transition. To grasp this opportunity, a strategy to conserve and restore the main characteristics of this marginality should be adopted in order to maintain its diversity.

To understand the emergence of an agro-industrial district in marginal areas, it is therefore necessary to adopt a broader concept than 'Industrial Atmosphere', which encompasses both the hardware and the software of a local system. We will use the concept of 'structured coherence' (Harvey). Structured coherence is made up of routines (Nelson and Winter), symbolic capital (Bourdieu), shared ideologies and built environment (Harvey).[2]

Built environment is a product and a producer of the other elements of a structured coherence. It embodies routines, institutions and ideologies and at the same time produces symbols and routines (Lefebvre). Built environment can be shaped through land planning and top-down intervention, but without coherent software it is likely to fail or to cause serious trouble to local people as, for example, the policy of 'big operas' financed by the World Bank in the less developed countries of the world has shown. While a built environment is easy to conceive at a technical level, it is much less simple to guarantee its maintenance without any 'software'. In most cases a top-down intervention in the built environment requires a top-down set of institutions, an irrigation system, for example, requires a strong institutional intervention for the management of water distribution. In the absence of a well-integrated set of institutions, an intervention in the built environment is bound to fail. But even in the case of top-down institutions, the intervention can trigger the marginalization of the local population.

Capitalist development produces, by way of the process of commoditization, a structured coherence that facilitates the circulation of commodities throughout the systems and, in the end, the accumulation of capital. To circulate, commodities need a built-up environment (roads, airports, industrial areas, supermarkets with parking) and software such as private property, regulation of work force, banking system, education and research.

For areas peripheral to this pattern of development, the possibility of adhering to it has so far been seen as an attempt to build an environment suitable to capitalist (and namely industrial) development according to a model already experienced in more developed areas. This is, in many cases, the model followed by development projects financed by the World Bank in less developed countries as well as in many Italian regions.

Since endogenous development is, by contrast, a way of joining global networks following an original model of adhesion, it requires a specific structured coherence that allows the production, reproduction and valorization of local resources by local actors. 'Structured coherence' is such that the natural resources, symbols, rules and patterns of interaction of the locality can easily be turned into production. The product embodies the characteristics of the locality and the locality is represented by its products as well. In turn, the production of symbols allows a better visibility of the locality and its products from the outside.

How is it that a structured coherence emerges? And what elements should be introduced in order to facilitate the emergence of structured coherence as a basis for endogenous development? We can confront the problem by beginning with an analysis of the relationship between enterpreneurial activity and its environment. Let's take farming as an (important) example.

In the 'commoditization' theory, an important distinction is made between market networks and non-market relations. Drawing on a rather widespread image, the process of commoditization can be seen as a progressive penetration of market relations into an original network of communal and familiar relations (see Figure 16 and 17). During this penetration, market relations progressively replace traditional relations.

Though in some cases this process has been seen as a passive acceptance of market relations, a large body of literature has shown the importance of action, of the capacity of actors to choose and set up original strategies of production and reproduction. With this approach, we can see farming as the original point of intersection of different domains (nature, family, local community, state and market). Producers interact with these domains setting up relations with other actors and with nature, that is they participate in different networks.

In this context entrepreneurs try to pursue individual projects. To succeed, they establish relations with other actors and objects and secondly, they give an internal or external quality to these relations. Defining an internal means involving some actors and resources in at least a part of the same project. For example, deciding whether buying or making implies a different set of relations to the firm: buying an input does not imply a condivision of objectives with the seller, while producing it implies cooperation. Different levels of inside and outside can be considered: family, firm, locality, region and so on. Finally entrepreneurs choose, inside and outside, allies and opponents. Unfortunately, many individual projects are not compatible with each other. Different producers give different meanings to the same local traits, for example, the same land can be an important element of a landscape or a disposal area. Conflict arises over the shape to give to a built-up environment as well as over what we have called the software. For this reason, individual producers find allies in order to gain power over their opponents.

Figure 16 A Non-Commoditized System

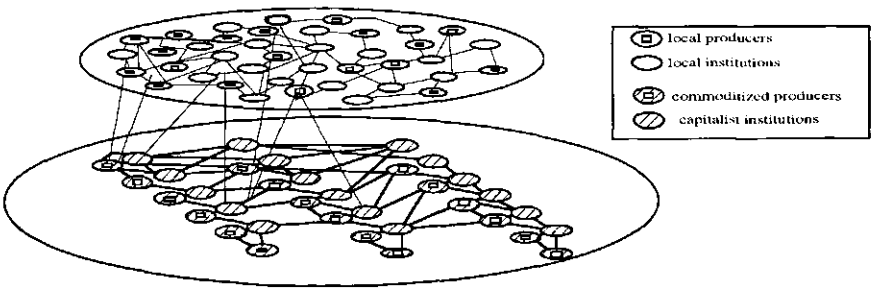
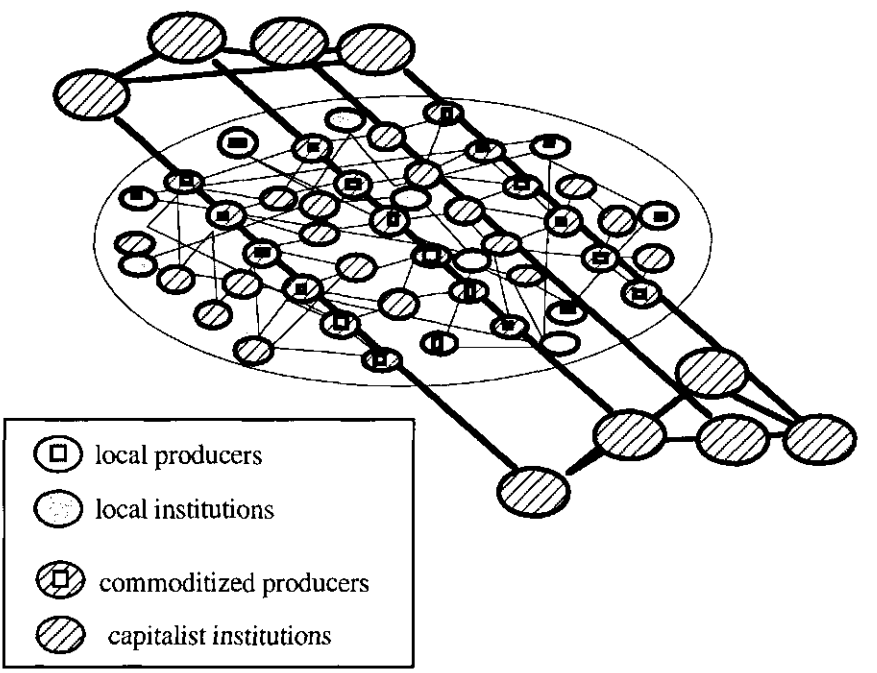


Figure 17 A Commoditized Area of Production

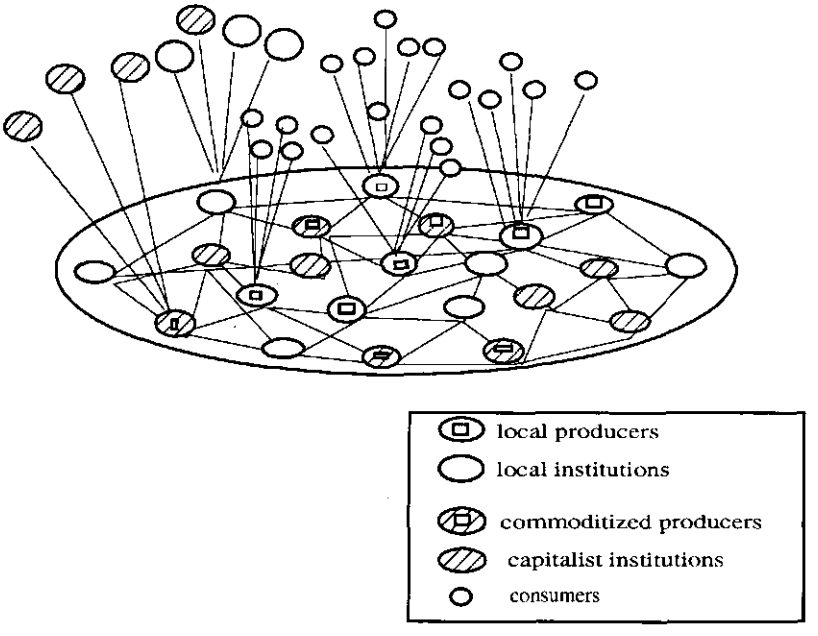


The very exchange of materials and symbols with other actors and with nature is therefore the product of the action of creating an arena of interaction, an *economic space,* which is the original way producers connect themselves to broader processes. It is important to stress that the concept of economic space is much broader than that of a commercial network, since we also include in it all the relations which constitute the premises of a commercial activity.

Market relations are an important set of relationships activated by actors. They are hardly 'pure', in the sense that beyond the very objects

of the commercial transaction, actors exchange information and values and set up a reciprocal acquaintance. Commercial and extra-commercial relations are, in a nutshell, strongly intermingled: social relations can turn into commercial relations and vice-versa. (Figure 18).

Figure 18 A Local System



Embedded as they are in a broader set of social relations, market relations are strongly influenced by the characteristics of their context and have different meanings and functions for different situations (Polany). In other words, we cannot speak of market as a metaphysical category but of more concrete *markets*.

In rural areas, there are comparatively more non-market factors than in urban areas. This characteristic, which many authors identify as a symptom of backwardness, can be considered a resource in an endogenous development approach. Pursuing endogenous development means, in fact, searching for original combinations of social relations, markets, technologies, and built-up environments capable of turning local features into resources. Economic space is therefore a set of relations which enables producers to activate flows of materials and symbols, which will constitute the inputs and outputs of their entrepreneurial activity.

The direction and intensity of these flows, both inside and outside the firm, are regulated by rules. Though a process of formalization (Benvenuti) takes us in the direction of an increasingly greater dominance of written laws over social life, a great many rules are not written and emerge as an

effect of repeated interaction. Past behaviour and its outcomes have a significant influence on present behaviour (Simon).

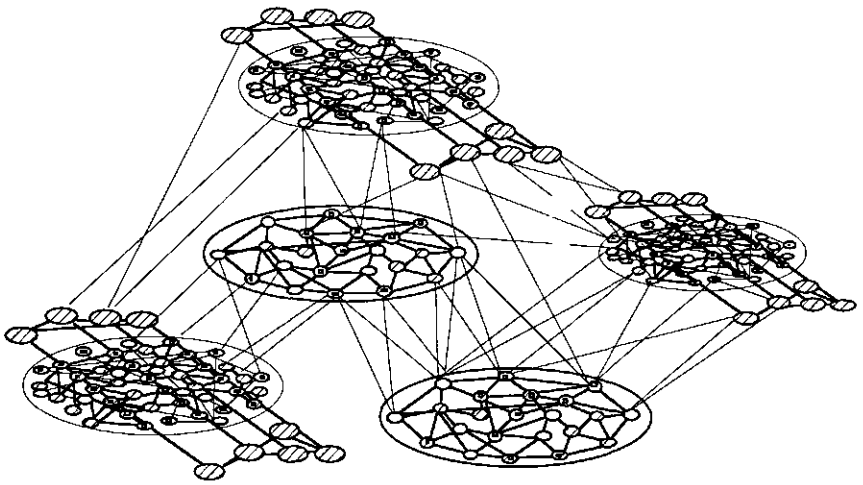
Rules are an important aspect of structured coherence. They intervene on the premises of action, embodying power relationships and lowering conflictuality in relations. Once actors agree to play, they can control whether the others comply with the rules or not and call for sanctions on those who do not comply. To comply with the rules means accepting the differential of power embodied in these rules. For this reason, changes in the context of interaction give the actors reasons to try to modify rules to their own advantage.

Rules are, in brief, prescriptions which actors interiorize into their behaviour, from family relations to production techniques. A strategy of endogenous development requires that rules of behaviour are reoriented according to its principles, that is valorization of local items such as resources and autonomy. This means changing the matrix of power, giving a different shape to the pattern of interaction of local producers among themselves, with other local actors and with the outside world.

Stressing the need to change rules means being more concerned with *structuration* than with structure. In other words, it is more important *who* builds it and *how* than the actual results of the construction. It is important, in fact, to point out that the construction of a structured coherence is not a linear process neither is it in most cases painless for everybody. It is performed through a struggle between actors in all ambits of local life. This struggle is mainly played out at a symbolic level because people try to impose their meaning on things as a premise for setting up new rules of behaviour, for example. Is hunting a sport? Does intensive farming damage the environment? Is rural landscape a public good or a private good? For this reason, a structured coherence is subject to continual change, there being different groups interested in different shapes. A structured coherence can collapse if conflicting groups are strong enough to hamper a cohesion but not strong enough to impose their hegemony over the others.

Endogenous development centres upon local resources and circuits. This is very defferent from isolation. Endogenous development can aim at linking locality to global networks in a satisfactory way. From the considerable range of choices offered by globalization, opportunities are selected that might strengthen the local community. In other words, the challenge of endogenous development is to build markets whose characteristics help producers to 'reconstruct locality', that is producing and reproducing local resources according to a structured coherence. Contrary to the logic of exogenous development, which tends to extract resources and to shape environment according to external goals, endogenous development tends to reinforce local identity as an important feature of the product sold. Local identity is hence a public good to be pursued not only by single producers, but by the whole community and its institutions.

Figure 19 Local Systems and Global Markets



There is a final point be made here. If endogenous development is a strategy which does signify an isolation from global networks and displays a different pattern of connections to them, then it not only has the capacity of creating a 'niche' in the global market but, more ambitiously, it can introduce into the network values that can create hegemony in a local discourse. In other words, it can contribute to giving a different shape to economic development.

A Case Study: The Cereal Growers in the Colline Pisano-Livornesi

In this section, we will first establish the decisive role that information plays in determining the organization of the firm, then we shall touch upon the importance of investigating the whole network of activities which the entrepreneur establishes, and upon which he bases his decisions. We will outline a methodology we would like to use to identify these activities, which define exactly what the economic sphere of the firm is.

It was not until the 1960s that economic theories began, on the one hand, to consider the possibility that subjects react to uncertainty by acquiring and elaborating information, and on the other the consequences derived from an even distribution of information among the subjects themselves. In this respect Muth's (1961) comment is very significant: 'Information is scarce, and the economic system doesn't scatter it'. 'Information is an expensive resource' commented Stigler in 1961 noting at the same time the asymmetry of information, that is information that is

distributed unevenly among operators. Postulating asymmetrical information signifies abandoning the hypothesis of shared information and presumes that some subjects will possess private information that they can conveniently use in exchanges. The existence of this asymmetrical information is also due to man's (or the firm's) intrinsic limitations. We cannot cope with all the information we received and consequently we refer to uncertain conditions and limited rationality.

The role carried out by information thus becomes one of the central elements in the study of the enterprise's organization. In fact, the organization can be seen as a way of activating a dynamic decision-making process which, in time, will structure the firm. Decisions made by subjects, as a result of the analysis made on the flow of communication, generate interaction inside the firm and between the firm and the outside. The aim is to maintain a balance point between economic efficiency and the level of satisfaction derived from the attainment of additional, not strictly economic objectives.

In a general outline of this kind, it becomes essential to identify the optimum strategy for finding this information and to adopt certain criteria for selecting information considered important for taking appropriate decisions. The firm, to be healthy, needs a series of activities of a profoundly different nature. These activities define the economic sphere in which the entrepreneur both searches for information, and increases his knowledge so as to be able to re-evaluate his ideas and adapt to changing conditions over time.

The connection between endogenous development and the local system of firms allows us to see the organization of production in a limited area that cannot be exclusively described by the flow of raw materials, products and money. If we assume that external affairs are unavoidable for the firm in a world where technological development brings about an exponential growth in competence and task specialization (a phenomena known as 'terziarization'), the introduction of distance as another specific element in determining the economic sphere of the firm can help determine to what extent a firm belongs to a given local system.

One of the aims of our research is the definition of potential factors capable of supplying the premises for endogenous development. Thus, we have taken as our starting point the study of the productive organization of agriculture (and industrial agriculture) in the area. An inquiry was carried out and interviews were made with various operators. In this inquiry emphasis was placed on the organizational side of the firm and its relationships with the outside world.

We have made an initial attempt to classify the activities of two of the agricultural firms interviewed in the context of research on cereal agriculture in the area. This classification, which is not yet complete, should allow us to establish the degree to which an economic unit belongs to the territory (or local system) and to specify a relationship between the econ-

omic sphere and economic efficiency. In our discussion here, however, we will only deal with the first aspect. The various relationships have been classified as follows:

- social relationship and/or cooperation = (S/L)
- flow of factors, products and resources (commercial activities) = (C)
- relationship with real services = (SE)
- relationship with innovations/investments = (IN)
- exclusively informative reports
- history of the firm = (ST)

These relationships shows that it is of fundamental importance to examine the different hierarchical relationships, their frequency, their persistence with time and also the degree of satisfaction that the entrepreneur derives from them. Such an analysis cannot come from reading history, because it is often real past experiences that are decisive in influencing future choices. We have included exclusively informative relationships because we are aware that each relationship has an informative function which leads to an increase in the firm's knowledge (even if it is not top priority for the entrepreneur) and it seems important to highlight the area the entrepreneur explores to reduce his degree of uncertainty in taking future decisions.

Table 1 lists the facts that emerged from interviews made in two family-controlled farms both of which had similar cultivation patterns. However, these farms were in two very different phases of their 'life cycle'. The first farm was in a 'central' phase, the second one was in a 'declining' phase. Looking at the table in which we have recorded a description of their bases, we can state that the firm in the 'central' phase of its life cycle clearly has more opportunity to act – and thus had a wider economic sphere – than the other farm.

Now let us try and see to what extent the two farm belong to the territory in which they operate, in accordance with the direction taken by the report given in Table 2. With this in mind we can identify three possible projects:

- inside the firm (which involves above all the relationships between family and firm)
- between firm and local system
- between firm and external system

Such distinctions involve narrowing the borders of the local system. This we have done by considering the hills around Pisa and Livorno (Colline Pisano-Livornesi) to be a single, local system because they are characterized by similar socioeconomic and cultural conditions.[3] However, a local system could also emerge ex-post) from an investigation which brings to light a network of relationships between a group of firms situated in the same territory. Only if there are informative, commercial and institutional relationships which grow in the territory and productive units

which have common rather than individual aims can we speak of a local system and consequently of endogenous potential for development.

In Table 2a and 2b we have stratified the report given in Table 1 as a function of the typology and the direction taken. The extent to which the two firms belong to the local system is clearly different: the firm, in the 'central' phase develops its economic sphere predominantly outside the local system. The other firm, however, is firmly situated in its territory.

Without passing judgement, we can say that in theoretical terms, the external activities of an enterprise within the local system are characterized by low transactional costs and determined by widespread information whereas the enterprise's activities outside the local system should be characterized by higher transactional costs. The outside, however, cannot be defined as merely being the result of the physical dimension (distance), it is also a product of a temporal dimension. In fact, some activities despite being outside the local system geographically speaking, can enjoy very low transactional costs if they are consolidated by reciprocal trust in time.[4] This situation calls for a new definition of local system, since it is no longer attached to its territory.

Finally, there is one other point to be clarified. How can we explain the presence of reduced economic spheres into wholly integrated firms such as cooperatives? In this case, the cooperative super-imposes itself on the firm's economic sphere because the firm adopts a strategy which could be labelled as speculative. If this noticeably lowers the threshold of the external receptors, it is nevertheless in a position to benefit from suitable economic objectives. However, this can be a double-edged sword in the sense that a crisis in the cooperative would also lead the firm into crisis since it would be less able to deal with the outside.

Finally, in Table 3 we have tried to define the enterprise's organization in terms of its relationship with the outside as a consequence of the tasks carried out by the members of the family. In this instance the reports have been differentiated as 'market' and 'non-market' reports. It is noted that the owner and his oldest son predominate in managing these activities, though carrying out fairly specific functions. The owner mainly runs the commercial side, in particular, the buying and selling of cattle whereas the oldest son, whilst he is also concerned with the commercial aspects, is more involved in the dealings with public institutions (bureaucracy). It is significant that the youngest son, who is still a student, is also mainly concerned with the bureaucratic side of farm affairs. We should note the way in which the oldest family member is primarily concerned with activities in the local system sector, whereas the younger family members are concerned with activities outside it.

The example presented here gives an indication of how feasible this line of research may be. The research itself is still in its early stages. Eventually, it may be possible to use this research in defining organizational

networks with the objective, for example, of defining the best possible interventions for developing the endogenous potential of a local system.

Notes

1 Luciano Iacoponi has written Sections 1 and 2; Gianluca Brunori Section 3 and Michele Rovai Section 4.

2 We have in mind, for example, Wittfogel's Oriental Despotism and Duby's Mills, in which an analysis of the relation between structures and institutions is performed.

3 In the L.A.'s farm there are frequent references to the Gambassi (FI) district. We have assumed that this district belongs to the same local system because Villamagna, a country of the Volterra district where the farm lies, is adjacent to the Gambassi district and also because Gambassi district is characterized by the same socioeconomic characteristic as the Pisa-Livorno hills.

4 This may be the case for a firm which has all its activities outside the local system, because of activities consolidated in time. In these circumstances, in may arise that the immediate enviroment is characterized by a greater degree of uncertainty and thus seems more hostile.

APPENDIX

Table 1a List of the Relationship of the Two Farms Interviewed

M.G.P.'s farm (120ha) - San Luce (PI) Family farm with fifty year old owner and two sons (26 and 18 years old)(life cycle = 'central') animal husbandry, cereals and forage		
Type of relationships	Description	Subjects
C	buy cattle	Fattoria di Paltratico (farm)
C	buy cattle	Trader
C	buy cattle	Farm
C	sell cattle	Butcher's shops
C	buy forage	Other farms
C	sell forage	Trader
C	sell hard corn	Trader
C	sell hard corn	Gori flour-mill
C	sell hard corn	Pardini flour-mill
C	buy fertilizers, pesticides, etc.	Copal (cooperative society)
C	sell alfalfa seeds	Trader
C	buy fertilizers	Consorzio Agrario (trader society)
C	buy fertilizers	Cerealtoscana (trader)
C	sell manure	Trader
C	buy cattle fodder	Margimificio Pietrini
C,I	information, buying	Trader
C,I	information	Aima (Agency for market intervention)
I	information	Public Administration
I	ex-alderman of agriculture	Public Administration
I	review, magazine	Chamber of Commerce
I	information about hard corn	Copal (cooperative society)
I	information about hard corn	Agrarian school
IN	buy machine	Consorzio Agrario (trader society)
IN	buy land	Other farms
S/C	maintenance of ditches	Filippi's farm
S/C	son's school	Agrarian school
S/C	daughter's work	Clothes's centre
SE	associate	Confcoltivatori (farmer's assoc.)
SE	borrowed capital to buy land	IFCAT (bank)
SE	bureaucratic's demand	Local Public Organization
SE	bureaucratic's demand	Local Public Organization
ST	his family	family
ST	wife's family	family
ST	father's work	?
ST	his past work	Service tilling
ST	his past work	Piaggio (industry)

The various relationships have been classified as follows:
- social relationship and/or cooperation = (S/L)
- flow of factors, products and resources (commercial activities) = (C)
- relationship with real services = (SE)
- relationship with innovations/investments = (IN)
- exclusively informative reports
- history of the firm = (ST)

Table 1a Continued

M.G.P.'s farm (120ha) - San Luce (PI) Family farm with fifty year old owner and two sons (26 and 18 years old)(life cycle = 'central') animal husbandry, cereals and forage		
Type of relationships	Locality	Periodicity
C	Castel Nuovo VC	now current
C	La Spezia	sometimes
C	Viareggio	now current
C	Livorno	now current
C	San Luce	now current
C	Orciano	now current
C	Collesalvetti	now current
C	Altopascio	now current
C	Lucca	now current
C	Chiappino	actual (sometimes)
C	Collesalvetti	now current
C	Pisa	actual (sometimes)
C	Altopascio	actual (sometimes)
C	Pescia	now current
C	?	now current
C,I	?	now current
C,I	Pisa	now current
I	Pisa	now current
I	San Luce	now current
I	Pisa	now current
I	Chiappino	now current
I	Pescia	now current
IN	Pisa	now current
IN	San Luce	form 1966 onwards
S/C	San Luce	now current
S/C	Pescia	now current
S/C	Pisa	now current
SE	Pisa	now current
SE	Pisa	from 1966 onwards
SE	Pisa	now current
SE	Livorno	now current
ST	Benevento	in 1966-67
ST	Marche	in 1952
ST	Germania	before 1966-67
ST	Orciano P.	before 1970
ST	Pontedora	before 1970

Table 1b

L.A.'s farm (46 ha) - Villamagna (Volterra - PI) Family farm with seventy year old owner (life cycle = 'declining') - animal husbandry and cereals		
Type of relationships	Description	Subjects
C	sell lamb	Trader
C	sell lamb	Butcher's shop
C	sell hard corn	Cecchi (wholesaler)
C	sell hard corn	Bartalini (wholesaler)
C	buy fertilizers	Cecchi (wholesaler)
C	buy fertilizers	Bartalini (wholesaler)
I	information	Local market
IN	buy machines	Mechanic
S/C	cutting of tree of the forest	Friends
S,C,I	brother's work	Coldiretti (farmer's assoc.)
SE	harvest	Rossi V. (service tilling)
ST	member of cooperative society	Ente Maremma (Reform Agency)
ST	farm assignment	Ente Maremma (Reform Agency)
ST	share-cropper	Monastery
ST	buy land	Other farm

Table 1b Continued

L.A.'s farm (46 ha) - Villamagna (Volterra - PI) Family farm with seventy year old owner (life cycle = 'declining') - animal husbandry and cereals		
Type of relationships	Locality	Periodicity
C	Gambassi	now current
C	Volterra	now current
C	Pistoia	now current
C	Lajatico	now current
C	Pistoia	now current
C	Lajatico	now current
I	Volterra	now current
IN	Gambassi	now current
S/C	Gambassi	now current
S,C,I	Volterra	now current (since 1978)
SE	Prato d'Era	now current
ST	?	from 1952 to 1976
ST	?	in 1952
ST	Volterra	before 1952
ST	Villamagna	years ago

Table 2a Flow of Firm Relationships Towards the Inside, the Local System (LS) and Outside of the Local System

M.G.P.'s farm (120ha) - San Luce (PI) Family farm with fifty year old owner and two sons (26 and 18 years old)(life cycle = 'central') animal husbandry, cereals and forage		
	Subjects	Social / cooperation
INSIDE	family	oldest owner's work wife's work (part-time) oldest son's work youngest son (part-time)
LOCAL SYSTEM	Filippi's farm adjacent farms Local Administration Trader (Orciano P.) Cooperative Copal Trader (Collesalvetti) Fattoria Paltratico (farm)	maintenance of ditches
OUTSIDE LS	Conz. Agrario Pisa (trader society) Aima Pisa (Agency for market intervention) Provincia Pisa (Public Administration) IFCAT Pisa (bank) Confcoltivatori Pisa (Farmers' Assoc.) CCIAA Pisa (Chamber of Commerce) Public Adm. and Organ. Pisa Clothes' centre Pisa Butcher's shops Livorno Public Adm. and Organ. Livorno Cerealtoscana (trader) Altopascio Molino Altopascio (flour-mill) Molino Lucca (flour-mill) Az. Agr. Viareggio (farm) Agrarian school Pescia Trader (Pescia) Trader (La Spezia) Mangimificio Petrini (cattle's fodder)	daughter's work youngest son's study

Table 2a Continued

M.G.P.'s farm (120ha) - San Luce (PI) Family farm with fifty year old owner and two sons (26 and 18 years old)(life cycle = 'central') animal husbandry, cereals and forage			
Flows of factors, products and resources	Service	Investments / Innovations	Information
buy forage sell forage buy fertilizers, etc. sell hard corn sell alfalfa's seeds		buy land	local laws information hard corn cultivars information
buy fertilizers set-aside contribution sell cattle buy fertilizers sell hard corn sell hard corn buy cattle sell manure buy cattle buy fodder	borrowed capital fiscal assistance etc. bureaucratic demand bureaucratic demand	buy machines	CAP's information information review's subscription hard corn cultivars information

Table 2b Flow of Firm Relationships Towards the Inside, the Local System (LS) and the Outside of the Local System

L.A.'s farm (46 ha) - Villamagna (Volterra - PI) Family farm with seventy year old owner (life cycle ≈ 'declining') - animal husbandry and cereals		
	Subjects	Social / cooperation
INSIDE	family	owner's work son's part-time work
LOCAL SYSTEM	adjacent farm butcher's shop (Volterra) Local market (Volterra) Coldiretti Volterra (Farmers' Assoc. Service tilling (Prato d'Era) Trader (Gambassi) Mechanic (Gambassi) Friends (Gambassi) Bartalini spa Lajatico (wholesaler)	 son's work cutting of tree (forest)
OUTSIDE LS	Cecchi spa Pistoia (wholesaler)	

Table 2b Continued

L.A.'s farm (46 ha) - Villamagna (Volterra - PI) Family farm with seventy year old owner (life cycle = 'declining') - animal husbandry and cereals			
Flows of factors, products and resources	Service	Investments / Innovations	Information
sell lamb sell lamb buy fertilizers sell hard corn	harvest	buy lamb buy machines	prices information
buy fertilizers sell hard corn			

Table 3 Distribution of External Firm Relationships Among the Family Members

M.G.P.'s farm (120 ha) - San Luce (PI)		owner	
	Subjects	Market	Non-market
INSIDE	family		X
LOCAL SYSTEM	Local Administration		
	Filippi's farm		X
	Cooperative Copal		X
	adjacent farms	X	X
	Trader (Orciano P.)	X	
	Trader (Collesalvetti)	X	
	Fattoria Paltratico (farm)	X	
OUTSIDE LS	Conz. Agrario Pisa (trader society)	X	
	Butcher's shops Livorno	X	
	Az. Agr. Viareggio (farm)	X	
	Trader (La Spezia)	X	
	Mangimificio Petrini (cattle's fodder)	X	
	Aima Pisa (Agency for market intervention)		
	IFCAT Pisa (bank)		
	Cerealtoscana (trader) Altopascio		
	Molino Altopascio (flour-mill)		
	Molino Lucca (flour-mill)		
	Trader (Pescia)		
	Public Admin. and Organ. Pisa		
	Public Admin. and Organ. Livorno		
	Provincia Pisa (Public Administration)		
	Agrarian school Pescia		
	Confcolitvatori Pisa (Farmers' Assoc.)		
	CCIAA Pisa (Chamber of Commerce)		
	Clothes' centre Pisa		

Table 3 Continued

wife		oldest son		youngest son		daughter	
Market	Non-market	Market	Non-market	Market	Non-market	Market	Non-market
	X		X		X		
			X				
			X		X		
			X				
		X	X	X	X		
		X					
		X					
		X					
		X					
		X			X		
		X					
		X					
		X					
		X					
			X		X		
			X		X		
			X		X		
			X		X		
			X		X		
							X

4 Policy Failure and Endogenous Development in European Agriculture

Gert van Dijk

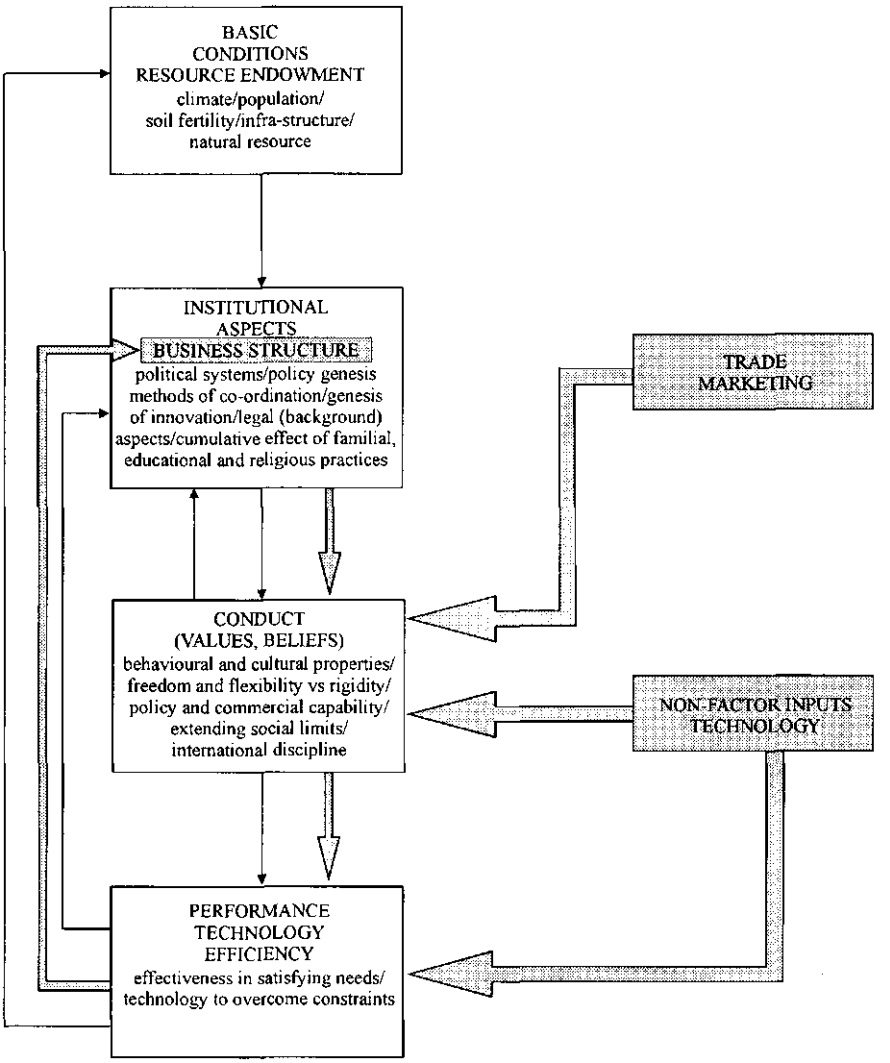
A Generalized Model of Endogenous Development

The general model for the endogenous development of agriculture is shown schematically in Figure 1. Resource endowment determines long-term production and elements include climate, harvest variability, land fertility, water quality and vulnerability to pollution. In addition to resource endowment as the basic conditions for economic development there is the significant determinant of the (ethical) values and norms held by society. Together with resource endowment they form the *basic conditions*.

The basic conditions constrain the economic system. The constraining mechanism consists of the rules of conduct, generally referred to as the institutional design. Society acquires its typical features by gradual instalments and in this way social rules, laws and methods of maintaining social equity and stability in times of plenty and in times of famine emerge. The institutional characteristics compliment resource endowment in the sense of long-term adjustment. Constraints facing a particular rural society may be absolute ones or they may have a certain life-span. In the latter case they may be overtaken by changes in behaviour, alteration of institutions or through new technology. In traditional societies new technology is not accompanied by changes in institutions and conduct. From the economic point of view all conduct is judged by its performance to relieve constraints. As Francis Bacon said: 'Science and technology is to the Glory of God and the Relief of the State of Man'. The technology of modern societies is often the engine of change as far as conduct and institutions are concerned. Science and technology will change market structure as business conduct will be based on competitive action geared to higher profits and a larger share of the market.

The feedback mechanism refers to long-term reactions. In subsistence agriculture there will be natural specialization but it is unlikely that this will lead to specialization through capital investments in the long-run. Feedback should be seen rather in the terms of Malthusian dynamics: population growth may result in food insufficiency and food shortages cause emigration and higher death rates.

Figure 1 Model of Endogenous Development



With the development of specialization and trade the feedback loops are recognized as 'normal' economic development. As the agrarian economy becomes an integral part of the international market system and the industrialized world, it is influenced by agricultural trade and marketing conduct in regions where conditions and resource endowments are often very different. Besides, technology is adapted from non-agricultural sources, such as mechanization for example, or embodied in non-factor inputs that include fertilizer and crop protection chemicals.

Gradually, performance is judged by markets or competitive yardsticks. New technology is increasingly applied to enhance business efficiency and as a weapon in the competitive struggle either to gain a share of the market or to survive under conditions of depressed market prices. Industrial organization theory teaches that this competition causes business structure to change and hence the institutions governing economic conduct have to be adjusted accordingly. Big business, for instance, creates big government and vice versa.

Henceforth, when exogenous factors become dominant we speak of exogenous development. Under conditions of exogenous development agriculture is less determined by resource endowment than by trade relationships. Likewise, consumption patterns are less influenced by regional specialization than by the marketing of trans-regional food and agribusiness. Below, an attempt has been made to provide the reader with a plausible interpretation of exogenous development using the case of Dutch agriculture.

Exogenous Agricultural Development: The Case of Dutch Agriculture

Historical background

At a time when it was far from normal for a rural European economy to participate in trade relationships, the Dutch agricultural economy began to emerge as somewhat of an exception. In the maritime Dutch Republic, rural areas possessed institutions which granted a measure of juridical autonomy and taxing authority to the population. This was exceptional for the period.

In medieval Europe this situation was a prerogative of cities. Urban communes and cities existed as 'legal islands' in a rural sea of feudal jurisdictions. The special character of Dutch rural life and its institutions was probably based on the fact that the countryside lent itself to the development of superior regional communication. The institutional characteristics of the rural economy, however, were the carriers of the precocious political and economic liberation experienced by the Dutch republic in the seventeenth century.

There were many side-effects, the most important being the opportunity for the specialization model to develop. Once direct dependence on agricultural production was removed, mainly by the importation of grain, the urban economy began to develop. The peasants entered a market economy selling agricultural products to the urban market and purchasing non-agricultural goods and inputs which previously had been produced with less efficiency on the farms. The construction of strong trading links between the urban sectors, based on rural specialization in agriculture and the concomitant growth of the rural demand for manufactured goods, was at the heart of economic growth in the Netherlands. A large volume of

trade flowing between the rural and urban sectors increased the importance of local trade in an economy which otherwise – as in the peasant model, for instance – would be primarily concerned with long-distance trade centred on the ruling class.

The Dutch specialization in trade was thus based on the considerable industry they had already developed and on the advanced transport and communication that existed between the centres of trade and the rural hinterland. By the mid-seventeenth century, Amsterdam had become the world's chief bullion market and this early development of a suitable and internationally reliable financial structure paved the way to the successful integration of international trade into the national economy. Probably the horizon-widening effect international trade had on producers was responsible for the continued introduction of new crops, many of which appeared to be well-suited to European climatic conditions.

During the sixteenth, seventeenth and eighteenth centuries traders from the Dutch Republic found themselves in an excellent position. The nation imposed no trade barriers and the only tariffs were for tax purposes. At an early stage this was the perspective from which Dutch grain producers faced world market prices and regional trade developed. Requests from agricultural circles to introduce levies on grain imports were generally successfully countered by trading interest groups and, in general, a policy of free imports for agricultural products was favoured and maintained.

The student of Western Europe agricultural history quickly discovers that the Netherlands in particular was influenced by international trade and the economic development of harbour towns at a very early stage. The consequences of this situation are obvious. The prices of products and intermediates on international market became determinant for agricultural development in the countryside. Farmers feel the effects of the international outlook of their government most strongly in periods of low world market prices and oversupply. It is clear that if protection of the cereal market had been introduced during this period, it would have destroyed international trade patterns and worked against the interests of the trade centres.

Protectionist policies in Europe to defend farmers from cheap grain imports were introduced in the nineteenth century. This caused considerable instability. The trade in grain changed fundamentally. The cereal trade began to function as a way of assisting industrial specialization. Adjustment of the farm sector also meant specialization and Dutch farmers were encouraged to counter foreign competition by using low-priced cereal imports as inputs in animal production. Farmers were thus integrated into international trade: they started importing feed and exporting animal products.

Trade and farm integration

As international trade was carried on by private trading companies and shippers, these were in a stronger market position than individual small farmers from the very beginning. Well-known examples are traders in butter and the suppliers of potash. They exploited their market position and farmers were compelled to find a countervailing power. Cooperatives were founded and in this way farming was gradually integrated into the international economy. In other words, cooperatives were the route by which an industrial organization was created in which farmers could develop – using their own structure as starting points – to position where they could meet the challenges posed by the totally different patterns of conduct prevailing amongst traders.

Dutch cooperatives are nowadays regarded as the most successful in the world. Due to the outspoken exogenous development pattern the Dutch cooperative system is, however, a different species to cooperative systems in other countries. Cooperatives in the Netherlands are very much based on the way normal business is conducted between the members. The core-business of cooperatives is to lower transaction cost and to organise workable competition among members, so that their cooperative companies can achieve a strong market position.

The role of the government

Government, whilst it could not provide measures to give farmers market protection, resorted to other ways of supporting them. The most important aspect of government interference since the late nineteenth century has been the provision of public funds for agricultural research, extension and education. Government provision has also played an important role in stimulating structural adjustment such as water control systems and land consolidation. Both types of policy interference have stimulated a shift from resource-based agriculture to science-based agriculture. New technology favoured new farm structures and new farm structures stimulated a speeding up of new technologies.

The impact of government policy on structural adjustment and research and development must be considered against a background in which land was a particularly scarce production factor. Both policy lines have contributed, in fact, to making Dutch agriculture the most intensive type of farming in the world.

Intensive agriculture

Dutch farmers succeeded in realizing high levels of production growth supported by a system of price stabilization and, later, by EC support, investment subsidies, government-founded research stations, extension services and heavily subsidized programmes for land consolidation and reclamation. This was not only due to their hard work, but also to the availability of new tools and inputs. The development of tractors and

associated machinery, chemical fertilizer and plant protection products enabled farmers to cross barriers that had hitherto kept production levels low. Dutch agricultural policy facilitated a rapid dispersion of new findings into everyday farming. Also a high labour exit rate due to the growth of employment in the non-farm sectors created a new need to replace farm labour.

The inclination towards more intensive production systems and higher outputs per hectare and per animal was stimulated considerably by Common Agricultural Policy (CAP). When the Common Market was established the Dutch agricultural sector was strongly in need for new market outlets. The EC provided Dutch farmers with ample opportunity as the CAP further stimulated the type of developments that had already been taking place in the Netherlands. The Common Market meant a larger market and the guaranteeing of reasonable farm prices. In this way extra incentives to increase production and income were introduced. Production enhancing inputs such as fertilizers and pesticides were not affected by the EC and prices stayed at a relatively low level. Given its advanced position, the opening up of stable EC markets has further encouraged Dutch agriculture to develop into what is probably the most intensive farm production sector in the world (see Table 1). There are both agronomic and economic reasons for this development.

Table 1 Input and Output Levels in Various Countries

Variable	The Netherlands	Germany	France	USA
Output				
wheat (kg/ha)	6,240	4,950	5,030	2,220
potatoes (kg/ha)	37,600	29,000	27,300	29,800
milk (kg/ha grassland)	10,159	5,278	2,493	2,469
Input				
N-fertilizer (kg/ha)	237	109	70	24
pesticides (kg per ha)	5	1	2	n.a.

The rationale for intensive agriculture: agronomic reason

The agronomic reason for intensive agriculture is that at high levels of nutrition the growth processes of plants and animals are biologically more efficient. It is easier to 'understand' a cow with high yield than a cow with a low yield from a scientific point of view. This is because the optimum relationships between growth factors are better achieved at high levels of input. With an optimal supply of water, for example, the dry matter production of a crop is notably larger but it also increases for each kilogram of nitrogen applied. If all other conditions for growth are near optimum, the uptake of nitrogen applied to a wheat crop is nearly twice as high as in conditions of sub-optimal ratios. In addition, the proportion

of nitrogen fertilizer which is effectively used increases to 0.75 compared with 0.43 in subtropical conditions.

Economic grounds
There are also economic reasons for intensive agriculture. Due to the characteristics of the production process, various of the direct costs connected with crop growing such as sowing, fertilising and plant protection measures are fixed costs. Given earlier investments in soil improvement, water control and land consolidation it makes no sense in most areas to change to more extensive production systems with less yield enchancing inputs. No cost-price reduction can be achieved in this way. This fact has been proved time and time again by Dutch research stations. Adjustments, on the contrary, are always being looked at particularly as far as further control and intensive methods are concerned. New insights and scientific knowledge are embodied in non-factor inputs and in new investments.

Stimulated by the CAP
A third reason for adjustment by intensification and yield increases per hectare and per animal is to be found in the climate of agricultural policy. Under the Common Agricultural Policy regime, emphasis in agronomic and technological development was put on land-based production. Increasing the productivity of land has assumed a dominant position in farm management. In the Netherlands, this means that differences in skills and management are reflected in the productivity levels of different farms and these differences in farm management are reflected in land prices because land is the most scarce factor of production. The price of high land in the Netherlands not only means high production potential, it also reflects differences in farm incomes. Differences in farm income are, in turn, the outcome of rapid technological advance. Rapid technological advance means the successful development of new inputs, non-factor imports (seeds, fertilizer, pesticides) and factor import (skills, machinery and land use practices). All this can be summarized under the heading of intensification.

The EC market and price policies created a very special market situation. That is to say lower product qualities were allowed by the policy measures. It is clear that this considerably stimulated a biological-technological type of innovation. Numerous research projects by intermediate industries have been geared to generic production efficiency. Investments in this type of research and development, moreover, were not at all risky because the CAP created market guarantees.

Intensive agriculture favours commercial integration and vice versa
Gradually, in Dutch agriculture, the capital-land ratios increased. In horticulture and intensive animal production this meant that investments were of shorter duration. Investments in land cannot be depreciated and

are of a fixed-cost character. Investments in other production factors have a shorter life-cycle and enable a more rapid rate of innovation. As a result horticulture and intensive animal production became less land-based and increasingly integrated into market chains and financial markets. This phenomenon of further integration fits in well because intensive production means increased added value. The possibility of being able to vary value-added in the product is a prerequisite of effective market strategies. In this way these sectors become more integrated into the food and fibre agribusiness, that is the processing and distributive sectors.

Exogenous Versus Endogenous Development Pattern in the Hey-day of CAP

Exogenous Development

In this section the patterns of exogenous and endogenous agricultural development are described. This is done under the conditions of EU agriculture, when the CAP was enjoying its hey-day, and is summarized in Figure 2. The four major descriptors are shown as the axisses of the four squares. They show the relationship of agriculture to:

a CAP and GATT (including negotiations and policy reforms)
b technology and investment patterns
c institutional development
d resource endowment, ecology and natural environment.

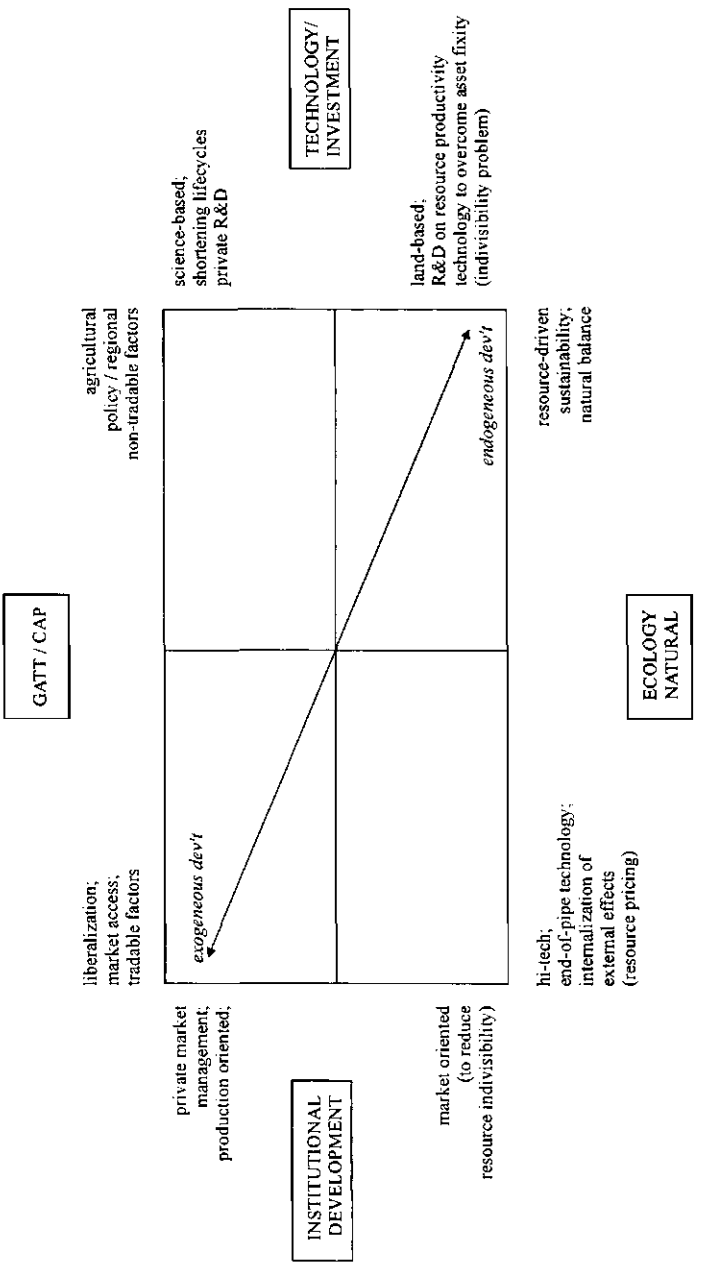
Naturally, Quadrants I and IV are the two quadrants that can be most meaningfully interpreted. Nevertheless Quadrants II and III can also be described according to examples of agricultural systems.

Quadrant Number I may be seen as the extreme exogenous case. Examples here include modern glasshouse horticulture and intensive meat production systems. Modern intensive animal production farms take an interest in market liberalization. The GATT agreement safeguards such farms from protectionism thus guaranteeing free access to grain substitutes. The opportunity of generating greater market access for its end-products is also in the best economic interests of this type of farm. Production volume is determined by efficiency and market access.

The exogenous development pattern has led to a farming concern which is integrated into the international trading system. The farm is seen as a real business. It has made itself as independent of farm policy as possible and it regards land-based farm systems as supplier of raw materials, in this case feedstuffs.

The exogenous farm system is both commercially oriented and science based. Its investment behaviour aims at lowering the incidence of fixed cost items at farm level. Shortening investment life cycles, furthermore, has the advantage of allowing technology to be adopted more quickly. Research and development at farm level is accomplished by study-groups.

Figure 2 Four Dimensions in the Differentiation of Endogenous and Exogenous Development



When considered from the perspective of ecology and natural resource endowment, imports of feed have created surpluses of manure and caused the mineral intoxication of soil, water and air. The solutions to this external effect have been looked for in high-tech, end-of-pipe methods. Likewise specialization and necessary business-type restructuring is implemented. Examples are the tradable emission rights for farms in certain regions. Tradable emission rights are an example of exogenous development directing institutional development towards the privatization of market policy. Another key feature of exogenous development is financial innovation.

Endogenous Development under the Conditions preveland during the Hey-day of CAP

The first and foremost feature of endogenous development under CAP is that agricultural systems following the 'more' endogenous route have remained largely land- or source-based. As a result this type of agriculture was most threatened by the GATT negotiations and the MacSharry reforms. The most important reason for dependency on CAP is that endogenous agriculture is characterized by high fixed-costs because of the importance of land input. Nevertheless the resource-driven character of endogenous agriculture research and development has had a considerable impact. Research and development was mostly geared to enhancing the resource productivity of crops and animal products under the heavy CAP-market regimes. However, due to the land-based character of these systems the natural ecological balance was generally maintained.

Market orientation has been overshadowed by the marketing and pricing policy of the EU but restructuring of farming has continued. Restructuring has, generally speaking, resulted in the enlargement of farms and a continuous increase of non-factor (non-farm) inputs. In this way farms have tried to reduce the problem of resource indivisibility (man/land ratio, capital/land and man/capital ratio). Finally, the development of this type of agriculture is related to the development of the rural economy, especially in the remote and less densely populated areas.

Exogenous and Endogenous Development – Their Future Meaning

In the preceding section the concepts of exogenous and endogenous agricultural development have been discussed in terms of the past. Now we will address ourselves to the question of their future prospects. In doing so we will confront some fundamental trends and turning points. It will be argued that European agriculture is coming into a new era and profound changes are at hand particularly as far as the role of government in agriculture is concerned.

Government and Power

A. Trends: political power. In many Western European countries the twentieth century was a century of building tacit coalitions, quasi agreements and umbrella organizations in order to gain and exercise collective power. The Keynesian approach to economic policy-making most probably had a strong and stimulating effect on the view that collective goals can be formulated and that these can subsequently be achieved by collective instruments that is collective action. Institutional engineering and social engineering – the making of societies as if they were mere social constructions – was the logical consequence of this view. In state socialism these ideals have been elaborated to state intervention which occasionally led to the extremes of a command-economy. The collapse of parties and systems in Central and Eastern Europe has made dramatically clear that human nature does not readily accept such systems. In Western European countries collective institutions are under attack, or to put it more precisely, they are crumbling.

Turning Points

The view that collective goals can be formulated and can subsequently be secured by applying collective instruments is no longer a dominant one. There is now a growing consensus that claims collective goals are impossible to attain. Responsibilities are born by firms and individuals. Individuals make calculations concerning the cost-return of relationships when planning to enter into a contract and deciding whether they will cooperate or not. In the same way it is no longer self-evident that an individual becomes a member of a professional organization or 'belongs to' a church. The role of government has also changed. Government used to represent justice, ethical values, and present the long-term view. Now, increasingly, the government is seen as the coordinating agent in an ongoing society-wide debate (a never ending discussion about conflicts of interests, formal law and the legal conditions acceptable to private business. In other words, the government is increasingly regarded as – and in fact acts according to the managing organization of the various political arenas. As a result governments are more involved in making procedures and allowing legal conditions and organizations to drift, than in setting priorities and collective goals. Increasingly the philosophies of the neo-Austrian school with the views of well-known scholars such as J. Schumpeter, W. Röpke, F.A. Hayek and L. von Mises are being recognized as acknowledged sources for reformulating the role of government in the modern state.

B Trends: the economic power of the state. Formerly, economic power was closely related to the constitutional powers of the state. It used to be possible for government agencies to introduce market stabilization policies. In this way they realized price levels that were considered adequate for

the realization of decent farm incomes. Governments, in fact, acted as a buyer-in-last-resort with open-ended funding. As they were able to continue such policy mechanisms for many years, farmers began to think that the treasury was limitedless in its resources.

Turning Points

Although no one can deny that Western governments and the EC can still bear the cost of farm policy it is self evident that public support for financing agrarian policies is rapidly disappearing. A better example can, however, be found in recent experience with the collapse of the European Monetary System. National banks were unable to maintain currency exchange rates within set limits. In fact, when currency traders launched an attack on the French franc, the French National Bank used up its reserves in less than a day (1993). Other examples can be found in the collapse of 'welfare state' – arrangements and the adjustments being made to social security systems throughout Europe. European governments are wrestling with budget restraints, there are no prospects in subsidizing old industries and labour costs are high given new sources of competition.

These experiences have convinced political and business leaders that it is unavoidable that Europe fosters cooperation and the integration of policies. Similar competitive conditions and quality regulations are seen as necessary in the different regions. This becomes especially true as the region becomes the entity with which citizens feel the most affinity. Formerly it was the nation that illicited the most loyalty. Now this new region-phenomenon can be observed throughout Europe and has had an impact on both markets and the representation of interests. In agriculture, national leaders of professional farm organizations see their power reduced and, at the same time, regional leaders gain influence. Food consumers increasingly demand food grown in their own land and cared for by people who they know. Firms working on a European scale and other multinational companies adapt to such trends and need the facilitation of European currency and European regulations to avoid non-tariff trade barriers. Governments, of course, still have to play a role in such processes. However, the new law seems to be that 'governments follow business' rather than 'governments control business'.

Markets and Consumer Behaviour

Trends There is little doubt that policies and technological developments in the agrofood industry were focused on the growing numbers of consumers who wanted good quality at reasonable prices. Consumers were becoming increasingly used to the quality of choice and uniformity of products available to them. Outward appearances began to play a key role as soon as basic requirements were fulfilled. Food industry analysts in

recent decades have described the period as one of 'the industrialization of products'. Products were increasingly controlled and agriculture began to become science-based rather than resource-based. Efficiency strategies were followed and consumers were supplied with a complete range of uniform products week after week.

Turning Points

The trend towards the industrialization of food products is changing too. Consumers are increasingly critical especially as far as production methods, animal welfare and residues from crop protection chemicals are concerned. This trend turning point is undoubtedly a most fundamental one. Consumers are influenced by behavioural trends that seem unique in history. Two points have to be mentioned. In the first place consumer conduct is determined by an extraordinary form of personal health care. It seems that consumers only want one thing: to keep themselves young, fit, healthy and virile as if there was no tomorrow. We can compare this attitude with the life and philosophy of Francis of Assisi who spoke of his body as 'Brother Ass' which had to suffer for the cause of spiritual values and the 'business of Heaven'. In the second place there is the success story of (international) brands. Consumers seem to want brand products. Brands stir up emotions. It is important to understand that today, as Joan Robinson has noted it is desire not satisfaction, that determines price. This seems to contradict the first trend. However, they may have something in common and this can perhaps be found in the philosophy of post-modernism. On the one hand, man is freed from collective principles, his personal faith is what he 'feels', he is but a part of eternal cosmic developments. On the other hand, the modern consumer wants to ascribe truth and value to the products he uses. He apparently wants to be able to put his faith in someone supplying something. 'A modern brand is a collective to which I belong'. This is the expression of an almost narcisistic culture and it is a fundamental necessity for product integrity. There is little doubt that this schizophrenic consumer is posing considerable problems to agribusiness firms. He is also 'a difficulty' as far as government policy is concerned. One has to bear in mind that consumer behaviour does not stand alone. It is a reflection of fundamental social, philosophical and religious trends in society.

Government Policy in Agriculture

Trends In industrialized countries governments have generally practized protective policies as far as farmers are concerned. These policies have either taken the form of price subsidies via levies on imports and subsidies (restitutions) on exports or of government payments in the form of deficiency payments. Deficiency payments are financed by taxpayers and levies on consumers via higher consumer prices. Therefore, the deficiency payment system has a less negative impact on consumption. However,

both systems lead to rolling-over the internal disequilibrium to world markets and to countries that cannot afford to offer similar protection to their farmers. In the EC, variable levies and restitutions have lead to the complete isolation of domestic (EC) markets from the world markets.

Turning Points
Recent disputes under the auspices of the Uruguay Round of GATT negotiations have made clear that, in fact, it is the government budgets of the various countries which are in competition. As a result, each country is beginning to see that the intended effect of its policies on farm income is far from being realized. New trends following the GATT negotiations include reduced support to farmers and the acceptance of foreign competition. Variable levies and quantitative import restrictions are increasingly being substituted by lower and fixed tariffs. Instead of supporting incomes through price and market policies, a new trend towards direct income support is emerging. Direct income support can take the form of direct payment to farmers, but it is more likely to be realized by payments per acreage. It is their social task to assist in distributing the impact of government policy to different regions, sectors and farming styles.

The Institutional Design of Agriculture
Trends The institutional design of an agrarian sector reflects the role of government and its relationship with the private sectors right to self-regulation and the structure of interest representation. The government cannot reach each farm individually and, therefore, it is necessary that farmers organize themselves in order to make (more or less) homogeneous interest groups. In this way a farm lobby is established. The desires and fears of farmers are then given voice through various organizations, some of which are private and other semi-public. The trend was that, generally speaking, professional farm organizations negotiated on the policies to be applied by the government.

Turning Points
Just as governments have generally turned to more open competition and direct measures of income support, in traditional lobbies the inter-relationship between markets and farming is also being reconsidered. Instead farmers organizations, negotiating on direct measures of income support, are now supplemented by local, regional and specialized or niche market-oriented structures. These new groups act on the understanding that farm income is increasingly determined by market forces. Therefore, they attempt to build their own vertically integrated chains and to exert power on agribusiness firms and supermarket chains.

The institutional design of agriculture is presently in a state of flux. No clear structures have, as yet, been established. Governments no longer have 'THE farm lobby' as their private discussion partner. Increasingly

farmers and their market partners have joint interests and governments are not yet ready for this situation. In the past it was farm policies and as yet there are no farm-agribusiness policies.

Asset Fixity and Transaction Costs

Land-based farming is supported by governments all over the world. The reasons for this can be summarized as follows: the technical structure (influence of the weather and inflexible production times), the production structure (many, relatively small, family farms with an inflexible supply of labour and capital) and the structure of the market (a limited number of goods which, in many cases, are homogeneous with little price elasticity in response to supply and demand) render the market for food – which is a basic need – very unstable. No country has ever been able to afford to take serious risks in this area. It is essential to realize that this market instability has been reduced by technical means. The weather, soil fertility, diseases and epidemics have a less decisive impact on the volume of production than they used to have. However, economically inflexibility has increased.

The proportion of fixed (or virtually fixed) costs in total production costs has risen. The cost of land and buildings have traditionally been the main factors in land-based farming. That is why a fall in the price of a product does little or nothing to reduce the volume marketed. Even if some farmers go bankrupt, it is no solution because the land remains in production and their 'neighbours' buy it in order to cut production costs by means of economies of scale. This phenomenon has been accentuated because, as a result of technical development, capital has replaced labour and the proportion of fixed costs accounted for by capital has increased. Moreover, technical changes have resulted in low marginal productivity for 'variable' inputs to increase yields such as artificial fertilizer, crop protection products and compound feed, because they are in effect technically dependent on one another and, therefore, have to be used in virtually immutable ratios. This means that when prices of inputs rise and output prices fall, there is a fairly wide margin within which the optimal technical mix remains unaffected. The real choice is between carrying on as before and taking the radical decision to cease production. In the latter case, the land will be taken over by another farmer in an attempt to secure economies of scale to compensate for falling prices. If it were true that economies of scale would, in the long run, enable agriculture to become competitive, a policy of restructuring could be defended and protection as a means of avoiding restructuring would be defensible. Protection as a means of avoiding restructuring is, however, economically unsound and politically untenable. But here is the rub. In many countries it is impossible for land-based agriculture to become competitive through restruc-

turing without severe sacrifices being made in terms of the landscape, environment and habitability. Countries like Argentina, the Ukraine and the USA are exceptions and not the rule. Thus the choice that remains is between substantial (or at least greater) dependence on food imports combined with price instability, and subsidizing farming in an appropriate manner and an appropriate amount. There is an additional argument to be considered. Since the fixed-cost problem outlined here is also becoming increasingly common in the other parts of the world as farming develops, the free sway of price mechanism is doing less and less to control production. Thus, in the world at large, the markets power of self-adjustment is weakening and this will obviously lead to chaos in food supplies.

Transaction costs are the major issue in economics and policy making. Transaction costs basically stand for the costs of running an economic system. Throughout Europe, and perhaps world-wide, there is a trend toward decreased government influence and more dependence on the operations of market mechanisms. It should be realized, however, that market economies are only successful in lowering transaction costs if one extremely important precondition is fulfilled: morality and basic values with respect to sticking to contracts and making market truths by keeping ones promises. A market economy can have such a basis if it is built into a country's institutions, rules and regulations. When the institutions upon which commerce and production are based are detached from keeping resource endowment in line with production systems, it is unlikely that the food system will be able to stand the test of public requirements. And it is precisely here that we must look for the rationale of endogenous development patterns.

Conclusions

It is hard to imagine that agricultural development will take an extremely endogenous character. As a matter of fact, the introduction of greater market responsibility into agricultural policy will force agriculture to integrate with agribusiness both in terms of processing and intermediate products supply. Notwithstanding this development, there is little doubt that the lines of the Common Agricultural Policy now being applied have stimulated a type of exogenous development that will now come to an end as agricultural policy changes. As a result European farmers will have to find their own paths of development. In the process there will undoubtedly be greater room for individual variation. The emergence of new farming styles has already been illustrated by van der Ploeg and Saccomandi (Chapter Two). These farming styles seem to be more susceptibility to local resource endowment and local demand.

Local demand will also have its own impact. Consumers in the region are increasingly stressing product integrity and the origin of their food.

Product integrity refers to production methods which take into account modern views on social welfare, nature and environment. Product origin has a more complicated meaning. There seems to be a complex of elements which relate to the idea and value of food products 'from people I know' and 'products from this region'. The policy-makers in Brussels are presently giving backing in this development by stimulating more extensive production systems. In other words, to production systems which can make more extensive use of resource endowments.

All these changes lead to more types of endogenous farm development. A crucial factor for the future of endogenous development will be the value of the 'brand name' of its products versus costs and prices. A key role in this process will be played by the food industry and the retail business. Countries which have so far experienced exogenous agricultural growth have developed strong cooperatives and export markets and are well integrated into the food business. Other regions which are less developed cannot successfully follow the exogenous route. Endogenous development means competing using specific product attributes, for example, as these relate to health, the environment and biology. This competition will start in local and regional markets. Therefore, it seems justifable to conclude that endogenous development will stir up regional competition. One thing is clear, in Europe there is no policy at hand to guide processes of endogenous development and concomitant regional competition in food production, processing and marketing. More research into the consequences of current changes and their implications for regions, policy and the food business is absolutely necessary.

5 Networks in Rural Development: Beyond Exogenous and Endogenous Models

Philip Lowe, Jonathan Murdoch and Neil Ward

Introduction

Ideas about rural development are being turned upside down. In the past decade endogenous (or 'bottom up') approaches have displaced exogenous models, which conceived the main forces of modern development as emanating from outside rural areas. In this paper we consider this shift and seek to understand why it has come about. We critically assess both endogenous to exogenous models of rural development in the light of recent developments, particularly the evidence on rural industrial districts. We conclude that the exogenous/endogenous distinction priviliges an artificial spatial polarity and we propose an approach to the analysis of rural development that instead stresses the interplay between local and external forces in the control of development processes.

We should begin by acknowledging that the economic functions of rural areas have shifted immeasurably in recent years. For instance, while agricultural employment has continued its relentless decline, it is now evident that new firm formation rates and employment growth have been higher in small towns and rural areas than in large urban centres. In France, for example, 52 percent of all industrial jobs in the period 1976-85 were created in rural areas. In Italy, between 1971 and 1981, 63 percent of the non-agricultural jobs created by private firms were situated in rural areas (OECD 1988, p. 16). The situation varies greatly from one country to another and from one region to another. In some cases growth is due to the decentralization of productive activities, but very often it is due to indigenous industrialization. In any case, research done in southern European countries (Fua 1988; Vazquez-Barquero 1988; Colletis *et al.* 1990) shows that industry in rural areas has increased productivity considerably. Furthermore, in more central regions, service activities have also relocated to rural areas, thereby accentuating an employment pattern already heavily weighted towards the service sector (Vazquez-Barquero and Lopez 1988). Within these broad shifts we ought to recognise the mix of exogenous/endogenous elements.

Certain characteristics of rural areas may be identified to account for these new roles. These might include:

- a relatively low-wage and non-unionized workforce;
- reduction in migration flows from rural to urban areas, as a result of both the urban production crisis and better accessibility, helping to stabilise rural labour supply;
- a small-scale business structure and a culture of entrepreneurship which provides conditions for rapid economic adjustment;
- state support for agriculture, which has been capitalized in land values, giving rural landowners sources of collateral to invest in new businesses, and which provides support systems designed to encourage farmers and rural landowners to diversify;
- greater accessibility for rural areas as a result of improvements in telecommunications and transportation systems;
- the favouring of rural locations by some of the new-wave technologies, particularly biotechnology and information technology;
- the high priority given to non-material and positional goods by influential and affluent sections of society, who place increasing value on the opportunities rural areas provide for living space, recreation, the enjoyment of amenity and wildlife, and a wholesome and pleasant environment.

These characteristics are not uniformly present. Being no longer so subject to the imperatives of a single industry, the development trajectories of rural areas are thus diverging, leading to a more differentiated countryside across Europe. Differentiation is heightened by the increasing competition within and between regions to attract or resist external forces of change.

In the wake of these changes has come a shifting emphasis in both policy responses and the social scientific understanding of rural economic development. This paper begins by reviewing traditional exogenous models as formulated and applied in a Western European context, and shows how they have become discredited. In recent years, endogenous approaches have been promoted. The paper formulates an empirical and relational concept of endogenous development in terms of local control. It then seeks to locate the contemporary dichotomy between exogenous and endogenous development in an analysis of the changing context for rural development from a restructuring perspective, and goes on to discuss the development of the concept of rural industrial districts in relation to endogenous development. It is argued that all these approaches have lacked a grounding in social theory. In response to this state of affairs, the final section presents the methodology of network analysis as a means of analysing the empirical concept of endogenous development and of conceptualising the relative endogeneity of specific development processes from within a coherent theoretical perspective. We conclude with some comments on the potential roles that rural areas might be expected to play in emerging constellations of network forms.

The Exogenous Model

The classical formulation of the rural development problem was founded in an understanding of urbanization and industrialization as mutually reinforcing and unilinear processes whereby capital and labour were increasingly concentrated in cities. Within the modernist development trajectory, the function of rural areas, stripped of other economic activities, was to provide food for the expanding cities. The notion of balanced or articulated development was embodied in the achievement of a spatially polarized but nationally integrated geography in which cities functioning at the core of specialized regional economies concentrated the bulk of population and commercial and industrial activity, while rural areas became dominated by a technically progressive, market-orientated agriculture. The spatial category of rural was often viewed as a residual category and became equated with the sectoral category of agriculture.

The 'problem' of rural development followed from this classification and was seen to arise in those regions and countries where too many people remained on the land, thus restricting the transfer of profit and labour needed to fuel urban and industrial growth, as well as inhibiting the development of a competitive and efficient agriculture. It was widely believed that such stagnant regions needed to be connected to dynamic centres and expanding sectors. It was never clear, however, what the eventual equilibrium between urban centres and their rural hinterlands would be. Even areas of highly commercialized agriculture seemed destined to steadily lose population because of the tendency towards diminishing returns within agriculture. Thus even the most developed and prosperous rural areas were locked into an unequal exchange relationship with urban-industrial growth poles.

Classically, therefore, the development problems of rural areas and regions were diagnosed as those of marginality. As a concept, marginality has a number of dimensions – economic, social, cultural and political – although discussions about rural development marginality is often understood in geographical terms to be synonymous with peripherality or remoteness. In this sense it has long been recognized that people living in rural areas have suffered problems of physical exclusion from urban-based services and jobs. Low productivity in the primary sector has compounded such difficulties, condemning those who live and work in rural areas to a low standard of living.

Peripherality, though, was always a metaphor for other types of distance too. Rural areas were distant technically, socioeconomically and culturally from the main (urban) centres of activity. In all of these respects they were either backward or lagged behind. From a regional perspective, the ideal model depicted dynamic centres as being locked into dynamic regions. Steps could be taken to encourage the transfer of progressive models, technologies and practices from dynamic sectors and regions. However, it was only through overcoming peripherality that rural 'back-

waters' could be reconnected to the main currents of economic and social modernization. Within this fundamentally exogenous perspective on rural development, the basic policy response was a combination of subsidising the improvement of rural services, the refashioning of farm structures and the modernization of agricultural production to enhance farm incomes, and the encouragement of labour and capital mobility.

The state-sponsored modernization of rural services and of agricultural practices and technologies has been a constant feature of post-war rural development. Policies to encourage labour and capital mobility, though, have fluctuated. The first phase in European policy was one of consolidating farm structures (i.e. land reform in southern Italy and Greece, and plot consolidation and enlargement programmes in Belgium, France, West Germany, Spain, and the Netherlands) linked to land improvement schemes (including drainage and irrigation) and the development of farm-oriented infrastructure. The aim was to establish commercial units able to mechanise and absorb other 'productivist' technologies and to reduce the agrarian population particularly through the elimination of small and marginal holdings. Although this strategy was intended to strengthen the economic and social structure of rural areas, the aim was closer integration into regional, national and international markets. It was participation in these wider fora which would ultimately determine rural development patterns.

However, it became apparent that such measures could not stabilise rural economies and rural populations; indeed, they seemed to intensify the flow of labour out of agriculture and often out of the rural areas altogether. A second phase of rural development therefore emphasized the attraction of new types of employment to rural areas. Manufacturing firms were encouraged to relocate from urban areas or to set up branch plants. As well as financial and fiscal inducements, development agencies concentrated on providing infrastructural support, including improvements in transportation and communication links and the provision of serviced factory sites and premises. Most European countries adopted this approach, but it was particularly strongly pursued in France, Ireland and the UK. In some regions the emphasis was on the development of tourism as well as, or instead of, manufacturing.

By the late 1970s exogenous models of rural development had fallen into disrepute. The continued intensification and industrialization of agriculture came up against the saturation of domestic markets, against ecological limits (with rising problems of agricultural pollution and ecological degradation) and against a greatly diminished capacity in the urban sector to absorb the surplus rural population. Moreover, the recession of the early 1970s resulted in the closure of many branch plants and a growing sense that rural regions which had attracted a great deal of such inward investment were highly vulnerable to fluctuations in the world economy and distant boardroom decisions. It was now recognized that:

'companies used regional policy incentives to locate either capital intensive or low wage 'cathedrals in the desert', which offered little to the host economy in the way of skill formation, technology transfer, linkage opportunities, transmission of new managerial and entrepreneuerial know-how, and reinvestment of profits. Terms such as 'branch plant economy', 'dependent development' and 'industrialization without growth' were coined to highlight the incorporation of such regions within the global business logic of firms governed elsewhere; a logic working against any self-governing and self-sustaining regional economic development' (Amin 1993, p. 2).

Endogenous Approaches

These difficulties encouraged the exploration of endogenous approaches to rural development on the assumption that the specific resources of an area - natural, human and cultural - hold the key to its sustainable development. The emphasis now shifted to rural diversification, to bottom-up rather than top-down approaches, to support for indigenous businesses, to the encouragement of local initiative and enterprise and, where these are weak, to the provision of suitable training. Prominent examples of this kind of approach can be found in the activities of development agencies particularly in peripheral regions of Europe, for example in the Irish Gaeltacht, in the local contract plans drawn up in the fragile zones in France, in the Scottish Highlands and Islands, in rural Wales and in mountain community projects in Italy.

According to Picchi (1994, p. 195) endogenous development is to be understood as 'local development produced mainly by local impulses and grounded largely on local resources'. He cites the following elements as critical to development 'from within' in the Emilia-Romagna region of Italy: the importance of the agricultural sector for the provision of capital and labour needed in non-agricultural enterprises; the ability of this labour to engage in new economic activities; the cultural orientation towards self-employment; an extensive network of small- and medium-sized enteprises; and a dense system of interdependencies between economic sectors and units. He also identifies a set of political-institutional arrangements which have helped strengthen endogenous development patterns. These include a rich network of services provided by local administrations for economic sectors, planning mechanisms aimed at strengthening development patterns and a stable climate for industrial development.

Such elements regularly feature in academic descriptions of endogenous development and the reasons for its success (and failure). However, while it has become possible to identify a number of variables which seem implicated in mobilising local development potential, social science *theory* has not been particularly successful in providing useful models to inform endogenous approaches. Indeed, the switch from a concern with exogenous to endogenous development strategies has been driven by practical realities and not by theory. On the one hand, as outlined above,

exogenous approaches have patently failed. On the other hand, quite unexpectedly and largely irrespective of deliberate regional policies, some rural areas and regions have prospered. The so-called population turn-around and the urban-rural employment shift surprized policy makers as much as academics. While social scientists have struggled to come to terms with the meaning and significance of these empirical trends, development agencies have realized that rural areas and regions may possess a growth potential of their own just waiting to be unlocked. Attention has, therefore, been focused on economically buoyant rural regions to see if the lessons learned from their experience can be transferred to enable a similar pattern of self-sustaining growth elsewhere.

The essential pragmatism involved in this type of development strategy has inevitably attracted the charge of empiricism. As Slee remarks: 'Endogenous development is not so much a concept with clearly defined theoretical roots but more a perspective on rural development, strongly underpinned by value judgements about desirable forms of development' (1994, p. 191). The irony is not lost on Slee that the same agencies and officials who once favoured exogenous development now enthusiastically promote bottom-up approaches and he interprets this as a refinement of their tactics:

> '*Development agencies have thus adapted their modus operandi, without altering their fundamental aims and obectives. They have recognized that long-run developmental gains are likely to be secured more effectively by encouraging local entrepreneurship than by inducing footloose branch-plants into the area. The same packages of infrastructure development, grant-aid, loan finance and business and community support services are still in evidence, but the agencies have learned to adapt these elements to the local social and cultural context*' (Slee 1994, p. 193).

He goes on to conclude that:

> '*It would be erroneous to describe these changes in development practice as a substitution of endogenous development for exogenous development. Both are examples of dependent development, although endogenous development strategies may provide rather more opportunities for locally-based social, economic and cultural circumstances to shape the development processes*' (Slee 1994, p. 194).

This analysis may well be perceptive in characterising the shifting tactics of certain regional development agencies, but it cannot be accepted as a definitive conceptualization of endogenous development. If endogenous development has any meaning it must refer to a local developmental potential which state agencies may be able to stimulate and channel, but which exists independently of them. The patterns and trajectories of socio-economic development must be distinguished from agencies' strategies. However, the neo-classical and Marxist literatures to which Slee

refers both portray development as externally generated, or as he puts it: 'External forces will be the principal determinants of development. Endogenous forces may colour the nature of the process' (pp. 193-194).

This structurally deterministic perspective, which would formally deny the possibility of endogenous development, is clearly misconceived. Most forms of development in capitalist societies involve the welding of local with extra-local labour and resources. Development does not merely happen in localities, but *through* localities, each with their own distinctive composition of labour power and resource endowments. It is inevitable that development processes, whether exogenous or endogenous, are shaped by local factors. As van der Ploeg and Long suggest, the crucial issue, therefore, is the 'balance of 'internal' and 'external' elements' (1994, p. 4) and they proffer the following definition:

> '*Endogenous development patterns are founded mainly, though not exclusively, on locally available resources, such as the potentialities of the local ecology, labour force, knowledge, and local patterns for linking production to consumption*' (pp. 1-2)

This definition represents a step forward in that it provides us with an empirical and relational concept – one which would allow actual development processes to be compared in terms of their relative exogeneity/endogeneity. However, its focus on the balance between local and external resources is misplaced (reflect, for example, on how the activities of international mining companies would automatically be classed as endogenous development on this definition). Instead, the crucial distinction should be between local and external *control* of development processes. Of course, such control may embrace local resources and their valorization, but the overall consideration is the extent to which individuals and groups are the object or the subject of development.

The definition by van der Ploeg and Long must be regarded ultimately as inadequate because it fails (except in the ideal but unrealisable case of self-sufficiency) to address the question of how local circuits of production, consumption and meaning articulate with extra-local circuits. For many if not most producers, this articulation occurs at the point of exchange and thus the terms on which it occurs are of crucial importance in determining the exchange value of their products.

Whatmore has expressed a similar criticism, using the example of farm business typologies, in the following terms:

> '*The socioeconomic relations of farming and individual farm units cannot be divorced from the wider social relations and institutions which structure the processes of food production and consumption. Typologies should help to identify the vital, reflexive connections between the local and the global, rural and urban, producer and consumer, such that the analytical and policy significance of endogenous development is not restricted to a series of unrelated and bounded geographical arenas*' (Whatmore 1994, p. 36).

Likewise, we believe that the discourse of endogenous/exogenous development is inextricably rooted in geographical boundaries and this prevents a full understanding of the complex relations referred to by Whatmore. Rather, we wish to argue below that an institutional focus which specifies *precisely* how the links between local actors and those situated elsewhere are established and the nature of the relations specified by those links is a useful way to proceed. This approach, we conclude, recasts endogenous and exogenous concerns into the analysis of economic relations as *power relations*.

Rural Industrial Districts

Evidence that a more complex understanding of the articulation between local and non-local economic institutions is evolving can be discerned in recent concerns around rural (or agro) industrial districts. Interest in such districts originates from literature on flexible specialization and the 'new institutional economics'. This branch of industrial economics, which developed in the 1970s, tends to emphasise the importance of studying the institutional context within which economic activity takes place. Thus the competitive process is seen as resulting from the construction and operation of institutions rather than the operation of so-called 'market forces'. The starting point for studies of industrial districts is the work of the economist Alfred Marshall (1890; 1927; see also Bellandi 1989), who argued that economic efficiency could be achieved not only through economies of scale within large and growing corporations, but also within groups of spatially agglomorated small firms located in particular 'industrial districts'. The term has been taken up more recently by commentators examining urban and regional economic change with a particular interest shown in strategies of flexible specialization.[1]

In common with the proponents of endogenous development the concerns of researchers studying industrial districts have been dominated by the need to move away from top-down, global and structuralist explanations of change towards more micro, locally-based studies, which see the role of localities as more than just the expression of structural processes. As a result, new industrial districts have been examined by those interested in economic organizational forms characterized by 'flexible specialization' as an antithesis to the 'Fordist' model of development. Because of this specific intellectual history, little thought had been given, until very recently, to the application of the industrial districts concept to the specific problems of rural development, although the term 'agro-industrial' or 'agrofood' district has been coined by Fanfani (1994) and Iacaponi *et al.* (1994) to introduce an explicitly rural and agricultural dimension to the study of industrial districts.

Agroindustrial districts are understood in the context of the growing integration between food production, processing and retailing. More than sixty different industrial districts have been empirically identified in Italy

alone (Fanfani 1994), and many of them are geographically characterized by clusters of small towns surrounded by rural regions. During the post-war period in Italy, like most of rural Europe, different types of agricultural production became increasingly geographically concentrated. This has facilitated the evolution of agro-food filieres with locally agglomerated, small and medium-sized firms specialising in the processing and distribution of local, high quality foods. Closely networked relations between local farms, processors, distributors and retailers make for flexibility in adapting to technological and market changes, but at the same time, allow value-added in the non-agricultural aspects of the food chain to remain within the regional economy rather than being captured by exogenous, and often multi-national, food companies.

Agroindustrial districts have been empirically identified before being theoretically conceptualized, although there is an emerging economics literature which is beginning to identify transaction costs as a key explanatory factor in their success (Saccomandi 1994; van der Ploeg and Saccomandi 1994). Transaction costs are costs generated by the market itself. They are the costs associated with 'going to market', including, for example, the costs associated with negotiating a price, arranging a transaction, drawing up contracts, travelling to market, examining stock and so on. Conventional economic theory makes several assumptions about competition and the market-place. These include the existence of a large number of buyers and sellers, equal access to information, technology and freedom of movement, a homogeneous product and the absence of transaction costs. Of course, these conditions are rarely, if ever, met and so among the actors in a market-place there cannot be a symmetrical use of resources. Thus Williamson (1981), a key exponent of the new institutional economics, argues that to function in the market place, firms have first to address the question of 'make or buy'. That is to say, the costs of using the market (the transaction costs) have to be continually compared with the costs of changing the function of the firm to make the good itself. This means that transaction costs are closely associated with industrial organization.

In considering endogenous development strategies in agriculture, van der Ploeg and Saccomandi (1994) propose that an important difference between endogenous and exogenous development patterns is that quite different relations between transaction costs, transformation costs and management costs are entailed.[2] Their suggestion is that 'exogenous development is generally characterized by comparatively high levels of transaction and transformation costs,[3] whereas endogenous development, on the contrary, represents very low levels for the cost categories concerned; management costs on the other hand are comparatively high in the case of endogenous development' (1994, p. 10). Such a theory, in which the balance between transaction and transformation costs on one hand and managment costs on the other turns out to be decisive is employed as a

means of explaining the 'mystery' of why so-called 'less-developed' styles of farming are able to compete with 'more developed, high tech' farms as well as the economic success of agroindustrial districts.

Agglomerations of specialist food producing farms and firms (including input suppliers and food processors, for example) in specific localities or regions mean that within the local system, firms can exchange semi-finished products with each other in what Iacoponi *et al.* (1994) call a 'collective production process' within which transaction costs are very low. The technologies employed in each firm are very similar and are well understood by local actors. This local technological atmosphere means that information costs are also low. In addition, the relations between local firms are regulated not only by formal, national laws and regulations, but also through local institutional norms and customs. Thus Becattini (1987) describes the industrial district as having 'a local thicknesss of inter-industrial relations which is durable in time and forms an inextricable network of positive and negative externalities [and] historical-cultural inheritances' (quoted in Iacoponi *et al.* 1994).

It is this 'thick' network of social, economic and institutional relations that Fanfani (1994) argues is crucial in understanding the success of agroindustrial districts. Networks appear 'thickest' in areas of greatest specialization, but differ from district to district. In the four provinces of Italy where milk processing and Parmesan cheese production are concentrated, more than 800 (mainly cooperatively run) cheese factories process milk from around 15,000 small- and medium-sized farms, producing around 100,000 tonnes of Parmersan cheese per year, with numerous and close relations between farms and factories. However, in the areas around Verona and Forlì, where around 60 percent of Italy's poultry production is concentrated, processing is more closely linked to industrial poultry production units than to small farms.

These institutional complexities seem to indicate that transaction costs alone are an inadequate means of explaining the emergence of industrial districts. Moreover, Hodgson (1988) has argued that explanations of the firm/market divide in terms of transaction costs lead to a highly misleading account of how this divide is established. In essence, Hodgson argues, markets and firms are different means of dealing with uncertainty (i.e. they lend stability and order to an otherwise chaotic world): markets create and legitimate norms through the integration of relatively autonomous agents; firms are institutions which generate conventions and rules on a more permanent basis, allowing non-market sets of relations to be established and sustained. Thus the firm cannot simply be explained in terms of costs. Hodgson concludes that:

> '*What must be incorporated in the theory is the function of the firm in reproducing and developing the habits and routines which are appropriate as an alternative to the optimising, rational calculus of profit and loss. The nature of the firm is not simply a minimizer of transaction costs, but a kind of protec-*

tive enclave from the potentially volatile and sometimes destructive, ravaging speculation of a competitive market' (1988 pp.207-208).

Moreover, this 'enclave' may be expanded beyond the boundaries of the firm as economic agents attempt to reduce market uncertainties. Firms enter into relationships with others (i.e. joint ventures) which cannot simply be reduced to a transactions cost calculus. Thus some elements of institutional inter-relations also seem to be important.

This claim is supported by Amin (1994) who identifies four features of successful industrial districts which cannot simply be reduced to costs. These are: inter-firm dependence; structures of sociability, 'local industrial atmosphere' and 'institutional thickness'. Inter-firm dependence arises from product specialization, not at the level of the individual firm, but specialization within an integrated system and with a 'detailed division of tasks between specialist producers, each of whom reaps the cost savings accruing from task-based, rather than product-based, specialization' (Amin 1994, p. 20). Structures of sociability, or 'local industrial embeddedness', relate to the local containment of the division of labour which usually refers to the 'local specialization along the entire length of a given value-added chain and related business services' (ibid p. 20). The local embeddedness of the chain, rather than being pre-given, arises from a local centre's ability to build large enough markets to generate sustainable demand for intermediate goods from other local suppliers. Local industrial atmosphere, Amin's third feature, represents 'the consolidation of an area as a centre of knowledge creation, inventiveness, entrepreneurial capability and information dissemination within a global industrial filiere' (ibid p. 21). Under such conditions, the competitive strengths of a district are derived from the use of flexible, multi-purpose technologies, craft skills and product adaptability, with information and 'know-how' 'seeping through every channel of the local economic system (firms, institutions, households etc.)' (ibid p. 21). Knowledge is thus collectively created and diffused in an atmosphere of socialization, sociability and 'studied' trust. For this to be so, networks of institutions are required to mediate conflict and facilitate cooperation. This 'institutional thickness', is Amin's fourth feature of an industrial district, and is defined as a 'strong institutional presence, that is, a plethora of institutions of different kinds (for example chambers of commerce, innovation centres, financial institutions, training agencies, trade associations, unions, local authorities, government agencies, marketing boards) which are highly proactive and provide a basis for widespread trust in collective representation' (ibid p. 21).

The identification of the institutional features of industrial districts alerts us to the complex nature of the local relationships likely to be evident in particular case studies. However, we are still a long way from a theory which would allow for the analysis of these institutional mixtures and linkages. At present this work is still operating at the level of simple

description. The problems with the approach as it stands become evident when we consider particular examples of industrial districts. As we saw above, Fanfani presents us with two sharply distinct examples of successful districts. How are we to compare and make sense of these? This problem can be summarized by Gertler's question: 'When is a district a 'district'?' Or, 'how do we recognise a true 'industrial district' or 'territorial production complex' when we see one?' (1992, p. 263). Amin and Robbins (1989), for instance, examine a series of case studies in the Third Italy (Emilia Romagna, Toscana, the Marche, the Arbruzzi, and the Veneto) and discern 'significant differences between them in terms of their origins and their consolidation as industrial districts' (Amin and Robbins 1989, p. 17). They conclude that 'in the new orthodoxy, virtually any example of localized economic life which is new or thriving, and which displays some sign of collaboration between specialized units, is to be interpreted as an industrial district' (ibid p. 21). Even in the high technology districts of the USA, marked differences in social organization are apparent between such areas as Silicon Valley and Route 128 (Gertler 1992; Saxenian 1991). Amin and Robbins (1989, p. 23) speculate that there may be 'several types of new production complexes which are very different from each other and whose development is not guided by one overarching structure of transformation'. They advocate an approach which meshes 'rigorous theoretical inquiry' with 'rich historical analysis'. While the latter may now be more common, the former is conspicuous by its absence. At present we have very few theoretical tools – aside from the 'thick description', to use Geertz's term, of so-called districts using the very general variables identified by Amin.

Beyond Endogenous/Exogenous Models: Network Analysis

As established national and regional economic hierarchies succumb to globalising and localising trends, the external and internal linkages of regions are subject to extensive restructuring. An optimistic view, shored up by cases such as the Third Italy, emphasises the decentralization of management and production which can produce new complexes of local ties and linkages, as a basis for the regeneration of formerly marginal regions (Sabel 1989). More usually, though, the crystallization of inter-firm networks and alliances across sectoral boundaries is not a localized phenomenon and thus a basis for consolidation of a regional economy, but involves a world-wide web of business linkages along the value-added chain. This process of functional integration and spatial dispersal is apparent across the spectrum, from agribusiness and manufacturing, to hightech industries, financial services and the cultural industries. Thus while some firms are plugged into global economic networks others remain, or become, marginalized within their own region.

Given the distinct, and often divergent, complexion of successful rural industrial districts, and their differential integration in, or exclusion from,

new economic configuations, it is clear that any theoretical approach aimed at uncovering the reasons for these outcomes must be itself flexible and able to work with the grain of actually existing practices. In this context, we believe that the key questions to be addressed in accounting for success must be: How is value generated in chains of production and consumption? and, secondly, Who exercises control in such chains? By focusing upon such issues as 'institutional thickness' we are forced to confront how associations between economic actors are constructed, how control is exercized and value extracted. Thus, strengthening what Amin and Thrift (1994, following Latour 1986) call local 'powers of association', may help improve 'institutional thickness' to the extent that networks of local actors and institutions can be built up in such a way that the sum is greater than the parts. Using the terminology of associations or networks we can begin to examine the local embeddedness of networks in regions, their relations with the 'outside', and the conditions which allow for the successful retention of control and value by local actors (Murdoch 1995).

These issues are often discussed in relation to the 'network paradigm', a clear exposition of which can be found in Cooke and Morgan (1993). In a discussion of new trends in corporate strategy and regional development, they outline how a number of theorists have utilized 'networks'. The network paradigm can be considered to mark the emergence of a relatively distinct economic form in which 'transactions occur neither through discrete exchanges nor by administrative fiat, but through networks of individuals or institutions engaged in reciprocal, preferential, mutually supportive actions.... Complementarity and accommodation are the cornerstone of successful production networks' (Powell 1990, p. 78, quoted in Cooke and Morgan 1993, p. 544).

According to Cooke and Morgan, a wide and growing spectrum of corporate activity now seems to fall within the network mode of organization. The two previously dominant forms of economic governance, markets and hierarchies, suffer from market imperfections and hierarchical rigidities respectively. They 'were too polarized [and] failed to capture a wide array of economic activity that took the form of interfirm collaboration, such as strategic alliances, buyer-supplier partnerships, joint ventures, and corporate consortia' (Cooke and Morgan 1993, p. 545). Such *inter*-firm networking between suppliers and subcontractors is seen to be driven by technological change, the shortening of product life, customized markets, competitive pressures, and so on. Networking practices can also be identified, in Cooke and Morgan's view, at the *intra*-firm level. Firms are more and more compelled to coordinate their internal activities much more effectively and 'most multinationals are now evolving from a centralized hub towards an integrated network' (ibid p. 548). These networking practices 'appear to be critical to the 'new order' that seems to be supplanting the classical Fordist order which was segmented rather than networked' (ibid p. 545 and p. 549).

Likewise Dicken and Thrift (1992) believe that enterprises should now be considered as vast and complex *networks* of power relationships (p. 279). They say 'a particularly fruitful way of conceptualizing the organization of production chains and production systems is as a complex set of *networks* of inter-relationships between firms which have differing degrees of *power and influence*' (pp. 285-286, emphasis in the original). They agree that these organizational frameworks come about as firms seek flexibility, but caution against making universal generalizations from a limited number of empirical cases. The flattened hierarchy of these networks, which include intra- *and* inter-firm linkages, can in practice take many different forms.

This focus on networks usefully integrates the study of economic forms with the analysis of social processes. From our perspective it usefully supplants a concern with endogenous/exogenous development and allows us to ask: 'which actors come to exercise power over others within and through networks? and how are local actors drawn into sets of relations and on what terms? The issue becomes, therefore, how key actors, or using an organizational term, *centres*, act on others in other situations; in short, how do they 'act at a distance' (Latour 1987). If we turn to what we might call the geography of networks, then it becomes apparent that when we speak of 'global' or 'local' networks we are really raising the issue of the *reach* of the network in question i.e. how others in distant (peripheral?) places (and times) find themselves 'fixed' by the strategic centres. The scale of these processes refers to distance, to the attempt by external actors to enrol local actors within particular networks of control. The question of scale (global, local) can, therefore, be posed in the following terms: what links local actors to non-local actors (*i.e.* actors in another locale) and how do these non-local actors effect change and control from a distance?

The study of economic forms as inherently social processes, or more specifically as sets of power relations, thus entails an understanding of the multiple ways that actors come to be bound together. From this perspective it is worth adopting Callon's (1991) notion of a techno-economic network, which refers to 'a coordinated set of heterogeneous actors which interact more or less successfully to develop, produce, distribute and diffuse methods for generating goods and services' (p. 133). Callon takes further Amin and Thrift's (1992, p. 14) observation that a range of factors are to be found at the heart of economic relations, and proposes that networks are constituted by both the social and the material. This approach combines the insights of economics, that it is *things* that draw actors into relationships, and sociology, that actors come to define themselves, and others, through *interaction*. Putting these together leads to the idea that '*actors define one another in interaction - in the intermediairies that they put into circulation* ' (p. 135, emphasis in the original). Callon identifies types of intermediaries – texts, technical artefacts, human beings and

money – which allow networks to come into being (they give 'shape, existence and consistency to social links' – p. 140). But they are far from passive tools: texts and technical artefacts, for example, define the roles played by others in the network – both non-humans (machines, accessories, and power supplies) and humans (sales persons, consumers, and maintenance engineers). By placing power at the centre of the analysis (as the 'glue' that binds the network together) we can begin to investigate how labour, raw materials and machines are integrated within the production process, how information flows through the system, how economic actors find their roles fixed by intermediaries, and how and where value is added and accumulated. As networks are established and consolidated so the distinction between 'inside' and 'outside' (both firm/market and endogenous/exogenous) may become secondary to the network form. Rather than seek an explanation which privileges either side of these dualisms we should attempt to understand them as the outcomes of network formation wherein economic actors use a range of resources and relations in the pursuit of certainty, stability and power.

The terminology of network analysis allows us to consider in some detail how some sets of associations come to be very successful (in terms of control and value-added) while others fall apart. However, while we recognise the value of this approach, we believe it is falacious to equate networks with some new economic epoch, such as post-Fordism (Murdoch 1995). It is important to put aside the normative conception of networks as the defining feature of a new organizational order, for two reasons. First, it is undeniable that networks are not novel, and that market and hierarchical relations are not fading away and a key question concerns how these traditional economic institutions can be recast in the network paradigm. Second, it is important not to make prior assumptions about the nature of the relationships in networks: exchanges may be unequal; some actors may be in a better position to fix networks than others; some may be crucial gatekeepers in articulating the local with the global. Empirical analysis might allow us to gain insights on the establishment of successful networks in areas where they have been conspicuous by their absence (again we should seek to avoid geographical determinism by equating successful networks with successful regions) without recourse to dualistic categories such as exogenous/endogenous. All the elements, local and non-local, can be identified as chains-of-links in which success is considered as the outcome of network formation and stabilization.

Thus, by considering economic forms as networks we can account more readily for distinctions in these forms and their potential impacts upon, and likely benefits for rural regions. This approach might then allow us to recognise sophisticated local/non-local 'hybrids'. For instance, Amin (1993, p. 2) suggests that multilocational firms can now be distinguished between cost or price sensitive companies, which dislocate specific mundane and unskilled tasks to peripheral regions (these would include those

responsible for the branch plant phenomenon of the the 1960s and 1970s), and 'performance' companies, which derive their competitive advantages from quality of production and which seek favoured locations for qualified personnel. The latter are generally characterized by organizational structures and strategies 'based on integrated manufacture, erosion of traditional divisions between managerial, scientific and manual functions, and the establishment of closer and more collaborative ties with suppliers' (ibid). The cost or price sensitive type of company, on the other hand, maintains the traditional hierarchical divisions, particularly between the organization's core and peripheral operations.

Such a distinction in network form has implications for regional development patterns. This is because:

> *'The cost-driven company, specialising in large volume, medium-technology goods continues to be characterized by task-specific plants displaying different levels of functional complexity in different locations; all closely tied into a framework of centralized and hierarchical governance. In contrast, 'performance' companies appear increasingly to be moving over to product-based, rather than task-based, plant structures for the management of worldwide operations, especially in manufacturing'* (ibid).

Performance company plants are much more complex than traditional branch plants: they have strategic functions; play leading roles in product development (rather than simply assembly); work on a cooperative, rather than hierarchical basis with other parts of the organization's structure, and have devolved and autonomous management and decision-making capabilities (Amin, 1993 p.3). The role of such plants in rural regions can have significant implication for endogenous development. They may enable the transfer of skills, entrepreneurship and technologies into an area. Once these resources are in place the plant is likely to remain committed to their retention in that place. The plant may also be allowed to develop complex local supplier linkages thus fostering further 'rounds' of economic development.

In the case of 'performance' firms we have, therefore, a potentially complex relationship between exogenous and endogenous elements. We should seek to account for this in terms which are not bound to the 'inside' and 'outside' of particular spaces. Rather we need to focus on the socioeconomic relationships which are 'making' such places. Our analysis should seek to understand the links between the various component parts of a firm, and between such firms and other local and non-local institutions, as a set of power relations in which resources are mobilized and constituted in ways which will entail particular consequences for those local actors that concern us. We need to ask what it is about particular networks that enables them to deliver beneficial outcomes for rural areas. Some of these networks might be regionally specific, but even then they are likely to be linked into complex relations with other organizations

outside the region, or they may be non-local, and we will need to identify the terms upon which they engage with actors within the region. Network analysis provides some simple methodological tools for investigating the constitution of economic associations. Thus, while it might be argued that the particular firm types identified above are still quite rare in rural areas, particularly those regarded as 'peripheral',[4] this case serves to illustrate the necessity to hold the local and the non-local together within a unified analysis and we believe that this might best be achieved through network analysis.

Conclusion

If we adopt the view proposed above that rural development must be considered as a complex mesh of networks in which resources are mobilized, identities fixed, and power relations consolidated, then we might be able to move on to propose a 'macro' account of rural development which remains in tune with the complexities of the networks that give rise to more widespread patterns of change. For those seeking to promote rural development it is worth attempting to gain some understanding of the most likely successful development strategies. Within these a mixture of local/non-local elements are likely to be discerned.

While we have tried to shift the focus of analysis from a spatial frame of reference to a social one, we should be ready to acknowledge that the range of outcomes that we might discern in any given area have the potential to both converge and reinforce one another, putting particular areas on viable growth trajectories. Thus, as the industrial districts literature emphasises, institutions and networks can become interlinked and mutually reinforcing, perhaps ensuring that rich or 'thick' ensembles emerge which form a solid basis for economic growth. However, we should also be ready to acknowledge that these local institutions will be bound into complex relations with non-local institutions and success entails ensuring that these linkages are constructed on terms which enable local actors to exert control and retain a reasonable proportion of the value added. In the literature a number of examples of rural industrialization have been identified based on consolidated, product specialist, small-firm networks and drawing upon traditions of craft production and artisanal skills. However, the attractiveness of rural areas in this changing economic context will not necessarily lead to endogenous development, for even where rural regions are successful this success may well be attributable to a whole range of local and non-local factors.[5] Where regions remain peripheral it might be the case that they simply cannot generate development from within and will therefore be particularly reliant on development from without. Simply attempting to impose a model of endogenous development from elsewhere may be futile. On this reading the cases of

strongly endogenous development leading to successful new self-reliant local economies in rural areas may be few and far between. We should, however, recognise and indeed celebrate interconnections between areas and between networks. Then the pressing task becomes studying associations and links as sets of power relations. The object of this analysis should be to ascertain where inequalities and asymmetrics within networks lead to a weakening of already weak actors in peripheral or declining areas.[6] The policy goal might then be recast as seeking equity between participants and an equality of participation. Such a task might best be undertaken within a social, rather than a spatial, frame of reference.

Notes

1 Industrial districts have been most closely examined in the Italian context, and the characteristics of the textile industrial district in Prato, Tuscany (Becattini 1987), the ceramics industrial district in Sassuolo, Emilia (Giovannetti 1987) and the Parmesan cheese district (Bertaloni 1988) have been particular foci for analysis.

2 As has already been explained, transaction costs relate to the costs incurred in using the market. When a firm chooses to go to market to buy a good, rather than producing the good itself, the total cost is the price of the good plus the transaction cost. However, if it is decided that the enterprise can produce the good itself, then it faces not only the cost of producing the good, but also transformation costs and management costs. Transformation (or adaption) costs are those incurred in the reorganization of the enterprise to adapt to new technological and production processes. Management costs relate to the management of new production processes. To illustrate, van der Ploeg and Saccomandi (1994) give the example of the choice between rearing or buying replacements for milking cows on dairy farms. In choosing to rear heifers, in addition to the direct and material costs involved in producting heifers on the farm, several additional costs, including the need to develop and maintain a good knowledge of cattle-breeding and selection, the need to find the required sires, the risk of mistakes, and so on, will also be incurred. These elements, which arise from the need to run a more complex enterprise, are defined as management costs. But additional costs above the monetary value of the animals themselves are also incurred if heifers are bought on the market. Good trading relations have to be established with traders, for example, and the risk that other farmers will never sell their best animals as well as the fact that diseases might be brought onto the farm have to be assessed, and time has to be dedicated to the transaction itself. These are defined as transaction costs.

3 Because new technologies are usually part of a process of externalizing elements of the farm labour process (to agribusiness companies, for example), increases in transaction costs and tranformation costs usually coincide, and exogenous development is usually characterized by high levels of both.

4 We should note that most influential accounts of changing economic forms stress the leading edge status of 'flexible', 'flattened', 'networked' forms (Cook and Morgan 1993). Rural development strategies which are seeking to 'go with the flow' of current industrial change would be well advised to pay heed to such descriptions. However, we

should make clear that we do not believe such economic forms necessarily constitute those most likely to be successful in the future. We are simply noting that a range of actors (academics, politicans, business people, employees organizations, professional associations, consultants and so on) are promoting a gamut of arguments and proposals which conform to this type. To the extent to which these people can mobilise other actors i.e. can recruit them to their networks then their particular accounts of the future are more likely to stick. (for an analysis the of promotion process as itself an action-oriented process, see Miller and O'Leary 1993).

5 In the era of globilization, it should be emphasized, remoteness is not itself a barrier to new types of investment and development (although the legacy of remoteness in terms of desertification and poor communications infrastructure may well be). Remoteness which has preserved natural environments or traditional cultures can be a positive boon. Conversely areas whose landscapes have been degraded by industrial agriculture, or mineral dereliction or scarred by military or nuclear installations are likely to pay the price.

6 For example, telecommunications developments, which have considerable potential for increasing the inter-connectivity of rural areas with the broader, international economy are often seen as the panacea of rural development in enabling new forms of economic activity and employment to be viable in rural locations. If accompanied by other forces which encourage decentralization, rural areas can indeed expect to benefit considerably, particularly from the spatial relocation of economic activity through various forms of teleworking. These benefits, however, are likely to be differentiated between rural areas. This is because telecommunications actually complement, rather than completely substitute for, the physical movement of goods and people. More remote areas, lacking good transport or other infrastructure, are therefore least likely to benefit. Nor can it be assumed that the implications of telecommunication-aided changes will all be positive for existing rural enterprises or communities. The enhanced inter-connectivity between rural and urban areas will, for example, increase the extent to which certain segments of the rural market can be served from urban locations, and may undermine those service functions of market towns currently provided by branch offices (Gillespie *et al.* 1991). Moreover, the chain of links within the telecommunication sector may be constructed in order to allow value to be extracted from rural areas and accumulated 'further down the line'. Again, the network is an expression of power relations.

Part II

Water and Bread, Meat and Milk

6 From Structural Development to Structural Involution: The Impact of New Development in Dutch Agriculture

Jan Douwe van der Ploeg[1]

The success of post-war agricultural development in the Netherlands is a well-known story. In recent years, however, it is a story that has come up against its own intrinsic boundaries and contradictions. The main parameters of post-war developments in Dutch agriculture included the constant growth of total agricultural output, the securing of new markets and agricultural income levels that were amongst the highest in the European Union. Today observers both in and outside the sector have drawn the conclusion that prospects for the future are haunted by several worrying problems. Dutch agriculture is in deep crisis.

Both success and crisis are the result of a deliberate modernization project formulated during the late 1940s and early 1950s and institutionalized a decade later. 'Structural development' was a key word in this project and was not only shared by state institutions, agribusiness and the agrarian sciences but also by the ruling elites within the farmers' unions[2] and, increasingly, by the union rank and file itself.

In this contribution I will analyze the foundations of the modernization project that has shaped Dutch agriculture for so many years and look at the current prospects for development which, in my opinion, go beyond modernization. I will argue that the notion of endogenous development (Long and van der Ploeg 1994: 1-2 and 4; Cristóvão *et al.* 1994: 52 and Lowe *et al.* this volume) is probably the most appropriate concept for uniting and summarizing the wide variety of new development tendencies blossoming at grass-root level. Local, and until recently forgotten and obscured resources, such as the capacity to combine agriculture with the conservation of nature and landscape; the possibility of producing high quality products and establishing new interlinkages with consumers; the challenge of responding to the environmental crisis with more adequate plans than the ones proposed by the central state and the 'art' of farming economically, are central to this new approach. In this chapter I will discuss a few of the main trends found in these new initiatives and above all I want to explore the potential impact of these new perspectives. In discussing these new trends I will use the Chayanovian approach because it is, I believe, an instrument that allows us to integrate the phenomenon

of highly differentiated transaction and transformation costs into the analysis.

From the perspective of modernization, it has been argued that the Dutch agricultural sector had too many farms and that most of these were too small and inefficient. Consequently, structural development was seen as a process of selective growth to be made effective through a range of corresponding interventions and mutual arrangements. Small and inefficient farms had to disappear and other, more promising farms, managed by dynamic entrepreneurs, had to be enlarged. Reallocation of land, quotas and later environmental space were seen as crucial to this approach. The same applied to agrarian policy in the broad sense. The specific opportunities and limitations contained in agrarian policy were reallocated unequally over the different categories of farms and farm entrepreneurs[3]. Throughout this process the notion of structural development gave coherence and consistency to the many elements making up agrarian policy and also gave an ultimate legitimation[4] to the policy of modernization and to its sometimes painful and controversial consequences.[5]

For the remaining farms, development was seen as involving expansion, scale enlargement, intensification, further specialization, a greater involvement with agribusiness and technological transformation. Whilst the degree to which these proposals were implemented varied considerably, their inner logic was internalized by the farmers and became, as it were, an in-built material necessity as far as the structure of their farms were concerned.[6]

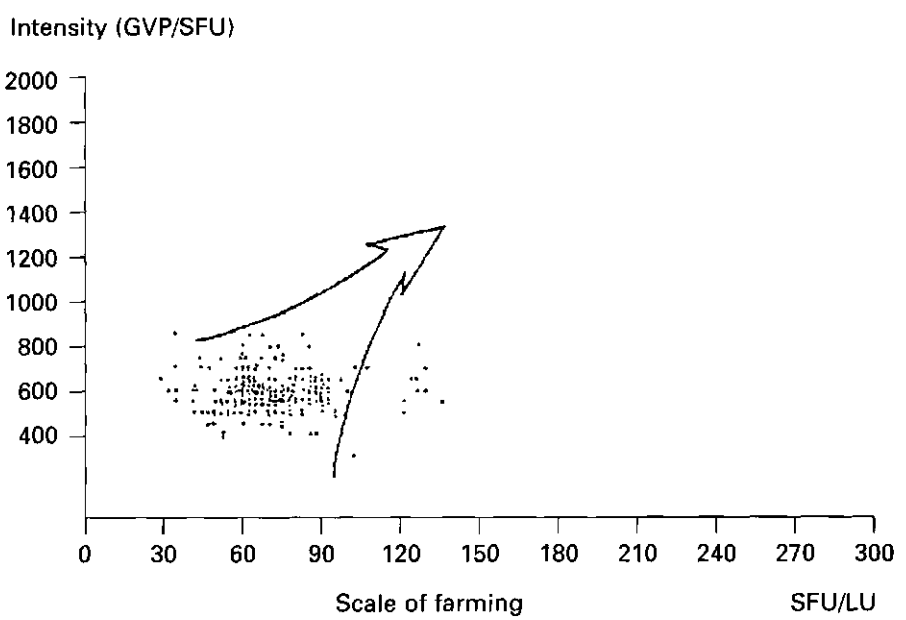
Graph 1 refers to the Dutch dairy farming sector in 1969 and shows the distribution of a representative sample of dairy farms along the dimensions of scale and intensity.[7] The graph also illustrates the modernization process as it was seen at that time. As the arrow shows, modernization amounted to a jump towards what was then conceptualized and quantified as being the optimal farm – a farm that was not only larger that existing farms but that was more intensive and large scale. The general notion of structural development, in other words, reappeared at the level of the single enterprise: farmers had to realize their own structural development, for only in this way, it was assumed, could the farm be continued over time. Diversity was considered irrelevant, a remnant of the past. It was held that through the selective process of modernization, the remaining farms would all be situated in or around the optimum as defined by new technologies and market relations.[8]

An interesting and strategic element here was the system of classification used by state agencies and agribusiness and which was strongly supported and underpinned by agrarian sciences. In this classification farms were divided into three main categories:[9] vanguard farms, small and inefficient farms, and intermediary farms. The vanguard farms were already relatively close to the optimum and continued to move in this direction. Small and inefficient farms, however, were too far away from

this optimum and were, in any case, considered incapable of making the structural jump. Finally, there was the intermediary group who either had to follow the route carved out by vanguard farms or be doomed to extinction.

'To be or not to be', this question has been rephrased consistently and without hesitation in the modernization paradigm. To be or not to be was understood as an objective fact reflecting underlying structural patterns. Structural development could not but express and reinforce these underlying structures. As Varenkamp, former president of the Landbouwschap[10] commented: 'It is not we who opt to eliminate so many farms and encourage growth in those that remain...it is the markets and science that determines these processes'(1986).[11] From another point of view, however, this reified classification scheme, together with the interventions derived from and justified by the scheme itself, transformed agricultural modernization into a self-fulfilling prophecy.

Graph 1 The Modernization Paradigm Applied to Dutch Dairy Farming as it was in the 1960s: Points of Departure and Goals



Clearly this particular process of modernization required and reproduced its own theoretical underpinnings. This is not only true for the technicalities implied in the practice of modernization, it also concerns the body of knowledge relating to rural and agrarian development. Agrarian development became increasingly synonymous with market integration and with the adoption of the newest technologies. Consequently, the continual fall

in the level of agricultural employment was seen as an integral and unavoidable feature of rural development.

An ongoing decline in employment may be an unavoidable trend as far as the practice of modernization is concerned.[12] However, it would be wrong to generalize these interrelations and turn them into iron laws of agrarian development.[13] In the epoch beyond modernization, such a generalization would be highly destructive.

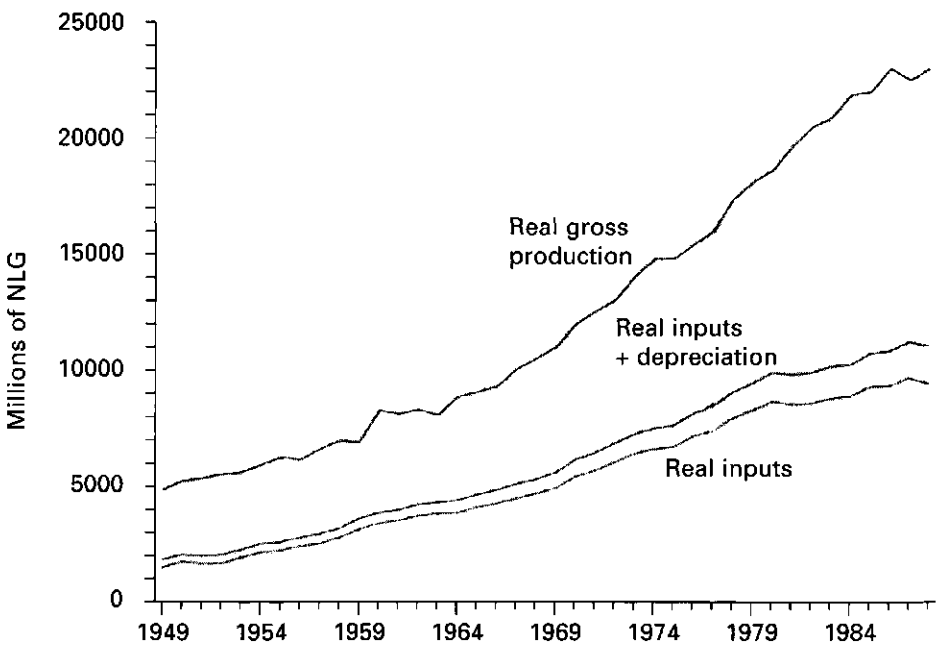
A Success Story Revisited

Graph 2 is based on data derived from Oskam (1991) and summarizes the modernization process that has taken place in Dutch agriculture. Real gross production (in constant prices at the 1970 level) increased from NLG 4.88 billion in 1949 to NLG 22.91 billion in 1988, an increase of 369 percent. The real cost of current operating inputs rose in the same period from NLG 1.55 to 9.44 billion, an increase of 509 percent. The relative increase of real total depreciation went beyond the relative increase in real gross production: 413 percent as opposed to 369 percent. Taken together this data reflect the essence of the modernization project. On the one hand there was remarkable technological development, expressed here in the relative increase of real total depreciation, whilst on the other farming became progressively integrated into the market, the relatively high increase of real current operating inputs being a clear expression of the tendency towards externalization[14] and market integration. The overall effect of both tendencies can be summarized as follows. Real inputs and depreciation accounted for 38 percent of real gross production in 1949 whereas in 1988, they accounted for 48 percent. Consequently, the space available for the valorization of factors of production diminished from 62 percent to 52 percent. Using the concept of sociological imagination as defined by Wright Mills (Wright Mills 1959), one might wonder what would have happened if agricultural development had not followed a route characterized by accelerated market integration and far-reaching technological transformation. Although such a question makes little sense and, from a methodological point of view is very difficult to resolve, the potential answer is at least provoking for if the relative share of inputs and depreciation had remained the same for the length of time under consideration then the total net added value available for compensating labour, land and capital would have been NLG 14.2 billion and not NLG 11.9 billion. Such a difference would ensure an interesting additional employment effect.

Graph 2 is highly aggregative. It summarizes – and obscures – significant changes in the overall composition of Dutch agriculture.[15] The inter-relationships demonstrated in Graph 2 can be referred to as mean interrelations, such as the ratio between Real Gross Production on the one

hand and the sum of Real Current Operating Inputs and Real Depreciation on the other, for example. Different productive sectors and different regions will repeatedly show a specific *deviation* from the mean ratio. Also within one and the same sector and within one and the same region a certain variation is found around the mean ratio. Here it must be stressed that such a variation should not be understood as a random phenomenon. It is closely associated with the different organizational patterns or styles in which farming is embedded. As far as the central inter-relations between inputs and outputs and costs and benefits are concerned, there is a remarkable variability[16] associated with different farming styles. These differences are highly significant from a statistical point of view and, given the gravity of the agrarian question today, of considerable relevance. I will return to this point below.

Graph 2 A Quantitative Overview of the Post-War Success Story

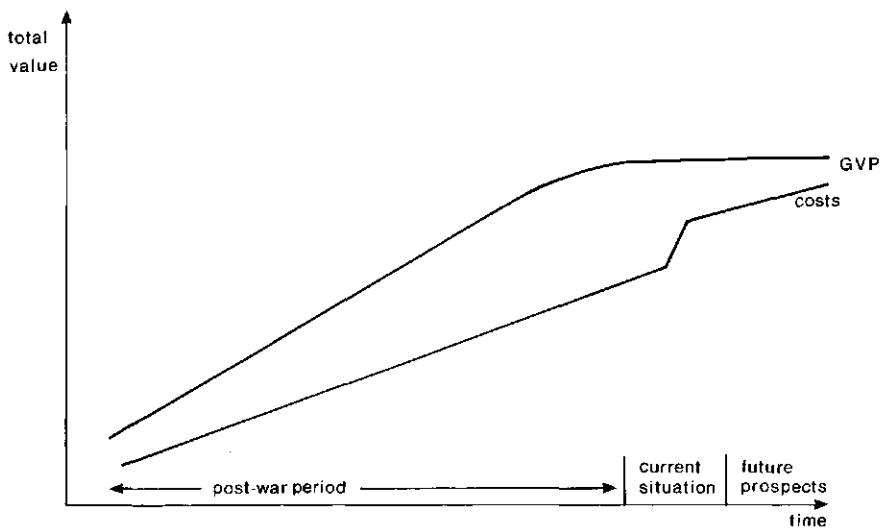


Dutch Agriculture: The Approaching Crisis

Graph 3 contains a simplified summary of Graph 2 and also introduces the trends that can be expected in the future, including the stagnation of total output. The modernization of agriculture has reached its boundaries, boundaries which, to some degree, were self created. This applies to total output as well. Markets are more than full and international relations do not allow any further expansion through mechanisms such as export sub-

sidies. More specifically it can be argued that Dutch dairy farming is caught up in the consequences of a quota system that brings with it a steady decrease in the total volume of production. Arable farming is currently in the throes of an on-going crises and horticulture and pig and poultry breeding are increasingly the target of consumer criticism as the public begin to voice their serious doubts about the quality of these products. Taken together this means that the total Gross Value of Production (GVP) of the Dutch agricultural sector cannot be expected to grow in the coming decades: either it will remain at the same level or perhaps it will decrease even further. It is not only marketing perspectives that are gloomy, environmental regulation and the increasing attention paid to nature conservation and the maintenance of the landscape practically exclude any further physical expansion of production either at the macro or micro (farm) level.

Graph 3 The Quantitative Dimensions of the Coming Crisis



Structural changes in the composition and magnitude of costs can also be expected. These include increasing concern for animal welfare (Meester 1993), the costs associated with having to reduce environmental pollution, the need to introduce energy-saving technologies and the probable need to contract all kinds of external assistance to obtain the required certifications. In addition, expansion at the micro level implies an entire range of new transaction costs, the costs associated with the reallocation of quotas being the most well-known example. The same will also apply with increasing frequency to so-called environmental rights. These changes are summarized in the jump in the cost line shown in Graph 3.

Graph 2 and 3 are built on constant prices. If we now introduce the tendencies most likely to occur in the development of current prices, then

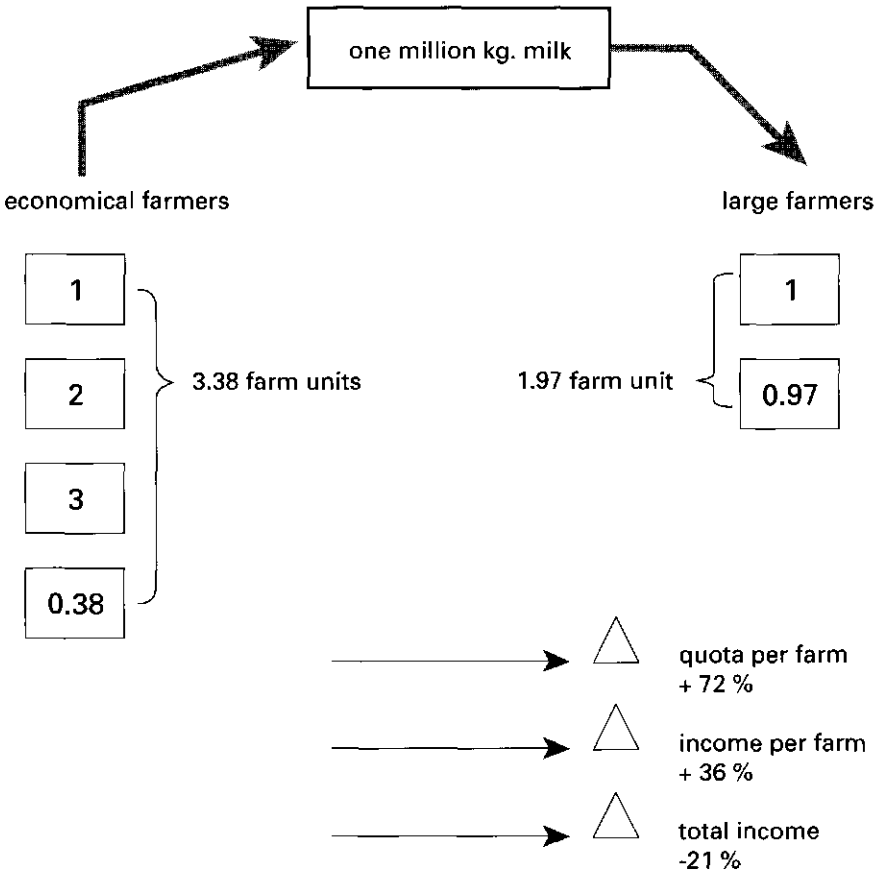
prospect becomes even more gloomy. Current prices for nearly all agricultural products are suffering downward pressures at present. Costs, on the other hand, are tending to increase. This is partly because of the interrelationship between industries and service agencies on the one hand, and the primary sector on the other. In the long run, energy prices will undoubtely rise again and this will have particular consequences for those types of farming that are based on the delivery and use of external energy. The tendencies discussed here will inevitably put a squeeze on any attempt to compensate farm labour and other factors of production (see Graph 3). An ongoing reduction in employment, therefore, appears inevitable.

The institutionalized response to this squeeze (see also Cochrane 1979) can be expected to be further expansion at the micro level.[17] However, such a response is no longer valid in the current crisis. The empirical implications of ongoing enterprise enlargement are, in fact, quite different from the assumed ones. Under current conditions, farmers reinforce the squeeze they are caught up in by continuing to expand at farm level. The squeeze is not only external to and/or imposed upon the agricultural sector, it is to some extent an internally produced and activated mechanism.[18]

Graph 4 summarizes the effects of a re-allocation of 1,000,000 kg of milk from three, smaller, economically managed[19] dairy farms to two larger farms.[20] At first sight such a re-allocation appears potentially beneficial at the private level with labour incomes rising by +36 percent. If, however, the transaction costs involved (related to the acquisition of the quota) are introduced into the analysis, the benefits of a rise are less clear cut.[21] In addition, and still abstracting from these transaction costs, it shows that the total sector income – represented here by the income from the production of one billion kgs of milk – would decrease by 21 percent under current conditions.[22] Hence, reallocation results in a negative growth. Under current conditions it is the farmers themselves who are tightening the squeeze from which the sector as a whole and expanding enterprises in particular[23] suffers.

It is often argued that a reallocation in favour of larger production units is necessary given the tougher competitive conditions agriculture can expect in the near future. Whilst this might be true in some situations, under present conditions it is becoming increasingly unlikely. As shown in Graph 5, the capacity to face a decrease in price or an increase in costs is no better in the larger farms than on the smaller ones. It could even be argued that a reallocation in favour of larger units increases the vulnerability of the sector.

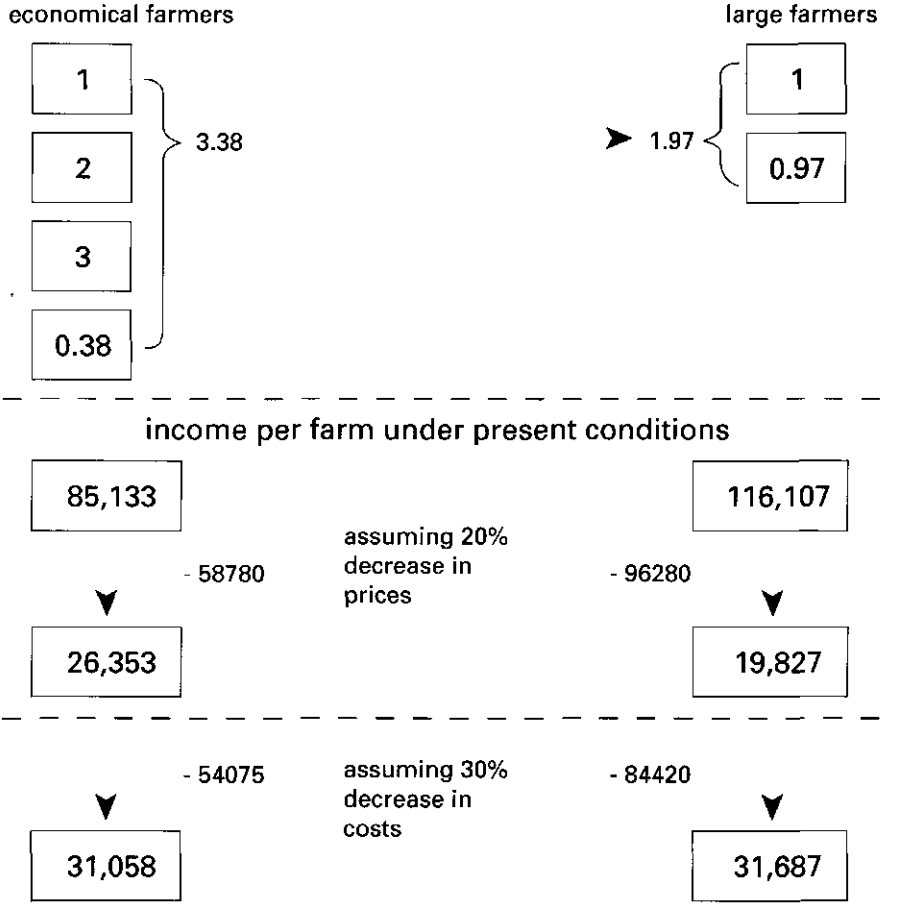
Graph 4 The Mechanics of Enterprise Expansion under Current Conditions: A Cross-Sectional Analysis



The prospects for continued expansion at farm level are poor. Graph 4 is based on a cross-sectional analysis that compares smaller and larger farms. It is important to note that the smaller farm cannot be understood as a miniaturized copy of a larger unit.[24] There are definite differences in style and these will be discussed later. Generally speaking, the smaller farm is the result of a specific strategy adopted by the so-called economical farmers. The larger farm is more often the result of a strategy in which expansion is central. The farms are, therefore, structured in very different ways and the relevant interrelations are highly differentiated. This is reflected in the fact that the expanding farmers have a lower employment level and a higher average tempo of growth than economical farmers.[25] This growth, together with the internal impact in terms of costs, reflects the conditions of the previous period. The point is, however, that it is precisely these conditions that are changing. Continued expansion today

means an enormous increase in transaction and transformation costs (Saccomandi 1991). When these are introduced into the analysis, the very process of selective growth appears as regressive and counterproductive.[26] Borrowing Geertz' terminology (1963), one could therefore argue that structural development becomes, under current circumstances, structural involution.[27]

Graph 5 The Robustness and/or Vulnerability of Different Farming Types



More sophisticated scenario studies built on linear programming and multiple goal planning procedures that go beyond the 'simple' cross-section analysis summarized in Graphs 4 and 5 produce the same type of conclusions (Antuma *et al.* 1993; van der Ploeg *et al.* 1993: 48). It has been concluded that if the current policy towards Friesian dairy farming is maintained (especially the quota system) there will be 3,550 dairy farms in 2005. However, a free-trade policy allowing for further expansion at

farm level would reduce the total number of dairy farms to 1,940 More significant, however, is that in the first instance there would be a total sectoral income at provincial level of some NLG 216 million whilst under free-trade conditions, increased expansion at enterprise level would reduce this income to some NLG 114 million. Again by opting for continued expansion, farmers squeeze themselves!

These conclusions are supported by other scenario studies. Proceeding from the potential of new technology, the Scientific Council for Government Policies (WRR 1992) has calculated that in the near future, all the necessary EU production can be realized by using only 30-40 percent of the labour force presently involved in agriculture. Similar trends have been predicted for the Netherlands as a whole in studies published by LEI, IKC and CBS (De Groot *et al.* 1994; Kolkman *et al.* 1994; Berghs and Van den Ham 1994 and CBS 1992 a and b). The squeeze, as illustrated in Graph 3, seems to imply an inevitable acceleration in the reduction of farm numbers and consequently, in rural employment as well. The prescribed response of scale enlargement combined with the other ingredients of the modernization paradigm will only tighten the squeeze further.

Farmers' Views

'Structural involution' is an image that also emerges from recent surveys. At the moment, farmers are more or less satisfied with their incomes, they like their work and are proud of it, but they are extremely pessimistic about the future. What must be stressed here is that the once unquestioned solution – structural development at farm and sector level – is no longer self evident and has lost its legitimacy and persuasiveness. Further structural development is increasingly seen as being part and parcel of the crisis itself. It has been transformed into structural involution.

In a national survey[28] held in April 1994, it was found that 67 percent of Dutch farmers disagreed with the proposition that current problems are merely conjunctural. Eighty-seven percent, in fact, felt that further reductions in the number of farmers can no longer be seen as progress. Whilst such a reduction is strategic to the modernization paradigm, 80 percent of Dutch farmers believe that the current annual disappearance of 3000 farms is a disaster.

This view is reinforced by other conclusions the farming community has drawn about the future. From the same survey it appeared that only 17 percent of today's farmers expect and approve of an ongoing reduction in the total number of farms and the expansion of those that remain. Forty-nine percent, whilst believing that this trend will continue, nevertheless heartily disapproved of it although, at the moment, they could see few clear alternatives. These farmers were the pessimists – and the fact that

nearly 50 percent of all Dutch farmers fall into this category underlines the general feeling of crises.

However, there was also a category of farmers in the April 1994 survey with opinions that differed radically from those of their more pessimistic colleagues. This group comprised 26 percent of the sample and believed that more farms would remain than was now generally believed. These farmers felt that those farms that remained would be characterized by many differences in farming style and scale. They positively valued this expected trend. Later in the text I will return to this group because they represent the nucleus of a rapidly expanding category of reformers.

Towards the end of 1994, another national survey was organized in the context of the National Debate on Agriculture. It showed that only eight percent of Dutch farmers wholeheartedly supported the ideas and implications of the classic modernization paradigm (Ettema and Nooy 1994: 6,7). The same survey also made it clear that whilst a growing majority of farmers rejected modernization in the context of everyday reality, the search for expansion was still quite strong. Thirty-five percent of farmers stated that they expect their farms to grow in the near future. Whilst this may appear to be a paradox, the apparent contradiction is, in my opinion, rooted in the erosion of the modernization paradigm and the simultaneous lack of any substantial alternative for rural development. In such situations farmers tie themselves to old securities. What is important, however, is that a wide-spread, still somewhat hidden search for alternatives is also taking place.

Beyond the Crisis: New Responses From Farmers

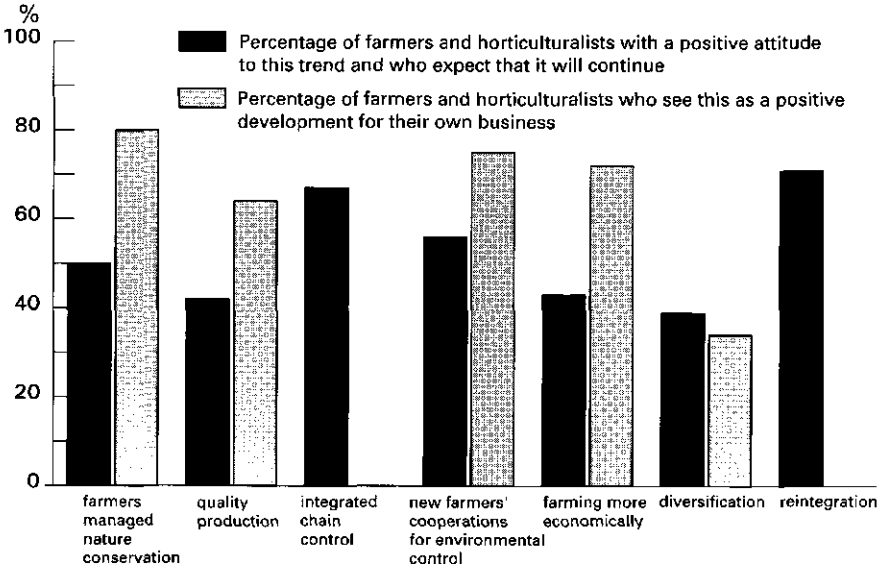
If 'to be or not to be' was the question that dominated the modernization epoch, the question of whether or not there are new ways of being is central to the current crisis.[29] Are there, in fact, new ways to augment the gross value of production and convert the tendency towards stagnation into a new and sustainable increase, (to use the terminology of Graph 3) and are there ways to reduce costs? These questions are valid both at sector level and at the level of the individual farm.

The suggestion that I wish to develop here is that whilst agrarian sciences and rural policy circles remain hopelessly tied to the modernization paradigm, in farming itself a series of new responses are emerging and together these represent the new ways of being so urgently required.

The November 1994 survey was concerned with how farmers were negotiating this period of crises. Topics explored included quality production, new forms of commercialization, the agrarian production of nature, farmers' participation in landscape maintenance, organized and collective responses to environmental problems, the creation of new interrelations between industry and agriculture, diversification and more economical

forms of production. The common denominator in all these activities is that, by employing new mechanisms, they increase the total value produced by the farm and in the sector as a whole as well as contributing substantially to cost reduction.

Graph 6 Farmers' Interests in New Development Patterns



The outcome was impressive. As Graph 6 shows there is a considerable and widespread interest in new ways forward and in finding new markets and new mechanisms capable of containing cost increases. This interest parallels the rapidly growing number of new farmers' associations concerned with the practical organization of new forms of quality production, nature conservation, product innovation, commercialization and environmental control.[30] Forgotten, obscured or institutionally blocked resources are being reactivated in individual and collective experiments. Taken together they represent the very many expressions of farmers innovativeness (Osti 1991). A particularly interesting feature that unifies efforts is that they neither built on nor contain additional external resources. What is central is the revitalization of the farmer's own resources which include the capacity to combine agriculture with nature and landscape conservation, the ability to create new networks to link production with consumption, the establishment of control over the resources lost when activities came under external prescription and sanction and finally, the common goal of using the benefits produced to further strengthen the local economy. In short what is being proposed is a more endogenous development that contrasts dramatically with the logic of modernization where the reorganization of farming in accordance with external models and using

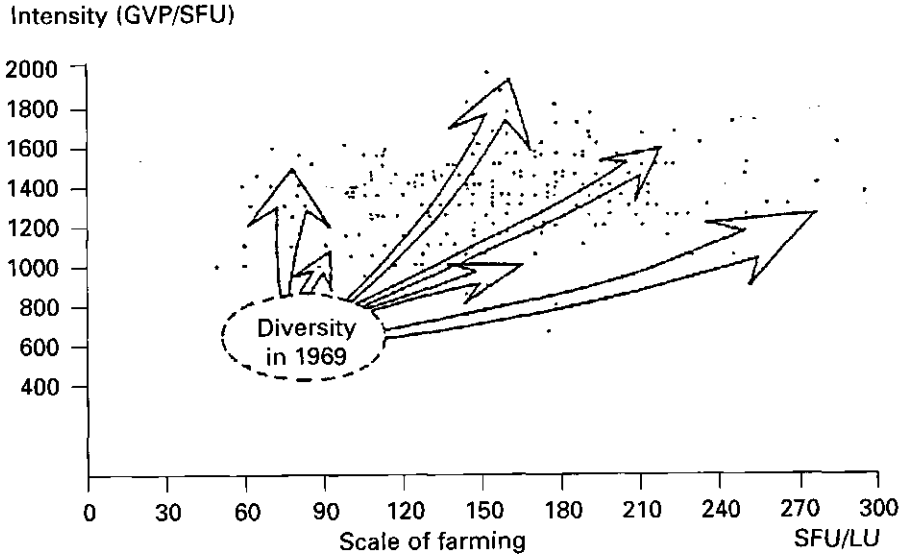
external resources is central. The critical question, of course, is whether this new, endogenous approach really offers a way out of the crisis?

This question now becomes my main concern. Will the renewal blossoming at grass-root level actually have a substantial impact on the sector as a whole or are all these promising activities doomed to remain at the niche level? First, I will deal with the issue of cost containment and then approach the more familiar question of the production of new goods and services for new markets. Finally, I will summarize my findings and try to underpin them in more general terms.

On Containing Costs

Within the modernization paradigm, agrarian development was seen as a unilinear process that inevitably produced a uniformity within agriculture itself (see Graph 1). What has actually been happening since the late 1960s is illustrated below in Graph 7.

Graph 7 Differential Developmental Processes in Dutch Dairy Farming between 1969 and 1982



This graph is built on the dimensions of the scale and intensity of farming and these are quantified in exactly the same way as they were in Graph 1. However, whilst Graph 1 referred to the empirical distribution of dairy farms in 1969, the data in Graph 7 is drawn from 1982. Graph 7 makes clear that the diversity that existed in 1969 did not disappear but was reproduced if not enlarged.[31] Development did not materialize as a uni-

linear, homogenizing process, rather it is differentiated farm development patterns, rooted in the strategic, knowledgeable and goal-oriented action of the farmers concerned, that bridge the differences between 1969 and 1982.[32]

Differential development processes give rise to a variety of different farming systems. Following Hofstee (1948, 1985) these are referred to in the research tradition of Wageningen Agricultural University as 'farming styles'. First, this is to emphasise the close inter-relation between the strategy of the farmers involved and the specific farming practices created by their strategic activity. Second, we speak of styles of farming to underline the fact that the best and probably only way to get to know and understand the particular dynamics, structure and rationale of specific practices is through the knowledge, insights and experiences or, in other words, through the goal-oriented action of the actors concerned.[33]

In general terms a style of farming can be defined as a particular unity and coherence of the following elements:

a a set of strategic notions, values, and insights shared by a particular group of farmers[34] concerning the way farming *ought* to be organized;
b a specific structuring of the practice of farming that corresponds to the strategic notions or 'cultural repertoire' used by these farmers;
c a specific set of interlinkages between the farm enterprise on the one hand and the surrounding markets, market agencies, government policy and technological developments on the other. These interrelations are structured in such a way that the specific farming practice can be reproduced over time.[35]

More specifically we can refer to the range of *empirical* farming styles explored in recent Dutch research. Graph 8, again constructed with scale and intensity as major dimensions represents a kind of summary. Using the folk concepts (Bennett 1982) employed by Dutch farmers, a variety of farming styles are identified and related to the dimensions of scale and intensity. Economical farmers are those who represent and apply a strategy which aims to contain external, monetary costs, whilst simultaneously striving for high levels of internal efficiency. Typically they target what they refer to as a step-by-step process of growth. The balance between own and borrowed capital is carefully controlled, machinery is bought second-hand and carefully maintained within the farm itself, the supply of industrial feed and chemical fertilizer is kept low and complementarity rather than substitution is the rule. Economical farmers consider the quantity and quality of labour to be decisive for the success of farming.

The practises of intensive farmers are in sharp contrast to those of their economical colleagues. Milk yields per cow, cattle density per hectare, fertilization levels, use of bought feed and fodder and the number of animals per unit of labour force are not only much higher than those of the economical farmers, they are quite often amongst the highest of all

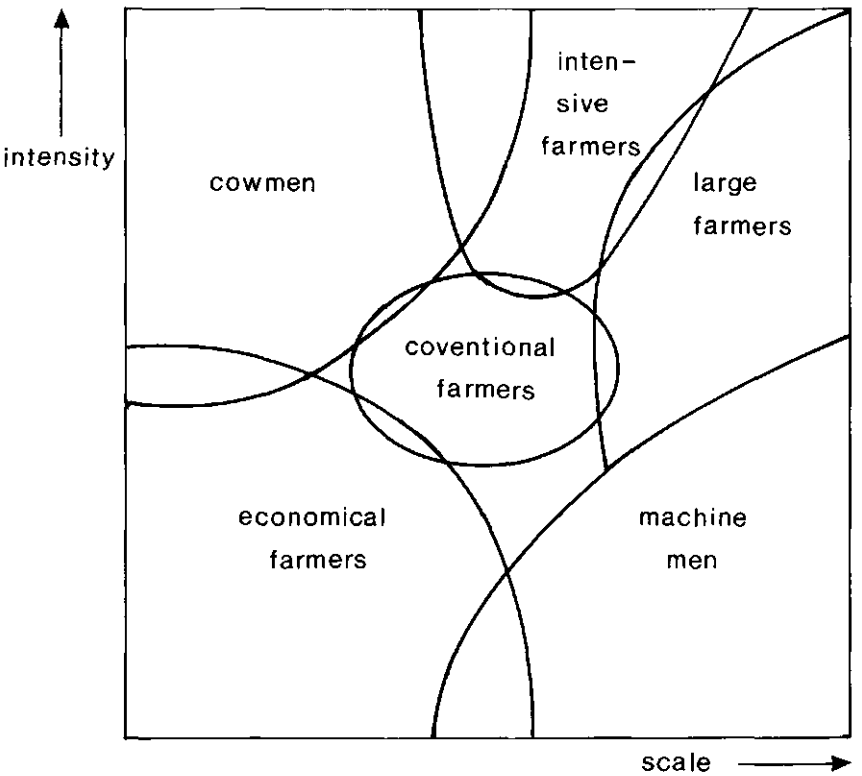
farming styles. Highly integrated into and dependent on the several input markets, these farmers have internalized the dominant technological model (the holsteinization of cattle, for example, is most developed in this group) and they represent the greatest rupture with the past. This contrast is reflected in the gossip of the countryside. Intensive farmers are described as the ones who have most closely applied the message contained in the agrarian policy of recent decades. Central to their approach is the mobilization of market resources in order to convert them into high output levels following the dominant technological model. A relatively low input/output efficiency is, however, the price they have to pay. The gross margin is low, hence the scale of farming is a critical factor in the generation of income. Ongoing expansion is, therefore, an in-built need in this style of farming.

Machine men offer another alternative for structuring farming and linking it to the outside world. Central here is the production of as much as possible for the lowest possible input of labour. The machine appears as a metaphor linking low labour input to a large volume of production. Mechanization, particularly the mechanization of field work, is the focus of attention. The intensification of animal production and the extra care this requires is considered to be counterproductive. Machine-men do not include time wasted in attending to cows in their concept of work.

Cowmen have adopted a style of farming in which the cow is not only central to farming activity – it is the pivot of this activity. The treatment and care of the cow is highly individualized and the use of meadows and grassland management is entirely dependent on the feeding requirements of the herd. Cattle selection is considered to be the highly privileged domain of the farmers themselves and a job that must not be delegated. Observing the herd is certainly no waste of time. Within the realm of farm economics these adjustments, made in the interests of the herd, result in a very high gross and net margin per cow. Even though intensive farmers get a higher milk yield than cowmen, the latter distinguish themselves by their higher margins. In this way a strategy materializes into a particular practice involving specific technical and economic interrelations that, in turn, confirm and reproduce the strategy.

In the farming style of the large farmer, the notion of expansion is critical. A particular farming practice is only relevant in as far as it is a pre-condition for expansion. Future prospects are considered a limited good, a telling indication of the degree to which the dominant discourse has been internalized. Only the largest farms are thought to have any perspective. In the Netherlands today, the image of the large farmer generates envy, admiration and criticism. In a certain way, the evaluation of their specific practice is at the heart of a popular classification struggle.

Graph 8 Farming Styles in Dutch Dairy Farming Sector

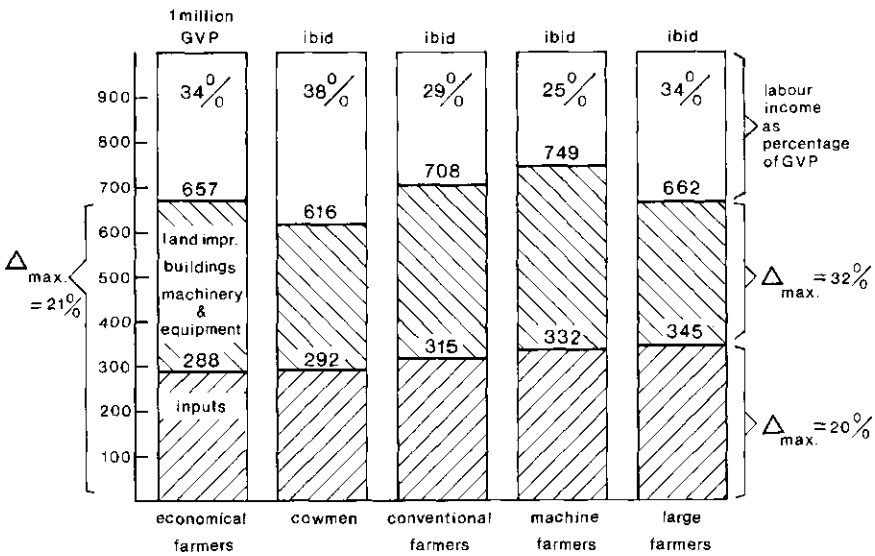


Taken together the farming styles described above constitute a richly chequered whole, in which specific sets of interests and prospects lead to particular farming styles. In the style of the economical farmers, for example, the maintenance of a relatively high employment level is seen as an important need. This is actualized through a particular strategy involving a specific structuring of the farm enterprise and its development over time. Machine men, however, consider that the burden of labour should be reduced as much as possible. This bottom-up pressure is also translated into a strategic approach which in turn gives rise to a particular farm structure.

In this context it is important to note that the various farming styles also contain highly differentiated input-output relations and significantly different Gross Value of Production/employment relations. In this respect 'there are no general interrelations neither are there any underlying and generally valid laws. The relevant linkages are embedded in, and therefore conditioned by, the styles in which they are created' (van der Ploeg 1994: 69). Let me illustrate this point by drawing on the example of dairy farms. In order to produce a GVP of one million guilders some farming styles

need 20 percent more inputs of fodder, fertilizers and veterinary services than others. The same is true for the use of technology: using current, neo-classical concepts it can be calculated that some styles systematically spend about 32 percent more than others on land improvement, buildings, equipment and machinery. Taken together (see Graph 9) we see the emergence of systematic differences. In some styles, 62 percent of GVP is needed to cover inputs and the costs associated with technology, in others it as high as 75 percent of GVP. This indicates that it is at least *theoretically* possible to reintroduce into discussion the issue of the malleability of the cost line represented in Graph 3.

Graph 9 Differentiated Interrelations between GVP and Costs (The Neo-Classsical Representation)



Probably more telling and transparent results are obtained when the Chayanovian approach is adopted. Here the net income or farm family income is critical. This net income cannot be attributed to individual factors of production such as land, labour, or capital. Subtracting the total outlay involved in sustaining the cycle of production from the GVP gives net income i.e the payment the family receives for its labour. This net income should be seen as the fund which supports family consumption, the reproduction of farm resources and any possible expansion.

The Dutch economist De Hoogh has reasoned in much the same way. The total farm family income produced by using the range of production factors owned by the family as a whole is the central concern of the farm household (1991: 18). Hence the guiding principles of neo-classical econ-

omics are rejected.[36] The practice of family farming represents a case of inverted economics (De Hoogh 1991: 49) and requires specific methods for its analysis and representation. A crucial consequence of this line of reasoning is that *calculated costs*, central to the neo-classical approach, lose their relevance.

In applying this particular perspective to the data discussed above, paid interests on loans taken by banks are considered as outlays. The calculated interests on the capital owned by the farm family, however, appear as an integral part of the farm family income. This point is particularly important because each farming style contains a specific and strategically managed balance between its own and foreign capital. Second, it follows that depreciations should be seen as an integral part of farm family income. The specific part of the family farm income used to renew existing resources is highly dependent upon the decisions taken by the farming family and therefore on the conditions faced by that family, the more so since there is no standard for calculating depreciations. The relevant time horizon can be extended or shortened but remains heavily dependent on the social organization of farming, i.e. on its style. Third, the calculation of labour costs by projecting the current situation on the labour market onto the farm family is arbitrary and also methodologically wrong. This leads us to a fourth point: the calculation of net profits and losses is totally misleading, especially as far as prospects for continuity are concerned. Whilst such calculations may serve certain needs and interests, they are fundamentally inadequate as a synthesized representation of the state-of-affairs in family farming and prospects for employment.

The Chayanovian approach associates well with the structure of historical book-keeping records, and also with many of the *calculi* used in family farming today.[37] Probably even more important is that the Chayanovian approach, which at first sight seems somewhat old fashioned, may well be a highly appropriate tool for operationalizing the neo-institutional concept of transaction costs. Today's agriculture is embedded in a complex network of markets and market agencies. This network is composed of commodity relations through which thousands and thousands of transactions are channelled. However, the degree of integration (or submission) is highly variable. In order to finance new investments, some farms have to establish relations with the banks, whilst others draw mainly on their own savings. In the first case there will be transaction costs which include the payment of interest rates. This is not the case where a farmer's own savings are included. In a neo-classical analysis, the difference between the two cases will be obscured, since regardless of the specific case, in the analysis it is the 'calculated' interests that are shown. In the Chayanovian approach, however, only the real outlays – the paid interest – are included. The same goes for other transactions. Take fodder, for example. Opportunism in the market may mean that the price paid for fodder may be too high or because it is of poor quality total production may be low.

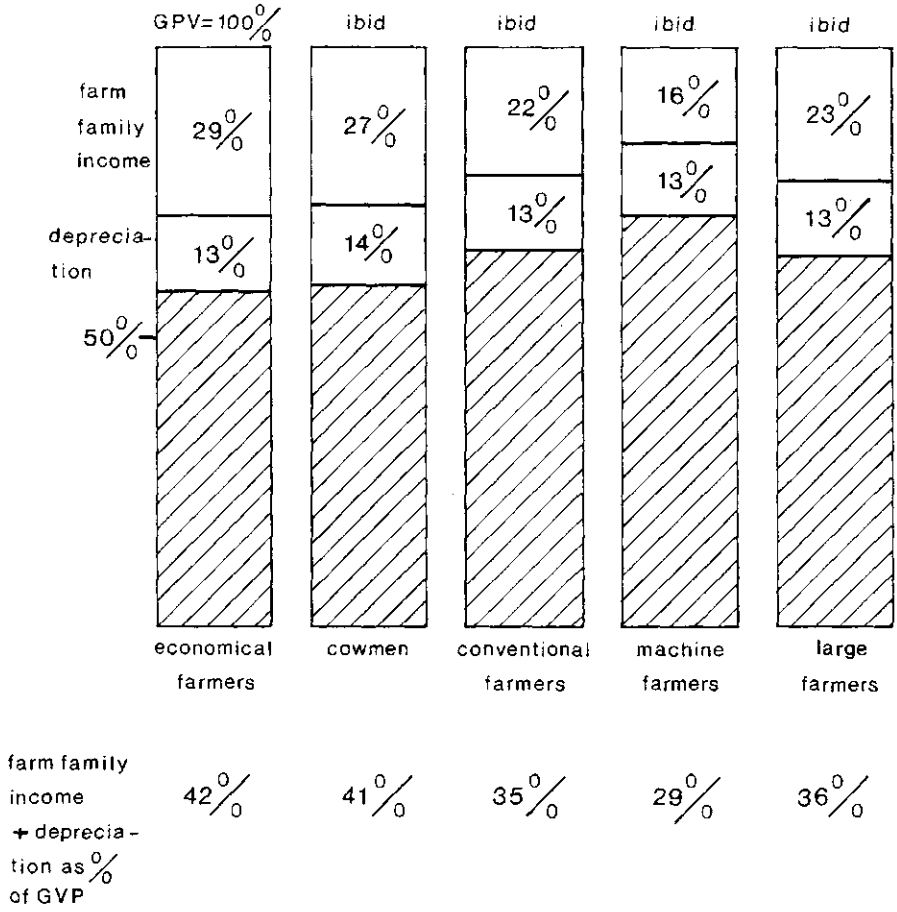
These kinds of effects will be reflected in the Chayanovian type of analysis and because it focuses on outlays, it synthesizes the real position of a farm enterprise vis-à-vis markets very well. It is precisely in this respect that farming styles differ sharply (van der Ploeg 1994).

Van der Ploeg, Roex and Koolen (1995) applied the Chayanovian perspective to a representative sample of nearly 600 dairy farms analysed by the National Institute for Farm Economics (LEI). They found that farm family income – including depreciation and calculated interests – ranges from 29 to 42 percent of GVP (see Graph 10).[38] In the case of large farmers this was 36 percent and for economical style farmers characterized by a certain distantiation of market and a particular deconstruction of reigning technological designs, it was 42 percent.[39] Six percent may seem a very small difference but in terms of the total GVP of the Dutch dairy farming sector its value in real terms is NLG 528 million which, assuming an income level of NLG 50,000 per year per labour unit, is equivalent to an employment effect of 10,560 units. Given the total number of dairy farms in the period under consideration – some 45,000 with an estimated labour force of 75,000 labour units – this is a considerable amount.

These differences in economic input and output indicate considerable space for manoeuvre allowing – at least theoretically – for a generalized reduction of costs in the agrarian sector. But will this space be used?

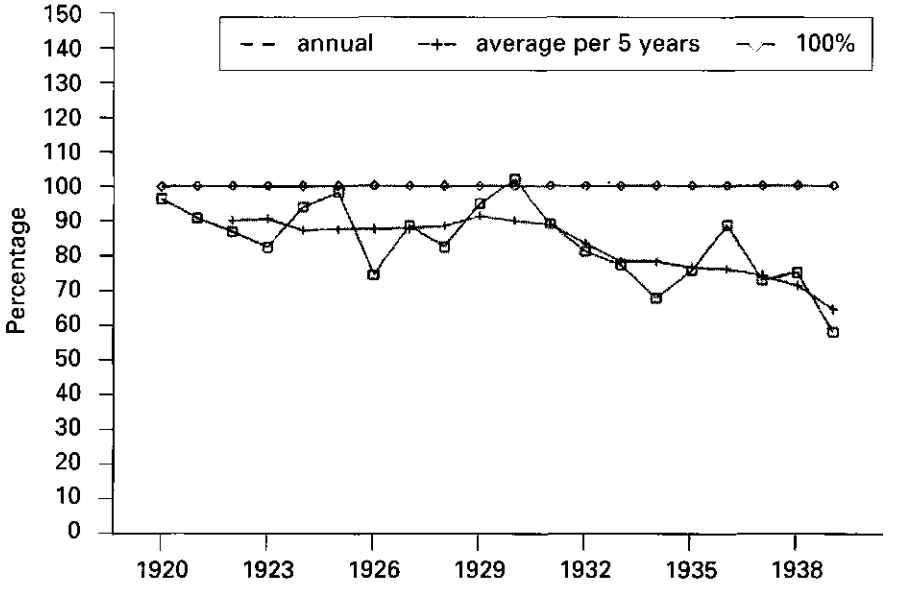
History shows that Dutch farmers have reacted to the recurrent crises in agriculture through decommoditization: resources mobilized through the markets were replaced by self-produced and reproduced resources in order to lower monetary costs as much as possible. A corresponding increase in farm family income – understood in the Chayanovian sense – was the result. One of the first systematic and provoking analyses was carried out by Vondeling (1948) who used a large quantity of farm book-keeping records. In his study – which covered the period 1923-1940 – he made a longitudinal analysis of 117 farms. This was a period that covered the crises years of the 1930s. It is remarkable that the monetary expenses of the farming sector were reduced the moment the crises began to be felt, slowly at first and then in a more consistent and substantial way (see also Graph 11 derived from Vondeling). Wages represented 25-30 percent of total expenses and were a very important item. Although the wage rate was reduced considerably, the total reduction of wage payments was mainly due[40] to changes in the cropping scheme [...], to a lowered intensity [...], to rationalization and mechanization [and] to replacing wage labour with family labour (1948: 102). Vondeling also showed that less cattle feed was bought although there was a slow increase in the milk yield per cow. To Vondeling (1948: 103), this reflected the increased efficiency with which internal resources such as grass and hay lands were being used.

Graph 10 An Application of the Chayanovian Approach

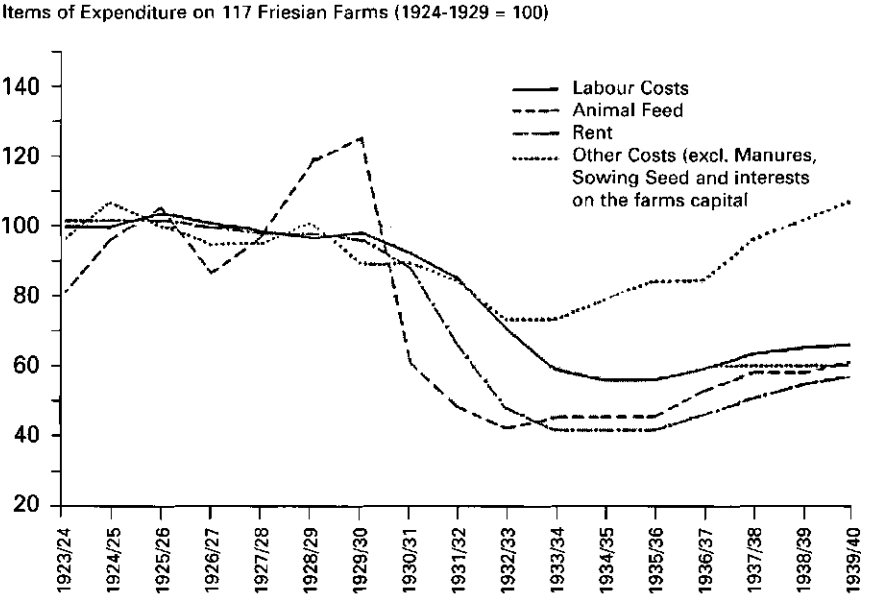


In his analysis of a crop-producing farm in the south-west of the Netherlands, Wiskerke (1992) found the same solutions had been used to withstand the problems generated by the crises years of the 1930s. Monetary expenditure was actively, purposely[41] and often ingeniously reduced in order to maintain the farm family's income (see also Graph 12 derived from Wiskerke 1992: 50).[42]

Graph 11 Farmers Responses to the Crisis of the 1930s – Dairy Farming, Friesland



Graph 12 Farmers Responses to the Crisis of the 1930s – Arable Farming, Zeeland



Today, it is possible to show that the same mechanism has been reactivated in several farming styles and it is interesting that whilst the decrease in spending and investments is perceived in dominant discourse as an expression of the crisis, from the farmers' point of view the same phenomenon is understood as an actively constructed *response* to the crisis.

Statistical data show a persistent tendency towards lowering cost levels. This corresponds with results obtained through surveys: 73 percent of Dutch farmers have explicitly opted for a more economical way of farming (Ettema, Nooy *et al.* 1994). Those who will not or cannot are destined to suffer more than others from the global effects of the crisis. As argued above, this will have a considerable effect as far as income and the generation of employment is concerned. Farming is, as it were, rebuilt on farmers' controlled (endogenous) resources and consequently transaction costs tend to decrease. This will affect employment in the ways we have indicated above. In addition similar effects, associated with a re-structuring of the development process of the farm enterprise, may occur particularly because farm development as structured during the epoch of modernization, involves considerable transformation and transaction costs.

Skimming the Cream: Towards Less Cost-Inflating Mechanisms for the Reallocation of Resources[43]

Each year some 7.5 percent of the available Dutch milk quota is transferred. The majority of these transfers, some 4.5 percent, take place within the farming families themselves and involve a movement from the old to the new generation. The remaining transactions are those carried out on the free-market and represent 3 percent of the total quota. Up to 1991/92 some NLG 4,000 million had been invested in quota transfers and NLG 500 million had been spent in temporary lease contracts. As argued earlier, the quota trade implies an enormous out-flow of income from the sector. At enterprise level it implies an increase in cost price which up to now has been somewhat mediated by fiscal policy.

Trade in quotas is, for most outsiders, a puzzling phenomenon. Farmers invest hundreds of thousands of guilders in quota acquisition. Their net gains, however, are minimal. The risks, on the other hand, are considerable. These investments, often represent very dangerous manoeuvres, as any drop in the price of milk will show. Moreover, they are usually partially financed by loans. In the period 1991/92 7 percent of all dairy farmers were involved in the acquisition of quotas. Their main and perhaps only reason for extending their quotas was that they were engaged in what they still call structural development. The future in agriculture was seen as a limited good and only the largest farms had a chance. The acquisition of quotas was not only seen as being correct in itself, it was regarded as a structural necessity.

There has been considerable debate in the sector about the free-market for quotas. The Association of Young Dutch Farmers (NAJK) has been particularly critical of this anarchic and counter-productive form of quota-mobilization and distribution. The Landbouwschap, on the other hand, has tried to legitimize the existing free market solution. Its arguments were telling. As far as the sector as a whole is concerned, it was claimed that slowing down the trade in quotas 'would imply that fewer farms would stop production and this, in the long term, implies that *the structure [of the agricultural sector, jd] will gradually become weaker*' (Landbouwschap 1994:8). Individual farmers, it was said, faced the dilemma of becoming accountants or entrepreneurs. Even when, from an accountancy point of view, the buying of a quota was unattractive, 'the entrepreneur will buy a quota in the interests of continuity' (ibid).

The problem with these statements is that 'continuity' is represented as a sort of Archimedean yardstick. However, available scenario-studies indicate clearly that it is precisely the large and rapidly expanding farm enterprises that will probably have the poorest chances as far as continuity is concerned. In the following table some significant data have been summarized.

Table 1 Differential Outcomes of Differential Scenarios[44]

	large farmers	economical farmers
quota in 1990	786,000 kgs	513,000 kgs
reduction of labour income between 1990 and 2005 under current policy conditions	-75,000 NGL	-67,000 NGL
remaining labour income in 2005	+ 36,000 NGL	+ 34,000 NGL
reduction labour income under free trade assumptions allowing for unlimited expansion	-102,000 NGL	-70,000 NGL
remaining labour income in 2005	+ 10,000 NGL	+ 31,000 NGL

Given the changes that have taken place in the political and economic context in which farming is embedded, the issue of continuity and how to produce continuity has to be redefined. However, there are strong interests within agribusiness, state agencies and amongst a small but dominant group of growers, that block such a redefinition. The statements of the Landbouwschap are just one expression of this positions.

There is clearly a classification struggle taking place (Bourdieu 1986) within Dutch agriculture and questions are being raised about the type of

farm development that will lead to continuity and whether or not further expansion is a good thing or something that will cause problems later. These are not only political issues, they are also matters of practical concern. The growing scepticism amongst farmers revealed in the surveys referred to above is also echoed in their everyday discourse and practise. A growing number of farmers are concluding that the quickest way to go bankrupt is to have a large farm, considerable debts and a recent record of accelerated expansion. These sentiments are expressed in other ways too. It used to be self-evident that one should buy ones neighbour's farm as soon as it came on the market. Today, however, farmers' are now more inclined to say 'I hope his farm does not come up for sale this year'.

Continued expansion of the farm enterprise is being seen more and more as a mechanism that tightens the squeeze and threatens the sector as a whole. Expansion moves the cost line shown in Graph 3 in an upward direction and this is harmful not only to the sector as a whole, but to expanding and non-expanding farms as well.

It is no Utopian yearning to want to slow down this type of counter-productive expansion, inspired as it is by the rather doubtful image of a limited good. Neither is it Utopian to look for better, i.e. less cost-inflating mechanisms to coordinate the necessary redistribution of resources such as quotas between farms. The NAJK has proposed a kind of positive skimming. To be more precise, 50 percent of all free-trade quota transactions should be channelled through the state. If a farmer sells 100,000 kg, another 100,000 kg could be allocated to the state. These state-controlled quotas, the NAJK suggests, could then be redistributed equally amongst all farms.

This proposal raised strong emotions and is enthusiastically supported on the one hand and vehemently contested by such agencies as the Landbouwschap on the other. The Dutch Parliament requested LEI to study the consequences of this proposal.

I will briefly refer to some of the findings of this study here, particularly because it might provide us with information about the additional impact of a farmers-controlled redistribution of resources. Leaving aside the technical details of the study, I want to focus attention on the fact that under the 'skimming' system the cost price of milk in the year 2002 (....) will be 8 or 8.8 cents *lower* than its price under the (free-trade) system'.[45] Hence, even a modest solution (taking away half of the free market transactions) would have a considerable impact on the cost line as reproduced in Graph 3. In more concrete terms the LEI concluded 'that when compared to the current system of quota re-allocation, the proposed skimming system would reduce the number of farm enterprises going out of business. Under the skimming system an additional 4,700 enterprises would be able to continue work and by the year 2012 this would amount to 8,800 enterprises'. In terms of employment this would mean 7,500 extra

employment opportunities by 2005. More radical solutions would probably have more far-reaching consequences.

Farmers' Responses to the Environmental Problem

Another interesting farmers' response related to the issue of cost control concerns the rapidly rising cost of environmental policies (see the jump in Graph 3). Environmental policy in the Netherlands involves a series of instruments and procedures to be applied in farming which require considerable investments and a rise in the level of costs. At the same time, the generic character of environment proposals is definitely at odds with the heterogeneity found in Dutch agriculture both in the diversity of its farming strategies and styles and in its ecological base. As a result the standard solutions prescribed in environmental policy often turn out to be much less effective than expected, very expensive and often inadequate or worse still counter productive. As a reaction several environmental cooperatives have emerged to look for alternative and locally-defined solutions. Some of the most interesting of these solutions involve cooperation and exchange between farmers, decentralization, local self-regulation and new technical innovations.[46] The position of these new groups can be summarized briefly: they do not contest the global goals of environmental policy instead they commit themselves to those goals but, in order to do so, they ask for a certain amount of manoeuvring space so they can develop and implement the most suitable course of action. These groups are currently negotiating with the Ministry of Agriculture.

It is impossible to make any realistic assessment of the potential impact of these new responses. The base-line, however, is quite clear. Government documents that underpin current, generic environmental policies, show that some 30 to 40 percent of Dutch farms will disappear in the near future because they cannot finance the environmental solutions being imposed. The Government does not see this as a problem because such an abrupt reduction will create the room necessary for the remaining farms to expand and increase their production in such a way that they will be able to off-set environmental costs. It is clear that the ghost of modernization theory is still very much present in this type of reasoning. This aside, however, it is clear that through the responses of these new farmers' cooperatives, the 'jump' indicated in Graph 3 , may well be alleviated.

Demonopolization of Markets in Order to Create Additional Income Flows

At the level of national policy making is has been decided to reserve 150,000 hectares for the development of nature. Parliament has expressed

the desire to accelerate the implementation of this policy and in particularly the acquisition of land for the development of natural values.

Slangen (1994) has recently calculated the costs associated with implementing this nature policy. As far as the financial costs to the State are concerned, the amounts involved are frightening. The acquisition of land at the rate of 5000 hectares per year for a period of 30 years, rebuilding this land into nature parks and the recurring annual costs of their maintenance and control come to more than NLG 11 billion. Annual expenditures will increase to NLG 615 million in the thirtieth year after which costs will decrease.

Empirical data, synthesized by Slangen, indicates that the maintenance and control of one hectare of nature in present nature reserves cost 1500 guilders/year/ha. The suggested reconstruction will cost an average of NLG 10,000 per hectare and the acquisition of land for nature goals is currently running at an average of NLG 40,500 per hectare. If a repayment period of 30 years and an interest level of 6 percent are introduced into the analysis, current expenses per year per hectare come to some NLG 5,166.

These figures are extremely relevant in the context of this article. At the moment there is considerable debate in the Netherlands about the interrelations between the production of nature and farming: Should the two be separated or can they be combined? These discussions centre partly on the *type, quality and accessibility* of the nature to be produced: Is a return to pure nature viable?[47] Should landscapes and the natural values embedded in them to be considered cultural contructs (Elerie 1994 and Zwaving 1994), and if so can farming make any positive contribution in this direction?

New farmers' associations all over the country are increasingly arguing that they can and should have a role in the production of nature. The specificity of local farming styles and their interaction with the green space in their vicinity are important to the argument used by these new associations (de Bruin and van der Ploeg 1992 and de Bruin *et al.* 1994). The demand for *farmer managed nature conservation* is increasingly recognized by regional and national authorities and also supported, albeit with some reservations, by sections of the nature and environmental movements.

The macro-economic effects of increasing space for farmer-managed nature and landscape conservation would be considerable. If, in a rather old-fashioned way, payments for nature and landscape conservation are defined as compensation for extra costs and lost benefits, in the Chayanovian approach they add directly to the total income of the farm family. If only half of the spending potentially ear-marked for nature production was re-oriented towards farmer-managed nature and landscape conservation, and if these new farmers' associations were to use this monetary flow to realize their plans, an area considerably larger than the presently projected 150,000 hectares would become the object of an extremely interesting and promising production of nature scheme and

there would be an extra NLG 375 million per year available to the agricultural sector capable of supporting at least 7,500 employment units.

Diversification

Although the image of the highly specialized farm enterprise still dominates the agropolitical arena, agrarian sciences and public opinion, it is clear that this image is increasingly at odds with empirical reality. Pluriactivity has emerged as a concept that more accurately reflects the *diversified* economic basis of the farming family. It is a basis that does not only involve activities located on the farm enterprise itself, there are also other, often very important sources of income that contribute to sustaining the farming family. Frequently it is these additional incomes that allow the farm family to continue.

In one of the few studies on pluriactivity in the Netherlands, de Vries (1995) found that in the region of the Maas and Waal only 36 percent of farming families derive their income exclusively from farming. In the overwhelming majority of cases either husband or wife earned an additional income elsewhere. Perhaps an even more important finding was that pluriactivity is not limited to older farmers and small-scale farmers but is widespread amongst younger farmers too. Quite often this implies new divisions of labour between young and old and male and female (van der Plas and Fonte 1994). Pluriactivity is also used as a mechanism to secure the passage of the family farm from one generation to the next.

Additional incomes are found in the economies of both large and small farms. The exact amount of additional, non-farming income is well known for the farming styles discussed here. In the farming styles that contain the largest number of smaller units, such as the economical farmers, for example, non-farming income totals some NLG 19,203 per family per year. In farming styles with a greater concentration of large units, such as the cowmen and the large farmers this additional income is between NLG 20,987 and NLG 30,746 per family per year. A crucial question here is whether this *diversification* in the economic base can be sustained. If, in fact, it could be enlarged it would increase the total GVP of the agricultural sector substantially.

Agrotourism is one of the many new expressions of the tendency towards diversification and for several reasons it is a particularly interesting one. A national survey has shown that between 7 and 8 percent of Dutch farms are engaged in agrotourist activities in one way or another. Summarizing a selection of detailed studies, Oostindie and Peeters (1994) conclude that on average these farms earn a net additional income of NLG 10,000 from agrotourist activities.[48] They also show that there is still considerable elasticity as far the supply and particularly the demand for these services is concerned. The main problem, however, is the lack of

institutional arrangements to coordinate supply and demand. This blocked market should be demonopolized urgently.[49] Much controversy surrounds the question of the significance and the impact of agrotourism. It has been argued, for example, that when the costs of these activities are calculated, they cannot be called remunerative. However, from a Chayanovian perspective such an argument does not make sense. Income earned in this way becomes an interesting component of total farm family income.

Given the existing diversity of farming styles, the current agricultural labour surplus and recognizing that style has a strong mediating effect both on the interest and potential for entering new, additional activities, it becomes promising to study the implications of a growth in pluriactivity for the sector as a whole. Estimates have shown that even a modest expansion in pluriactivity, such as small-scale tourist and recreational services and the commercialization of agricultural products, would, in fact, bring an extra, annual income of NLG 200 million to the sector as a whole. If pluriactivity was adequately supported by the appropriate institutional arrangements, then its potential impact in terms of income and employment would be even greater.

Quality Production

Quality production is a much debated issue (see van Dijk 1994, for example) and I will only deal with it briefly here. The phenomenology of quality production has been well described both for the Netherlands and for Europe generally (Barberis 1992; van der Meulen and Ventura 1994). In this context the implied increase of added value at farm level is evidently the most important feature. In the Netherlands, farmers and the localities in which they work have benefited from the added valued attached to the production of high quality, farm-made cheese, bread and ecological milk.

Quality production implies potential competition between agroindustry and those groups of farmers who aim to provide quality produce, although one could also argue that specific forms of mutually reinforcing cooperation are also possible. The critical issue, however, is control: who will define quality, who will set production standards, who will organize and control interlinkages with consumers. Second, there is the issue of redistributing the extra added value. Both issues are closely related. Within this arena two further factors are important: the monopoly over access to consumer markets as a result of privileged relations with supermarkets and the monopoly exercized over the image of what constitutes a good product. This latter type of monopoly is closely associated with control over mass-media advertising. The search for new, quality products and the construction of new, complementary markets must be seen in this context.

Consequently, the development of quality production expresses itself as a struggle for demonopolization.

The size, nature and composition of transformation and transaction costs are factors fundamental to any discussion on demonopolization. At the agribusiness level, for example, the definition, development and realization of those links with consumers that are crucial to the success of a new product go far beyond the transactional costs of the farmers themselves. There are several reasons for this. The first concerns scale. Whilst innovative groups of farmers can develop their markets step-by-step, the agroindustry adheres to the principals of large-scale operation. Second, much of the R&D necessary can be carried out by these farmers in on-farm experiments. Agribusiness, however, has quite a different organizational structure. These are a few of the reasons why farmers' innovations quite often result in economically attractive products and networks which at an industrial level do not seem credible. Apart from this, however, it should be noted that the transaction costs of farmers' innovations are, to an important degree, non-monetary involving an investment of their own time and resources. In industry, however, transaction and transformation costs are wholly monetary with urgent and tight conditions as far as profitability and time are concerned.

There is considerable interest in quality production amongst Dutch farmers and 65 percent of them consider it as a promising possibility for their own farms. Current farming practices are still a long way away from quality production but there are some notable exceptions. The potential impact of quality production can be considerable (see Antuma 1995, for example) even if the most modest assumptions are used in calculation. If the existing trend towards farmer-managed quality production is continued or strengthened, the stagnating GVP line illustrated in Graph 3 will be positively affected. Combining existing data on farmers interest, potential and extra added value gives an added value of NLG 62.5 million per year at sector level. This allows for a modest, but interesting increase in employment of 1250 labour units per year. Antuma and van Scheppingen (1995) suggest, in their economic analysis of Veenweidekaas production, an impact that goes considerably further.

Re-integration

The period of modernization has seen a movement away from the farm as a enterprise that integrated arable farming, dairy farming, meat production and production for home consumption with a range of non-agricultural activities to one characterized by an accelerated process of specialization. The process of specialization has, as we know, lead to considerable ecological disruption (Goewie 1994) but what is perhaps more important is that agricultural space has lost its flexibility. A re-integration at the level

of a newly-established, socially regulated division of labour and space between farms is emerging as an extremely interesting new opportunity and potentially new resource. Let us examine some empirical examples. In dairy farming, a considerable group of farmers have surplus land. At the same time, other sectors, such as horticulturalists specializing in tulips and lilies and arable farmers producing seed potatoes are experiencing an increasing and critical shortage of space. This is because of the need to extend rotation schemes to meet the needs of more environmentally-friendly production. If the coordinating mechanism is the buying and selling of land, the two will never meet. However, if the necessary transactions are institutionalized in the right way according to examples emerging in other parts of the country, then the supply and demand for green space could very well be brought together.

If the production of items with a high added value, such as seed potatoes, lily and tulip bulbs were accompanied by the space necessary for ecological rotation schemes – in this case one rotation in every seven to ten years – then there would be a threefold advantage. First, an expansion of economically interesting sectors would be possible without ecological damage, second the production of high-value added products could be expanded substantially and third, other sectors, such as dairy or arable farming, for example, would be able to profit considerably from the expansion.[50] An interesting additional income could be acquired from the annual rent of land.

Similar examples can be found on the axis that links intensive meat production and arable farming. Arable farming needs contracts that offer higher remuneration for grain production whilst meat production urgently needs to find ways of allocating manure and obtaining high quality cattle feed. Again, the two can be matched as grass-root arrangements demonstrate.

These possibilities have been introduced into the analysis for the province of Friesland (Antuma *et al.* 1993). If these and other relevant findings are generalized it can be concluded that such a re-integration adds at least a potential NLG 200 million to Dutch agriculture each year. More important, however, new institutional arrangements that can de-rigidify the land market and initiate changes both in farmers' attitudes and institutional rules could add an important extra growth-factor to Dutch agriculture.

Towards a Synthesis

As Kosik (1976) argued, the contemporary situation offers many contrasting developmental possibilities but only one of these can be realized. This is true for Dutch agriculture today. Throughout this discussion I have focused on one of the possibilities within Dutch agriculture – *the possibility of going beyond modernization*, an option which can also be seen as a turning

point and a movement from an exogenous rural development to a more endogenous form.

The concrete possibilities outlined above have been inspired partly by farming styles that have been neglected in the epoch of modernization. They are styles which build more intensively than other styles on their own resources and they secure an attractive re-allocation of *the wealth produced for the regional economy.* At the same time going beyond modernization has often been shown to mean a return to resources whose potential has been forgotten but which are becoming highly relevant in the context of the current crisis. Such resources include the potential to produce high quality products, the production of natural and environmental values, and the possibility of diversifying and cooperating along new lines.

If we aggregate the elements elaborated in the previous paragraphs, it might be possible to conclude that benefits can be increased and costs lowered considerably (see Graph 3). The impact of such shifts could easily yield some 30,000 labour units per year in the dairy sector. This impact is considerable given that the current level of employment in this sector is 75,000 and is not entirely hypothetical. It is realistic in as far as it builds upon ongoing empirical processes. Throughout this chapter I have argued that Dutch farmers have not been passively suffering during the crisis in their industry. They have actively constructed a range of new responses. These responses, as I have tried to show here, reflect a break with the iron laws of modernization and may halt the fall in the level of agrarian employment.

This reversal and its implied impact are hypothetical in as far they presume a shift in institutional arrangements, especially at the level of agrarian policy. So long as the modernization paradigm dominates policy making there will be no significant change in the current crisis. A new future for agriculture and the countryside is close at hand but at the same time very far away.

Notes

1 The author is grateful to Jerri de Hoogh, Rudolf van Broekhuizen and Gert van Dijk for their valuable and stimulating comments and critique on earlier drafts.

2 The interests of the state, agribusiness and several scientific institutions became aligned as a result of this particular modernization project. Christis' (1985) notion of a 'structural affinity' between capital and science can be aptly applied here. It must be added, however, that this affinity was probably not intrinsic: it was deliberately constructed and institutionalized within the context of the modernization paradigm.

3 This was the case with subsidies (see de Bruin, 1994 and de Bruin forthcoming), with technical assistance and applied research, for example. It also occurred in the context of spatial reorganization schemes. See van de Brink (1990) for an extensive description. From the end of the 1960s onwards, a similar policy was followed by agribusiness groups: price

differentiation favouring large entrepreneurs and a reallocation of common funds controlled by cooperatives towards investments realized by these large entrepreneurs are well-known expressions of this increasingly biased policy.

4 The more so since structural development became more and more associated with the strategy for securing the international competitiveness of Dutch agriculture and Dutch agribusiness in particular.

5 In dominant discourse the modernization project is not perceived (or represented) as a political project. Agrarian policies in the period 1950-1980 can be conceptualized as reflecting the general process of economic development. The agricultural sector could not but follow this general process: farm enterprises had to adapt to changes in the relative factor prices that resulted from the development of the economy as a whole. Consequently it was farmers themselves, especially the so-called 'vanguard farmers', who initiated and spurred on the interlinked processes of intensification, scale enlargement, market integration and specialization. Although I would reject any analysis that reduces farmers to passive receivers of general 'processes' or 'projects', I strongly disagree with this representation. Modernization has been a powerful political and economic project in which the state, science and agribusiness have been central. Probably one of the most telling indicators is that where ever and whenever necessary, it was the state that actively adapted and changed the relative factor prices to facilitate the particular developmental pattern thought to be crucial to the dominant interests of the time. This occurred with the price of capital compared to labour and with the price of energy compared to labour, for example. The same was true for the fiscal schemes that were imposed and which favoured accelerated growth and sanctioned step-by-step, the processes of development at farm level.

6 It was the relatively high debt as well as the in-built chains of interdependent technicalities that made continued expansion, as it were, an internal need on these farms (see for further discussion van der Ploeg *et al.* 1992 and Long and van der Ploeg 1994.

7 Scale is operationalized here as the SFU/LU ratio. SFU refers to Standard Farm Units and LU to Labour Units. To illustrate the term it suffices to say that, in dairy farming, this ratio comes quite close to the number of milking cows (and hectares of land to feed them) per unit of labour force. Intensity refers to GVP/SFU, that is the gross value of production as realized per Standard Farm Unit (for example the production of milk and meat per cow).

8 This reflects the dominance of neo-classical points of view within economics at that time. It can also be noted that the hard core of neo-classical economics was not contested by mainstream rural sociology. During the 1950s and 1960s the rural sociology mainly focused on the so-called diffusion of innovations, distinguishing the 'traditional' from the 'modern farmers'. An extended discussion and critique can be found in Frouws and van der Ploeg (1973). The foundations for a neo-institutional alternative to neo-classical analysis in agriculture has been developed by Saccomandi 1991.

9 See, for example, Bauwens 1979 and van Driel 1982 and 1984. For a critical discussion see van der Ploeg 1985.

10 The 'Landbouwschap' is the centralized top of the neo-corporatist structures within Dutch agriculture. See Frouws (1993) for an excellent theoretical and empirical discussion.

11 Although I do no want to elaborate this particular element here, it is interesting to point out that the notion of 'structure' was repeatedly reified in order to move certain processes out of the domain of what was debatable.

12 In the framework of modernization theory, the overall reduction of employment is related to, and consequently understood as the outcome of deteriorating terms of trade or, in the neo-classical approach as the outcome of the demand inelasticity for food. However, a more precise inquiry into the empirical reduction of agrarian employment shows that this reduction is related to a range of different mechanisms. In the second half of the fifties and in the first half of the sixties, for instance, there was an increase in the degree of mechanization on larger farms, which implies that employment opportunities for small farmers (between larger and smaller farms there used to be a particular division of labour and cooperation) disappeared quickly. Consequently many small farmers lost an important section of their economic basis and were therefore obliged to look for other employment opportunities (Eizner 1983; van der Ploeg 1993). Simultaneously, post-war industrialization implied an important 'pull-factor'. From the mid-1960s onwards reducing the total number of farms became an explicit object of many state agencies and here one could probably apply Burawoy's notion of 'political apparatuses' (1985). Through spatial reorganization, extension services and subsidies many farmers were stimulated if not pressed to leave agriculture. Maybe the most important factor, however, was the dominance of the notion of the 'optimal farm'. Many farmers began to feel that they no longer had a place 'in the community of farmers'. In public discourse, reality in agriculture was represented in such a way that a) smaller farms had no prospect and b) that the 'blame' for being 'small' was placed on the farmer himself. In this ideological conjuncture many farmers quitted and, even more important, many sons and daughters thought it was impossible to continue farming. The empirical fact, however, that in the same period many so-called 'small farms' have been reproduced anyway illustrates once more that it has probably been the socially constructed (and institutionally underpinned) 'unattractiveness' more than any 'objective' impossibility to go on farming, that spurred this exodus. From 1985 onwards it became increasingly difficult to reproduce the 'small farm' - the conversion of quotas and 'environmental space' into commodities increasingly blocked this reproduction.
Little research has been done on these crucial issues, but the available data suggest that acute income problems are seldom the reason for giving up farming. In most cases it is the lack of prospects as experienced by the younger generation and personal problems that are the main reasons for farmers leaving the industry as a recent CBS study has shown (Agrarisch Dagblad, 14 March 1995, page 2). From the mid 1970s onwards it was the specific (re-)distribution of opportunities and limitations by state and agribusiness which hindered the continuation of specific farms and which resulted in further reductions in the number of farms. Currently the gloomy prospects for the sector as a whole have made many people decide that they are better off selling their quota and their land 'in time' (i.e. before the predicted fall in quota prices actually materializes). This again underpins the notion of agrarian policy as a self-fulfilling prophecy. Further on in this article several of the elements discussed here will be touched on again.

13 There have been long periods of expanding agrarian employment. In the Netherlands agrarian employment rose from some 300,000 units in 1850 to 670,000 in 1955. Historians characterize the 1880-1930 period in particular as being one of 're-peasantization'. From 1957 onwards the absolute level of agrarian employment decreased steadily (by some 1% per year). Actually there is an agrarian employment of some 280,000 full-time labour units. The general decline is, however, a highly differentiated phenomenon. In some areas and some sectors it is far more accentuated than in others. The same can be concluded for Europe as a whole.

14 Externalization refers to the ongoing delegation of certain productive and reproductive sub-tasks (such as the production of soil nutrients, the production of feed and fodder, the reproduction of cattle and the maintenance of equipment, for example) from the farm to outside agencies. Subsequently, the implied goods and services are bought by farm: they are to be mobilized through the markets (see for further discussions van der Ploeg 1990; Saccomandi 1991 and Benvenuti 1989).

15 The relative importance of dairy farming and arable production have declined during the last decade, whilst the horticultural sector is becoming increasingly more important. Spatial redistributions are associated with these changes between sectors.

16 This variability is, in turn, an empirical expression of the malleability of farming as the 'technical conversion' of resources into output. Let me illustrate this point in the following way. For grassland production there is, according to the work of agronomists, at least 500 alternatives ways of organizing the farm technically and each of them represents a valid possibility. There are, for example, 800 alternative ways of organizing maize production. Taken together this provides a dazzling matrix offering many, many concrete possibilities for a specific combination of grassland management and maize production. If we add other domains such as the management of the herd (milking, cattle selection, medical care), the organization of the labour process, mechanization and the management of external relations, for example, than it follows that as far as agronomic, zootechnical and technical interrelations are concerned there is a considerable 'malleability'. This is as true for the farm enterprise as a whole, as it is for separate tasks (see van der Ploeg 1985a for a discussion of 'hay-tedding'). There is no single blue-print for farming. There is, instead, an impressive and constantly developing 'reservoir' of possibilities which can be used and realized in farming practice. It is through strategic choices that a particular way of farming is created and that a particular alternative is selected. It has been shown in empirical analysis that these different farming styles contain highly differentiated agronomic and animal husbandry I-O relations (NRLO 1994; van der Ploeg 1994b).

17 This depends evidently on the availability of the required technologies. Currently, this is not a limiting factor. A more important point is that the assumption that further expansion is the only valid response to the squeeze in which agriculture is embedded does not withstand empirical analysis or theoretical critique. See, for example, van der Ploeg 1985 and 1990 were I suggest that there are differentiated responses towards any such squeeze. In more recent research on Dutch agriculture this has been reaffirmed (van der Ploeg *et al.* 1993).

18 In this respect I differ from Marxist analysis, in which the supposed external nature of the squeeze is stressed.

19 I refer here to a specific farming style, i.e. the one used by the economical farmers; the issue of different farming styles will be elaborated further on in this text.

20 Graph 4 is build on the empirical data provided by the National Farming Accountancy Bureau (LEI), see van der Ploeg, Roex and Koole 1995.

21 Current quota prices are around NLG 4 per kilogramme milk. Leasing implies 40 cents per year per kilogram milk. Exceptions apart, it is currently assumed that the acquisition of a quota has little positive effect on farm income. Current fiscal arrangements are favourable to further quota acquisition. However, the prospect of declining milk prices threatens this perspective. The main advantages of quota acquisition are said to lie in the

expansion of the farm itself, which is understood, according to modernization logics, as a pre-condition for the continuity of the farm as such.

22 This is primarily due to the different I/O relations and therefore to the different relation between GVP and costs (as well as to the different composition of the cost category) of the larger farms as compared to the smaller, economically-managed ones. Apart from this, the transaction of quotas and land as associated with farm enterprise expansion, implies a considerable transfer of income from the agricultural sector to other sectors. At least, this is the case in the Netherlands where the reallocation of quota is realized through the mechanism of the 'free market'. In this respect the Dutch position is quite unique and, as the Union of Young Farmers (NAJK), argues, for example, quite 'counterproductive'.

23 I am well aware of the fact that unorthodox interpretations such as this provoke a range of new questions. Why is it, for instance, that some farmers continue to invest in quotas? Why is it that under the current quota regime there has been an increasingly rapid decline in the number of dairy farms? I cannot deal with all these questions here. They suggest, in fact, the need for a research programme, the relevance of which is given by the increasingly critical position of the rank and file members of farmers' unions who are particularly affected by the arrangements governing the Dutch quota system. An important observation here is that precisely because of the modernization project the 'future' became a 'limited good' for Dutch farmers. Hence, they invest in quotas, even when such an investment is, from an economic point of view, a highly questionable transaction. On the other hand, the same phenomenon reflects the embeddedness of markets in social, political and cultural institutions and is a basic phenomenon denied in dominant, neo-classical reasoning.

24 It is intriguing to note that whilst such an observation was a self-evident and integral part of the knowledge of every agronomist in the pre-modernization period (see for example, Dijkstra and van Riemsdijk 1953: 36-37 and for a more general discussion van der Ploeg 1987: 20-30), it is in the modernization epoch that these crucial insights are marginalized.

25 From a sample of Friesian dairy farms it was concluded that in the period 1987-1991 large farmers achieved a growth of 12 percent on their farms. For smaller, economically managed farms the figure was only 0.6 percent. This does not imply though that there was only stagnation in the latter group. The economical farmers continued to reduce costs and to augment internal I/O efficiency and by using this strategy they managed to maintain their income levels.

26 What is the 'tragedy' facing Dutch agriculture at the moment? 'Structural development' continues despite the fact that it may have lost its former rationality. Between 1989 and 1993 the total number of dairy farms decreased by 3,100 to the current total of about 44,000. In the agricultural sector as a whole roughly 3,000 farms close every year. Although most farmers now consider this ongoing reduction as an absolute 'disaster' (Ettema, Nooy *et al.* 1994), the process has been institutionalized in such a way that few people think it can be reversed. Dutch agriculture is facing its own 'modern' form of the old and well-known 'tragedy of the commons'.

27 It is even worse: whereas in the typical situation originally described by the concept of agricultural involution, a stagnating income was combined with rising employment, in the 'modern' or 'western' version of involution a decreasing income is combined with decreasing employment levels which in turn lowers income levels still further.

28 An extensive description of the results was published in the national agricultural weekly 'De Boerderij' (1994). The results were also published in van der Ploeg *et al.* 1994.

29 Maybe it is just a coincidence, but it is remarkable that at the level of theory the focus is increasingly on 'modes of ordering' (Law 1994), i.e. on a deconstruction of the deterministic concept of structure (see also Long and van der Ploeg 1994).

30 Detailed descriptions of these processes can be found in Broekhuizen, Renting *et al.* 1994; de Haan 1995; Hees, Renting and de Rooij 1993.

31 We have had heated debates in Dutch academic circles about whether variability has remained the same or has been enlarged. The reader is referred to a special issue of TSL (Tijdschrift voor Sociaal Wetenschappelijke Analyse van de Landbouw) 1993, for a summary of these discussions. When Graph 1 and Graph 7 are compared it turns out that standard deviations expressed as a percentage of mean scale and intensity have grown. More convincing data, built on constant samples covering a twenty-five year period, are more clear in this respect (see van der Ploeg *et al.* 1993 and de Bruin forthcoming).

32 Extending the analysis to 1992/93 shows even more remarkable trends. Scale decrease as an effect of the quota-system, becomes an important though not exclusive trend and intensification is considerably accelarated. At the same time particular segments show a persistent trend towards extensification. According to the data available from the Dutch LEI the standard deviation of scale in the 1990s is 35 percent of the mean scale, whilst the standard deviation of intensity is 21 percent of the mean intensity. The mean scale and intensity are only slightly different from the 1981 values. The range, however, increased considerably.

33 The powerfulness of such an approach has been demonstrated by Darré 1985, Maso 1986, van den Breemer 1984, and Bennett 1982, for example. In more general terms the farming styles tradition follows the so-called 'actor-oriented approach' as developed by Long 1985.

34 In the French research tradition the patterns of communication and cooperation between farmers have been extensively studied. The concept of Groupement Local Professional proved to be particularly useful. The reader is referred to Darré 1985.

35 See for a discussion of the interlinkages between markets and farms van der Ploeg 1990. The interlinkages between technological development and farming are re-discussed in van der Ploeg 1992. An excellent theoretical discussion of the highly variable interlinkages, embedded in the framework of neo-institutional economics, is to be found in Saccomandi 1991.

36 According to neo-classical economics, resources are to be allocated according to their marginal productivity. That implies that apart from the real costs or 'outlays' (i.e the money spent in the process of production), the calculated costs should be taken into account as well. This, however, implies that parts of the net value are to be assigned to particular factors of production, which is precisely what is rejected by Chayanov 1986.

37 See Bolhuis and van der Ploeg 1985, Chapter 4, where the concept of the 'parte pulita' is discussed.

38 A comparison of Graph 9 and Graph 10 reveals interesting differences. Within the neo-classical type of analysis (as contained in Graph 9) vanguard farms emerge as belonging to the echelon of those farming styles that produce a relatively high income. In the Chayanovian type of analysis (as contained in Graph 10) the picture changes completely. Here they are characterized by the lowest 'farm family income' (with or without depreciations). With the farms structured according to the strategy of economical farmers the opposite tendency can be noted. It is in the Chayanovian approach that they emerge as highly attractive. The differences between the representations as contained in Graph 9 and Graph 10 are due to the differentiated view on calculated costs and real costs. For economical farmers in particular this difference is considerable. The neo-classical analysis and representation therefore tend to undervalue the robustness and strong points of the economical farming style. This point has also been demonstrated in van der Ploeg, Roex and Koolen (1995). It goes without saying that this neo-classical representation of the economics of farming has been a strong medium in modernization. It was 'shown' time and again that 'vanguard farms' had a better economic record than other categories.

39 The reader is reminded that the data on the economical style of farming does not refer to a distant past, but to an empirical constellation realized today.

40 In the first years for 50 percent, later for 60 percent, see Vondeling 1948: 102.

41 One interesting feature of Wiskerke's study is that he was able to use oral history to reconstruct the intentionality of the indicated adaptations.

42 The same author shows that in the crisis arable farming faced in the 1970s, this same mechanism could not be used as it had been in the past. According to Wiskerke, who follows Benvenuti in this respect, this is mainly because of the chains of technological and administrative dependencies in which farming became integrated. Further on I will return to this particular discussion.

43 To avoid possible misunderstanding I want to make clear that I favour control of production as, for example, in the quota system. My main problem lies with the specific way the quota system has been institutionalized in the Netherlands.

44 Derived from van der Ploeg *et al.* 1993.

45 This is the finding when the main assumption regarding the time horizon of the quota system is fixed at 10 years. If, however, a horizon of 20 years is introduced into the analysis, then the comparative advantage will be, 4.6 kilogram to 5.4 cents per kilogram milk in the year 2002, and in the year 2012 it will be 2.1 to 3.6 cents per kilogramme milk. All these amounts refer to the national quota.

46 Here it is impossible to describe in much detail the wide and inspiring range of solutions developed by these farmers' associations. The interested reader is referred to Hees, Renting and de Rooij 1994 and to VEL, VANLA *et al.* 1995.

47 This is the position strongly held by some of the organizations for nature conservation. An interesting overview of different positions is elaborated in Donkers 1995.

48 In particular areas such as Walcheren, for example, these earnings are considerably higher. In other areas of the country by supplying more services such as canoes, breakfast, group accommodation, etc. earnings from agrotourism can be enlarged. Oostindie and Peters make interesting reference to Austria where agrotourism raises NLG 1.6 billion a year, France (7 billion French Francs per year) and also to smaller areas such as Hindenlang in Germany. It is interesting to note that a synergy might occur between farmers' managed nature conservation and agrotourism.

49 It is remarkable that in the era of 'liberalization' and 'de-regulation' only those markets are 'liberalized' that suit the needs of the state, agribusiness and other powerful groups. Other markets stay monopolized. This does not only concern agrotourism, but also on-farm transformation, direct off-farm commercialization, and the issue of nature production and landscape preservation that we discussed earlier.

50 Calculation by Strijker and van Dijk 1994 and Wiskerke 1994 make clear that in such a situation there would be a considerable *lack* of manpower even in the short term.


AGRITURISMO
S. CRISTOFORO

7 Methods for Identifying and Reinforcing Endogenous Rural Development: Experiences from Umbria

Hielke van der Meulen and Flaminia Ventura

This chapter addresses the methodological implications of evaluating endogenous rural development[1] at different levels of analysis: the farm, the marketing network, the rural area and the region. In this context we discuss the results of the following types of research carried out in Umbria: farming styles and food circuits research, the 'district' study and the scenario study.

Choosing a specific focus or level of research, we argue, is neither objective nor arbitrary. It depends on such related factors as geography, the local farming system, the gastronomic culture, the characteristics of the public administration and the databases available. A 'district' study, for instance, makes little sense if there are no intricate local networks of farmers and small-scale agroindustrial enterprises to provide the socio-economic dynamic typical of a district.

The focus also depends on the specific competence and interest of the researcher(s) involved and, directly related to this, on the researcher's quest for clues that may trigger endogenous development. These clues may be enclosed in the diversity of current farming practices and other linked rural activities. The research methods consider here are well-suited to that end because they are able to deal with diversity. In studying styles of beef production, for example, we examined the cattle breeding practices of farmers to see whether there was a possibility of 'endogenizing' production at the farm level. Likewise, it is possible to start by considering an obstacle to endogenous development and from this to proceed to choosing the appropriate level of analysis. For example, the planned closure of small-scale slaughter houses threatens to destroy local networks of breeders, butchers and consumers: this calls for a food circuits approach (chain level). Put in general terms, the method of analysis (identification) used and the method of intervention (reinforcement) go hand in hand.

Of course, the different approaches (levels) are not mutually exclusive. In Umbria, a wide variety of research methods have been used because they usefully supplement each other. When put together, the results make up a matrix of opportunities and limitations for endogenous rural development at various levels of scale. The point we want to emphasis here is that it is important to be aware of the level of analysis, and in this way the

level of problem-solving implied by each of the research methods discussed.

We argue that the dimension of 'endogeneity' changes according to the focus or level of research. But over and above the method used, *the concept of endogenous rural development requires a territorial concern*: the definition of a region to study and develop. Within the region smaller areas or specific sectors can be studied that have particular importance for the region as a whole. Again, within each sub-area or sector different styles of farming as well as distribution circuits can be studied. There is no single best focus.

The territorial standpoint does raise the question of what is endogenous. What is external to the single farm, such as market information for example, may be internal to the local marketing network or food circuit in which it is involved. Likewise, what is an external resource to the sector, such as bought corn for feed, for instance, may still be internal to the region.

'Endogeneity' is related to 'the proximity of economic and social relations' (Camangi 1993), which will be dealt with later and in more detail in the paragraph on agroindustrial districts, but which is relevant to all the research methods discussed here. It draws upon notions from neo-institutional economic science including transaction costs and asymmetrically distributed information. To this it adds such notions as formal and informal institutions (rules, norms) and complex feed-back mechanisms within markets and rural communities.

This chapter deals with the implications of the level of analysis and, in doing so, challenges the general definition of 'endogenous'. Second, it deals with proposals for concrete solutions, challenging the idea of heterogeneity (in farming) as a universal good. The fact is that practices which favour endogenous development have to be chosen. The explicit assessment within the CERES-CAMAR project of endogenous forms of development based on local resources and local control rather than the old growth model, is the basis of such proposals. In a concrete local context it means that certain farming styles, certain circuits, certain districts and certain public regulations are preferred to others. The choice aspect is most explicit in the case of the scenario study.

Broekhuizen and van der Ploeg *et al.* (1994) see heterogeneity in agricultural practices as the capacity of farmers to develop different yet feasible styles. This diversity is seen as positive and not as deviations from the optimum pursued by neo-classic economists. Any change in general agricultural policy, technology or markets does, in fact, generate new opportunities and new limitations, to which every farmer or group of farmers responds in their own way (van der Ploeg and Broekhuizen 1994, p. 33).

This view, however, runs the risk of obscuring the role of the researcher. The question is not only how farmers can be helped to create

more room for manoeuvre for themselves, it also concerns the direction which agricultural production and rural development should take. In some cases, the objective may be to curb farmers' freedom.

Endogenous development can be reinforced by collaborating with some farmers rather than others, but also by extrapolating research results to higher levels – to farmers organizations, the regional public administration, the national government and the EU. In this way the scientist plays a role in the supply of new limitations and opportunities and becomes politically involved. We return to this issue later in our conclusion.

This chapter is structured according to the various levels of analysis referred to above and concludes with some general considerations on the tactical and methodological requirements for research into endogenous rural development. The examples used in the text have been drawn from the Umbrian situation.

Farming Styles

We define a farming style as the shared conception of a group of farmers about the best way to organize production within a particular sector and within a limited area. Given the circumstances not one but several distinct conceptions develop over time. Farmers respond differently to the opportunities and limitations offered by the natural environment, public administration, available technology and markets. A farming style refers simultaneously to the structure of the farm, daily management, farmer strategy, and how these are perceived. The research method used to identify styles of farming involves an active search for diversity through in-depth interviews with farmers and local experts and the quantitative justification of the alleged styles by means of surveys among stratified samples of farmers.

In Umbria we studied farming styles within the beef, wine and tobacco sectors. The beef sector reveals roughly four styles of beef production (Ventura & van der Meulen 1993).

1 *Artisan breeders:* followed the tradition of the mixed farm where Chianina cattle used to be kept for traction. The Chianina has been developed into a top beef producing breed in which the use of self-produced fodder (barley, corn, lucerne, hay, garden beans) and the *cura* (care) of the farmer/farm women are essential elements.
2 *Industrialized feedlots:* the opposite of artisan breeders. In industrialized feedlots the balance between fodder acreage and number of cattle is disturbed. Feeder bulls from France are fattened with maize silage and bought concentrates. The production cycle is usually organized according to the all-in/all-out system.
3 The ranchers: an intermediate style where considerable numbers of suckling cows (Chianina and other breeds) are kept mostly on pasture

lands in the hills and mountains. Those ranchers who fatten the calves they breed rather than selling them, tend to use the same diet as industrialized feedlots.

4 *The arrangers*: they do not breed cattle, but keep a small number of fatting bulls of various breeds and feed them in the traditional way. Many of them sell the beef directly to neighbours and friends.

This short overview shows that some farmers make maximum use of external inputs (cattle, feed, capital), while others try to optimize or readjust the organization of their own resources (land, labour, breed, skill). From a neo-institutional economic point of view, one could say that farmers try to find their own balance between the transactions costs[2] they face in the market and the organization costs they face on the farm: the balance between 'to make or buy', as Williamson puts it (see Saccomandi 1991, p.283).

Though neo-institutional theory provides a powerful methodological support for the study of farming styles (see van der Meulen 1994 on Orvieto wine), it cannot account for the phenomenon of diversity under equal conditions. It advocates the optimization of the single enterprise in all its aspects and assumes that this is the central drive of all enterprises. In doing so, it stays close to the *hard-core* of neo-classical orthodoxy which is methodological individualism (rationality, reductionism). It only challenges the 'protective belt' of its secondary assumptions recognizing that a) markets are not independent, b) the amount and quality of information which individuals possess is asymmetric and that c) the costs of market use are not zero (de Benedictus 1993, p.34). Since neo-classical theory does not really deal with heterogeneity, let alone self-generated heterogeneity, no methods were developed to study the phenomenon. The existence of variety has either been denied, neglected or explained away as remnants of a backward past.

If, however, farm enterprises are considered from a more flexible systems perspective, which is the 'method' we prefer, variations in *farming styles* can be seen as the natural outcome of:

a the process of semi-autonomous producers trying to distinguish themselves and be creative;
b the fact that farmers must choose, simply because they cannot do and know everything;
c hazard.

Creative choices and hazard can develop into real strategies which, in turn, precondition future choices. It should be noted, however, that choices are not based on individual insights alone but constantly refer to the ideas of the local farming community, extension agents, salesmen and farming magazines. This explains the clustering of these strategies into *shared* styles.

From the Umbrian experience two methodological problems arise as far as the application of the farming styles approach developed by van der

Ploeg is concerned (see van der Ploeg 1992). The first complication concerns the role of the natural environment. In those situations where the physical and institutional environments are homogeneous, differences in style can quite safely be attributed to the strategies followed by individual farmers. In the Umbrian context, however, farming practices are often dependent on distinct micro-variations in soil and climate. This is the case, for example, in the Orvieto DOC wine area, where certain sites only allow a specific way of production (style) or preclude grape production altogether. A more subtle effect is caused by the difference between the fertile, erosive turf soil on the south-western side of the Orvieto valley and the stony and loamy soil on the north-eastern slope. This seems to have given rise to two 'styles' of mixed farming (see Appendix 1).

Despite the 'interference' caused by the geographic dimension, a number of general styles of grape production were distinguished in the Orvieto DOC wine area: small-scale mixed farming, small-scale, part-time farming, specialized family farming, specialized capitalist farming and the style respresented by wine-producing estates (see Appendix 2).

The argument is further complicated by the fact that geographical factors can also have the opposite effect. Within an relatively isolated area farmers may comply to a common, shared conception of good farming which maybe entirely different from that in another, ecologically comparable area. For one reason or another, farmers in the *Valnerina* area (the Umbrian Apennines) started to move into dairy farming in the 1960s. This turned out to be quite profitable and the setting up of cooperative processing plants was one of the results. At the same time, farmers in the Gubbio area, some 50 kilometres away, have professionalized the traditional breeding of beef cattle, initially Chianina and recently other breeds as well. Although there are differences in farming practices and farm size within each of these areas, there is a considerable consensus about what a good farmer ought to produce and how and what can be defined as a *local style of farming*.

These situations have some of the characteristics which Hofstee (1985) identified by using the term *bedrijfsstijl* (farming style). This style was a regional phenomenon that transcended the farm level and involved such descriptive details as how horses were used on the farm and the shape of the tools found there. However, the term also encompassed more dramatic common initiatives, such as those of the farmers in Groningen, the Netherlands, who ploughed-in their meadows and started arable cropping because they believed this to be the future of good agriculture. It is significant that farming practises in this area were enforced by strong social control mechanisms and upheld by some degree of involution.

A second critical comment on the concept of farming styles derives from those particular situations and areas where the concern was not with making a choice between various possible farm strategies or adapting farming practises to the prevailing micro-conditions, but with creating a

space for manoeuvre and finding more opportunities for exploiting local resources. Farming styles research presupposes the luxury of choice.

In Italy the development of national parks and, in particular, the so-called A-zones within these parks, precludes the use of pastures for agriculture. This has robbed the local population of their age-old pasture rights and lead to degradation of the landscape and flora as juniper bushes invade the area. In Umbria, this bureaucratic misconception which sees nature as being in conflict with (agri)culture has been given form in areas such as Monte Subasio, Monte Coscerno and Monte Pèglia. Farmers and hunters, whose interests usually conflict have now joined forces in order to retain access to the mountains. How successful the reinforcement of the Umbrian breeding sector will be and the future of attempts to recover the Chianina patrimony, and the *rancher's* and *artisan* style of beef production depends on the outcome to this conflict.[3]

The study of farming styles is not a neutral research method, but changes according to the problems conceived by the researcher and has pretentions that go beyond show a 'thousand flower blooming' in agriculture. Van der Ploeg's farming styles research *cum suis* arose in the Netherlands, and, in fact, stemmed from the very practical concern that the dominant paradigm of the large-scale, technologically advanced, 'head-runner farm' advocated and promoted by scientists, extension officers and policy-makers right up to the 1990s, had lost its relevance. Once studied seriously, the 'laggards' in agriculture turned out to be persistent and to have a logic of their own. In some cases they even proved to have a more valid response to the challenges of environmental policy and overloaded agricultural markets than the head-runners.

In the same way, research into the Umbrian beef sector demonstrated the persistence and economic feasibility of those 'traditional' farming practices that were based on the indigenous Chianina breed, traditional fodder crops and artisan skill. Although this shocked those Italian scientists and bureaucrats who had repeatedly predicted the rapid disappearance of 'backward forms of beef production', we went further and proposed interventions to reinforce these practices. Farming styles research is not only descriptive, it is problem oriented and indirectly favours some styles more than others: in our case the styles of farmers who base their production on the sustainable use of local resources. In terms of level of action, the methods capable of reinforcing these styles follow, to some extent, the methods used for their identification. One can mobilize farmers using the contacts made during the interviews and in this way, for example, set up small study groups. Home wine-makers in Orvieto, for instance, could discuss possible improvements in traditional processing techniques or the value of specific local cultivars for vinification[4].

Further, the notion that farmers can move together in the same direction, instead of following their own course (see above), is important for the design of reinforcement methods. Supporting some farmers in practices

that could add more value to the use of local resources might encourage other to follow. For many other interventions, however, attention has to be directed beyond the farm level to bottle-necks further up in the chain of production. This requires the study of how farming styles are integrated into specific *circuits* of production, processing and consumption.

Food Circuits

Food distribution circuits can be seen as the result of extending the farming styles approach to the level of the food chain.[5] A circuit is a social network of specific primary producers, processors, retailers and consumers, each with its own dynamic and 'style'. The term circuit emphasises the fact that what is involved here is not just a one-way flow from producers to consumers (with a reverse flow of money), but a flow of information, ideas and social control up and down the chain. Some circuits are local and tight, other are extended and loosely structured. Within the regional confines of a sector, whether it be beef, wine or tobacco, many different circuits can coexist. As in farming styles research, our objective was to find out which circuits best fitted the requirements of endogenous rural development.

The concept of circuit challenges the (Anglo Saxon) notion of 'chain' as a large aggregate of enterprises executing the successive phases in the process of generating a flow of uniform products. It carries an implicit critisism of the monolithic notions of 'market' and 'market price'. Again, as in farming styles research, we do not consider diversity to be a deviation from the Pareto optimum. Markets, in our view, are always partial markets, constructed and institutionalized by the actors involved in them: primary producers, processors, distributors, retailers and consumers. Neo-institutional economics show that the actors regulate 'their' markets through contracts and other agreements but that informal agreements, norms, habits and mutual socialization also play an important role.

In Umbria, the food circuit approach has been applied to the beef and the Orvieto DOC wine sectors (Ventura and van der Meulen 1994; van der Meulen 1993). In the beef sector, butchers form the pivot around which the various beef circuits are organized. As much as 80 percent of the regional meat turn-over passes through their hands. Research into the beef sector began, therefore, by interviewing these butchers. The butchers had different strategies (styles), and these turned out to be closely related to where they acquire their cattle or beef.

'*Traditional butchers*' (30 percent) usually buy their cattle from *artisan breeders* working in the neighbourhood who give good fodder and keep the much sought after Chianina. These cattle are generally passed through small, local slaughter-houses. The firmly-fleshed carcasses can be hung for several weeks, a procedure which gives the finishing touch to the meat.

Modern butchers (30 percent) prefer to buy from large-scale feeders in the region. They do not select the animals personally, a phone-call is enough. The regional origin of the beef and the absence of hormones is sometimes guaranteed by an official quality label. In contrast to traditional butchers, their clients are less familiar with rural life. Modern butchers invest considerable energy in the preparation and presentation of their meat, and into transforming joints that are not much in demand into attractive, pre-cooked dishes. The third circuit is the *anonymous* beef circuit (30 percent). Here butchers buy from wholesale dealers, the beef arrives in single cuts and requires little further work. The meat itself is bright in colour, tender and cheap and the 'raw material' usually come from the intensive farms in Northern Italy or from abroad. Finally, the shortest circuit belongs to the *arranger-type* of farmer who either sells directly to his friends and neighbours or through the medium of his own butcher shop (5 percent).

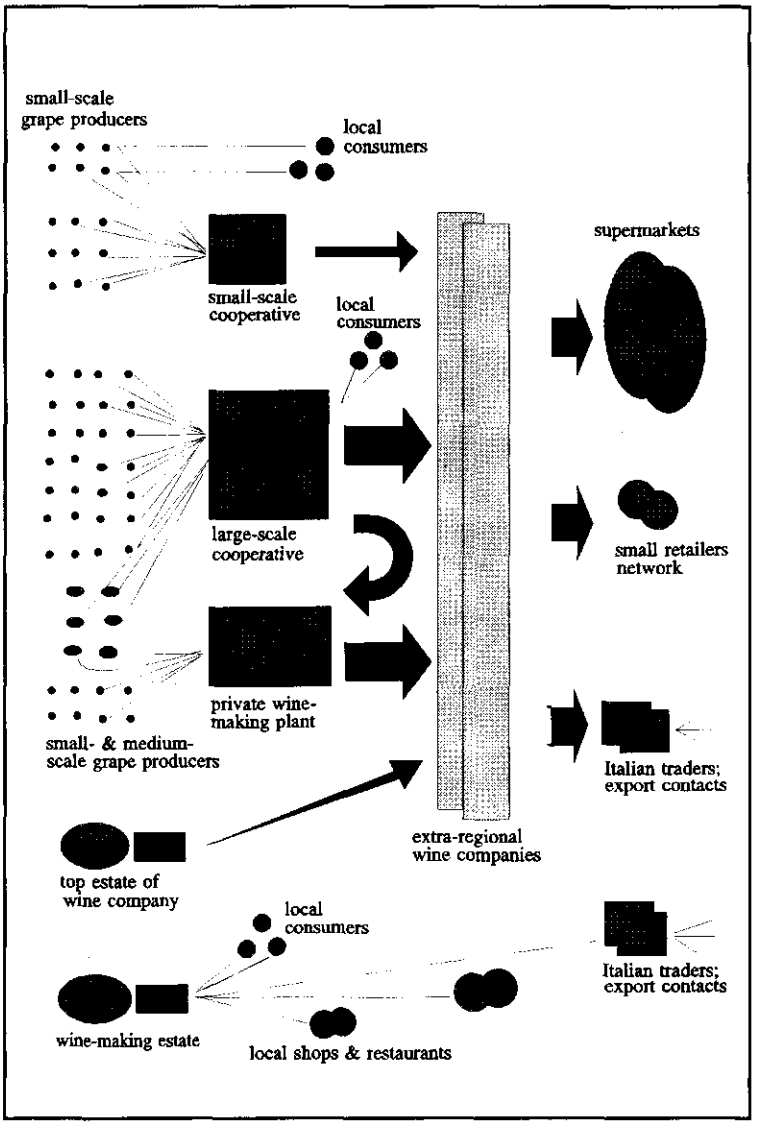
Consumers and farmers were studied using the same method. After a series of in-depth interviews (N=30), stratified samples were made as a basis for semi-structured surveys (N=150). Questions centred on the strategy and definition of beef quality as well as the (perceived) strategies and definitions of the other actors in the chain. As far as the farmers were concerned a farming styles approach was adopted. The resulting styles were then linked to those of the butchers and their customers.

The above description of beef circuits suggest that every farming style is linked to a distinct circuit. In general this is not true, for the simple reason that marketing is just one element in the farmers' strategy. Individual farmers may sell to the same processor and farmers using the same farming styles may sell to different types of processors. The example of the Orvieto DOC wine sector clearly illustrates this point (see Figure 1, Farming styles in Appendix 2). Here, the primary processing plant is taken as the nexus of the circuit.

The oldest circuit is that of the small-scale mixed farmers who make wine at home for their own consumption and small-scale sale or exchange. The technology involved is simple and available to everyone. According to modern standards this wine may not be 'the top', but it is typical and has not been tampered with. It is therefore in demand by a certain clientele.

Most of the grapes grown by these growers, however, enter the circuit of the *small-scale cooperative*. These cooperatives are concerned with processing the grapes of small-scale mixed or part-time farmers who work between 0.5 and 2 hectares of vineyard. It is noteworthy that the pressing technology used in these plants is an up-scaled version of the home press. Moreover, these cooperatives operate according to the same low cost strategy as the growers who supply them – voluntary labour and a simple infrastructure. The crude, rough wine is sold in bulk to large Tuscan wine companies who refine, bottle and market it.

Figure 1 Circuits within the Orvieto DOC Wine Sector



The third circuit is that of the *large-scale cooperative*, which receives its grapes from small, part-time farmers working on 0.5 to 2 hectare of land and specialized family farms of between 3 and 10 hectare. Unlike the small cooperative, these plants are equipped with high-tech pressing machines and huge, stainless steel fermentation tanks. Economies of scale and bulk processing is the common strategy. Member growers are rarely stimulated

to any quality production, since modern technology can rectify many problems particularly in white wine making. The crude wine produced in this way is again sold to the same large Tuscan companies that buy from the small-scale cooperatives. A substantial part of it goes to the local BIGI plant which functions roughly in the same way as the large cooperative but has better refining equipment and its own bottling line. BIGI also produces a small quantity of top wines from grapes produced on their own estates.

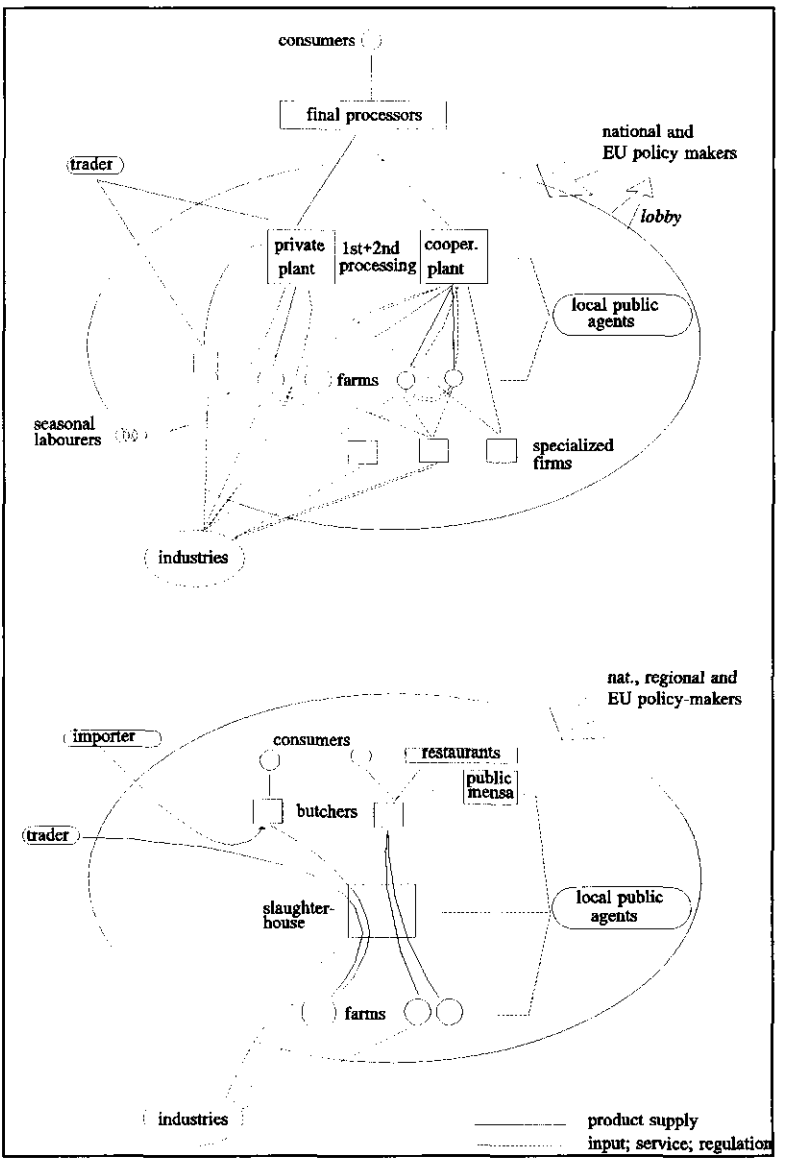
The fourth circuit is the *private estate* which range in size from 10 to 100 hectare. The 'chateau' only processes its own grapes and keeps bottling and marketing in its own hands. This wine is sold through a large number of small market outlets built on personal contacts, carefully developed and maintained by the estate managers.

A methodological complication in the identification of food circuits is the definition of boundaries. In our research, the region or sub-area was the object of study and national and international elements in the chain were left out in the sense that they were analyzed only from the perspective of the regional or local actors. Since the focus was on endogenous rural development at the local level, this conceptual limitation was not experienced as too great a problem.

A methodological problem in the formulation of initiatives for reinforcement arises from the fact that circuits are more or less loosely structured networks and not coherent social systems like some of their constituent parts (farms, processing firms, butcheries). Therefore, it may be difficult to identify a clear internal logic or structure for which a development plan could be designed. This is perhaps why policy measures are generally directed at stages in the chain, such as slaughtering, for example. Such a stage would then be technologically and economically 'rationalized', with a complete disregard for the differences between slaughter-houses and the role they play within the various circuits. However, the crucial factor in designing methods for reinforcing endogenous rural development through food circuits is achieving an integrated view of the various elements: the logic of the circuit.

A final methodological point is the definition of endogenous development, which in the circuit approach is lifted from the level of the farm (primary production) to that of the chain. This means that certain inputs which are external to the farm, such as market information, for instance, may be internal to the circuit with which it is involved, especially when the circuit is localized and based on direct personal contacts. Thus, part of the value added by the butcher – a loyal clientele and higher prices for good quality beef – will return to the breeder and contribute to the sustainability of local beef production. Transaction costs and the use of resources cannot be attributed to one stage of the production process but only to the whole chain.

Figure 2 Agroindustrial District (tobacco) and Rural Production Area (beef)



Agroindustrial Districts and Rural Production Areas

We have tried to stress the importance of an integrated territorial approach to the study of endogenous rural development. It is not easy, however, to define the research topics and methods for such an approach. Rural areas differ very much in their degree of *system-ness* or the multiplicity, diversity

and coherence of internal social relationships; their dependence on external markets (*openness*); scale; degree of industrialization and product specialization. Here, the concepts of 'district' and 'rural production area' are presented as two very different situations where an integrated territorial approach can be applied.[6] They will be discussed in terms of the use of local resources and self-regulating capacity. Figure 2 illustrates the basic features of these two models.

Agroindustrial District

In Central Italy there are a number of situations which can be defined as *industrial districts* or *agroindustrial districts* specializing in one type of product[7]. These districts came into being after the Second World War in areas where there was a considerable degree of share-cropping tenancy. The mechanization of agriculture freed considerable amounts of labour and craftsmanship – share-cropping families were extremely self-sufficient – and this, combined with an emergent industrialization, generated a multitude of small, family craft businesses in textiles, shoes, furniture and wine. These enterprises diversified and specialized and in some areas they became sophisticated conglomerates. The two most notable agricultural examples are Parmigiano-Reggiano cheese and Chianti wine.

In Umbria the production methods associated with tobacco in the Upper Tiber valley (see below), Orvieto DOC wine and olive oil in Trevi-Spoleto have incorporated (some) of the characteristics of agroindustrial districts. A district can be seen as a *local condensation* of ties which link enterprises to the local population – the human capital. The single firm and single worker in the district obtain advantages from their involvement in a 'complex and inextricable network of external economies and dis-economies' (Becattini 1979). These external factors – which are internal to the district – have their origin in two factors which coincide. First, a concentration of enterprises making the same type of product and using the same technology generates *economies of scope* and the specific knowledge and abilities acquired through time give rise to a stimulating *industrial atmosphere* (Marshall 1920). Second, the presence of common values and attitudes, rooted in the local socioeconomic history of the area, inhibits individual, opportunist actions in the transactions between enterprises. It also lowers transaction costs by generating a *communitarian market* (Dei Ottati 1988) in which joint actions and information exchange are very important.

The study of tobacco production in the Upper Tiber valley illustrates how an agroindustrial district emerges over time. Tobacco has been grown on the fertile soils along the River Tiber for more than a century. For many years the tiny republic of Cospaia was the only place to escape from the ban placed on tobacco production by the Papal State. After 1870, process-

ing and trading tobacco in Italy became the monopoly of the state and production rights were assigned to specific areas and specific *fattorie* or large estates worked by share-cropping tenants. From Cospaia, cultivation spread towards the town of Città di Castello.

Until the late 1960s, the marketing of tobacco as well as the manufacture and distribution of cigars and cigarettes was in the hands of the state. Every year quotas were assigned to land owners in the area and they redivided these quotas amongst their tenants. The only tobacco grown in this period was Kentucky tobacco, used in the manufacture of cigars. It was dried and smoked by the farmers themselves and sold to private traders. Gradually Kentucky tobacco was replaced by Virgina Bright cigarette tobacco. Bright can be grown on lighter soils and in a tight rotation scheme. This, and the lifting of the state monopoly after ten years, resulted in a rapid growth in the acreage of tobacco in the Upper Tiber Valley.

During the 1970s farmers' cooperatives were set up both by 'free' farmers and groups of ex-tenants, often at the initiative of their landlords. Bright production required investments in irrigation equipment and so called bulk-curing units. Enterprising inviduals set up repair shops and, over time, many tools and mechanical improvements for growing, transporting and processing tobacco were invented. The increased use of pesticides and chemical fertilizers stimulated the creation of information services in the area of pest control and nutrient management.

Although the state withdrew its monopoly, the public administration continues to intervene in the tobacco business. It is still an important buyer of semi-processed tobacco leaves and, more significantly, it subsidizes the farmers' cooperatives by paying the debts on the yearly balance. In addition, the gigantic EU price subsidy on tobacco, some 90 percent of the market price, allows for a very profitable traffic in batches of tobacco that go in and out of the same processing plant several times! The size of the subsidy reflects the enormous economic importance tobacco has come to assume in a few limited areas of Europe, in particular the Umbrian Tiber valley. The whole population from Sansepolcro to Perugia and beyond live either directly or indirectly from this labour-intensive product. The local political lobby is well aware that the area is, in fact, an intricate system which could collapse entirely if subsidies were to be removed. Only actions from within seems to be able to save local agriculture and the local economy. Farmers and the agroindustry are now working hard on new crops and new products such as sugar beet, *using the very same structures built up for tobacco* cultivation. The area has, after all, fertile soil, water, technology and an industrious population.

The 'district-approach' defines the concept of endogenous development in a more integral way than the farming styles or food circuits approach. As we have noted, economies which are external to the single enterprise or circuit may be internal to the district. Specialization among

farmers and industrial businesses leads to economies of scale for the single enterprise without increasing the costs of organizing the business. The *proximity of relations* reduces the costs of activities such as information gathering and the contracting of services (Camangi 1993).

Another very important effect of the internalizing capacities of a district is that skills and knowledge do not get lost so easily. In the Orvieto DOC wine area, small-scale grape producers who can only partially exploit their capacities on their own farm, take on specialist jobs such as pruning and tying on larger farms. A farmer's son may find a job at the cooperative processing plant, for example, because he knows all the ins and outs of local grape production, and is aware of the reasons for bad grape quality and the problems associated with grape supply, for example. Virtually every inhabitant of the Orvieto area has some relative who produces grapes and who is prepared to join in at harvest time. The existence of networks of labour exchange between small and medium-scale grape producers is important for the diffusion of experiences. Finally, the local bar and the *piazza* (square) function as centres were information can be exchanged and informal economic contacts are made.

The high degree of *system-ness* which is typical of the district does not imply internal uniformity in farming practices. Although it is important to recognize that an area has its own dynamic up to the point where it may behave as one system, it is just as important to note the existence of a wide diversity of farming styles and distribution circuits within a district. In fact, diversity provides for the necessary flexibility and dynamic. As to farming styles, traditionally it was only the medium-scale farmers and small share-croppers who grew and dried tobacco. Later on, as mechanization was introduced and tenants left the land, landowners stepped in on their own account. Recently, young entrepreneurs have begun to grow tobacco on an ad hoc basis, renting land, hiring labour and contracting machine services. However, these farmers all produce the same type of tobacco using the same high inputs of fertilizer, water, pesticides, labour and capital. However, on closer inspection, many relevant variations in the organization of the production process became clear.[8] Distinct farming styles emerge, each of them with a different but feasible socio-economic logic.

Varying amounts of land and differential entrepreneurial capacities are, of course, factors which affect the farming population. This effect is counter-balanced by the fact that tobacco is a very labour-intensive crop.[9] Large farmers have to hire labour and in the end benefits are distributed throughout the population. This has a strong unifying effect on the area and reinforces the coherence of the district. Everybody participates and shares in the development. The same phenomenon is observed in the Orvieto DOC wine area. Labour intensiveness seems to be a stimulating factor in the development of district-like situations.

As in the beef and wine sector, tabocco farming also shows that different farming styles are related to differences in the distribution and destination of tobacco. This gives rise to parallel circuits within the district. In the 1970s, some farmers took advantage of subsidies to buy a few bulk-curing units (see Figure 2 circle with attached square) and it was then possible for them to sell cured tobacco to traders or private companies who could offer a better price than the local cooperative. Cooperatives, on the other hand, offer all kinds of additional services including cheap fertilizer, heavy equipment and a secure market outlet. Some cooperatives are linked to what used to be large estates whilst others were set up more spontaneously on a geographical basis. Small and large cooperatives differ in their market strategy, some rely heavily on 'monopoly', for example, whilst others are oriented towards high-quality (light) Virginia tobacco. It appears, in fact, that tobacco passes through different circuits to different destinations.

Competition between local processors or entire circuits gives rise to conflicts as, for example, over the recent imposition of the production quota.[10] To the outside world, however, a closed front is maintained and an effective lobby is organized. Local authorities are pressured to relax the enforcement of environmental measures and national authorities are pressured to defend Upper Tiber tobacco interests in Brussels.

From this description, the district appears to be a 'positive phenomenon', displaying an intensive use of local resources (labour, skills, ecology) and having high employment and high added value as a result. It also shows itself to be highly flexible in responding to changes in the economic environment. Farmers and workers in the area demonstrate a good capacity for developing their own techniques and obtaining economies of scope through synergy. Although the district strongly conditions the behaviour of local entrepreneurs such as farmers, it also provides for unique opportunities and competitive advantages. The outside influences of new technologies, market information and policy regulations are buffered by the district through a complex range of negative (cost reducing) and positive (innovative) feedbacks.

However, *it would be wrong to classify the agroindustrial district as an example of successful and full-fledged endogenous rural development.* Although the use of local resources, physical as well as human, is generally very intense, the dependence on outside inputs can also be considerable and, in the case of tobacco, these inputs work to undermine local resources, exhausting the soil and polluting the ground water. In the last twenty-five years, dependence on 'imports' of seeds and machinery has increased enormously and this contrasts sharply with the period when Kentucky tobacco was grown and people used to build their own drying-huts. Now, the use of seasonal migrant labour by farmers and the processing industry has been increased because of high labour costs.

Even more marked is the dependence that has grown up on distant output markets. This is true for Orvieto wine as well as Umbrian tobacco, partly because they leave the area in a semi-finished state. Favia, an Italian researcher of the 'local agricultural systems' school, observes:

> 'When the degree of *openness* of a productive system achieves extreme levels, the phenomenon of mono-cropping emerges [...]. Then the organization of 'agricultural space' is no longer under the control of the local system, which is evidently fragile in a social and economic sense, and export of the product (food or non-food) is completely controlled by external forces.' (Favia 1992, p. 120)[11]

Another concern which manifests itself at the regional and national level is that one area or one district may develop at the expense of the others. This was the case in Rauscedo, a small village in Northern Italy where some fifty years ago people started to specialize in grafting vines. Now a huge conglomerate has emerged which almost entirely monopolizes the supply of *barbatelle* (young planting vines) in Italy and Europe. This is particularly so in the DOC wine areas where varieties are prescribed and a farmer has to prove the ones he uses are pure by having an official certificate in order to get DOC status for his vineyard (EU regulation). Only Rauscedo can give such a guarantee, using cloning techniques and *in vitro* reproduction. This means that districts such as the Orvieto DOC wine area and many others are faced with continuous cost and moreover, valuable local cultivars (sub-varieties) are being lost in the process (Saraceno 1992).

In designing methods for the endogenous development of an agro-industrial district or a *sistema agricolo locale*, it is important to analyze the degree of internal diversity. It is this that determines the self-regulating capacity of the area and its people and the socioeconomic sustainability of farming. At the same time, ways of reducing dependence on input and output markets have to be studied. If this leads to lower production, local skills and knowledge should be mobilized to increase quality, since this is the strong point of a district.

Rural Production Area

The term Rural Production Area (RPA) has been coined by the authors for this chapter. RPA refers to a situation in which the network of socio-economic relationships amongst local actors is less complex and (agricultural) production is less specialized and industrialized than in the agro-industrial district, but does nevertheless exist. We argue that it is often worth stimulating internal coherence particularly by adding more value to the use of endogenous resources, in order to create synergies and an internal dynamic. At the same time the negative side-effects of an external orientation, such as we have seen above in the case of tobacco, must be

avoided. The example of high-quality beef production in the Gubbio area may illustrate that both requirements can go hand in hand.

Gubbio is an ancient town in north-west Umbria. There are many beef cattle in the *conca* and hills. Although the farms vary in size, there is a general consensus about the proper way to produce beef. This is based on tradition and the opportunities and limitations of the natural resources available. Fodder and fattening cattle are, preferably, (re)produced on the farm itself. Many breeders still keep the indigenous Chianina breed which is believed to produce the best quality beef. In most cases slaughter cattle are sold directly to the local butchers who attach considerable importance to the exact origin of the meat because they know that their clients are equally particular. There is a considerable degree of shared knowledge as far as the production process is concerned among producers, butchers and consumers. Traditionally, every Umbrian farm had Chianina cattle for traction power. Over the last forty years most of these small farmers and tenants have disappeared or have done away with their cattle, but some of them have specialized in beef production. A major concentration in the Gubbio area has developed into a *local style of farming*.[12] In the last decennia more 'docile' breeds, like the *Pezzata Rossa* and Limousine have been introduced and these have been crossed with or inseminated by Chianina. A number of young farmers from other parts of Italy have set up ranches in the area and have contributed to dynamizing the beef cattle sector. Paradoxically, it was these farmers who took the initiative to protect the existing local breeder-butcher-consumer networks – *the artisan circuit* – from the 'import' of cheap beef of dubious quality. Breeders and butchers are now trying to create a kind of *appellation controllée* for locally produced beef, although this has been accompanied by considerable internal conflict and interference from 'concerned' bureaucrats. Production regulation, for example, restricts the use of industrial concentrates, especially if they are not made from locally produced grains. Public authorities are willing to contract participating breeders and butchers to supply meat to the canteens of the local schools and hospital.

This initiative will increase the value added to beef produced in the Gubbio area. The local slaughter-house also plays a crucial role for it helps to control the origin and quality of the labelled beef. Breeders can go there and see for themselves whether they produced the right quality. Further, local slaughtering not only keeps transport costs low, it also prevents the stress of long-distance travel from ruining the beef. Finally, a slaughter-house brings valuable income and employment to the poor economy of the area. If the project succeeds, Gubbio beef can, in the long term, become another one of Umbria's renowned quality foods.

The Gubbio case shows that a degree of specialization does not conflict with the objective of endogenous rural development so long as the balance between production volume and natural resources is maintained and so long as there is a balance between internal dynamizing (bottom up) and

stabilizing (regulating) capacities. It is important, for example, to base sales on the local consumer market in the first instance, for this ensures that a high degree of knowledge will be shared between producers and consumers. It also ensures that there will be economic stability in the selling networks and that the product will maintain its credibility to outside markets and consumers (Ventura and van der Meulen 1993).

With the above comparison between the agroindustrial district and the rural production area (Figure 2), we try to argue that it would be useful to apply the integral territorial approach to the second type of situation, which is less specialized and less industrialized, more often than has been done in the past. The study of interrelationships between farming and the rest of the local economy, even if they are very minimal, may serve indirectly to ensure that they are multiplied and strengthened. Thus, *the adoption of this particular research method could well be inspired by the desire to reinforce a specific kind of local, endogenous development process.*

Regional Scenario Study

The scenario study is the most encompassing of the four approaches discussed in this paper. The complexity of the study has been reduced by selecting only a part of the agroindustrial sector – in this case the beef sector – and by limiting the impact assessment of all farming styles, food circuits and specialized production areas within the beef sector to a few options. The economic scenario study we carried out in Umbria compared the *artisan* circuit to the *industrialized* circuit, or more specifically, the net added value of substituting beef imports (which represent 40 percent of regional turn-over) for regionally produced beef. Such a study allows us to go beyond direct economic costs and benefits to the primary sector and extend the analysis to the stages of slaughtering and retailing. It also allowed us to assess the effects these approaches have on the environment, landscape, food quality and tourism (see Appendix 3).

Each year Umbria imports nearly 4000 tons of beef and another 2000 tons comes from France in the form of young fattening bulls. Farmers are linked in different ways to the market. Breeders of Chianina cattle used to sell to local butchers, who, like their local customers, are very much concerned about traditional quality, the kind of feed and care the animals get and the specific breed. Large-scale feeders, on the other hand, are involved in more extended networks of butchers and consumers, although they still operate at the regional level. This market circuit proves to be quite vulnerable to competition from cheap imported beef, since these butchers move quite easily from one source to another. Feedlots themselves are also inherently unstable, because of their dependence on external inputs and the speculative character of fattening. This instability affects the

economic performance of enterprises further down the chain, in particular slaughter-houses.

We have calculated (using 1994 prices) that if the beef deficit mentioned above is produced on 48 standard *feedlots* each of which contain 300 animals, this will yield an additional regional net income of about 2 billion lire (4 million ECU) and additional employment for 95 people at 1994 prices. However, the high opportunity cost of the irrigated fodder land needed in this scenario brings even these small gains into question. If, instead, the same quantity of beef is produced on 855 new *Chianina farms*, regional net income will increase by 13 billion lire and employment in agriculture by more than 1700 places! Moreover, Chianina farms would draw much less on highly productive land than the feedlots and they can, to a very large extent, be situated in the hills and mountain areas. If EU premiums on suckling cows and fatting-bulls are also taken into consideration, the Chianina scenario adds another 10.4 billion lire to the Umbrian economy.

This is a remarkable prediction because scientists and policy makers in Central Italy have always thought the Chianina breed and its farmers would disappear because of their technical and economic inferiority (Ciani and Burini 1989; Marchini and Santucci 1991).

Quantitative economic gains for the rest of the chain do not differ substantially in the two scenario's. There is an important qualitative difference, however. The feedlot scenario favours a further concentration of slaughtering at the central plant in Perugia. The Chianina scenario, however, make it possible for the local slaughter-houses to remain open and these in turn are crucial to the strongly localized circuits of interlinked Chianina breeders, butchers and consumers. Crucial too because dealers from the North try to break open the Central Italian market for their qualitatively inferior beef. In that perspective it is an 'advantage' that these local plants do not fully comply with EU hygiene norms and are therefore not allowed to take cattle from outside the region. Consumers can therefore rest assured that the local *macello* only handles *carne nostrale*. The regional government has recently acknowledged the important role of the ten local slaughter-houses.

The Chianina scenario also has superior *indirect* pay-offs when we compare it to the feedlot scenario. Environmental damage is less and the typical Umbrian landscape is better preserved by medium-scale breeding practices that are based on local resources. Another evident gain is in public health. Localized circuits provide a better guarantee that there are no illegal toxic substances in the beef. They also provide the context in which a positive definition of quality can be developed. Chianina beef has become one of the prominent, high-quality Umbrian food-products.

In the choice between the Chianina and the feedlot scenario, the image of Umbria as a green region and a tourist haven is at stake. It is only the Chianina scenario that will be able to provide the necessary impetus to

maintaining the region as one in which is good to be because people produce and consume on their own terms. The perspectives for reconquering the regional market with high-quality Chianina beef are now better than ever: the devaluation of the lira, food scandals and EU policy are all working in this direction.

In the regional scenario study the choice element is more explicit than in the seemingly descriptive farming styles and food circuits approaches. The options presented clearly suggest what should be chosen. This does not need to be a problem so long as the criteria – in this case favouring of endogenous rural development – are made explicit.

Conclusions

'Since research and action are linked in an intentional and functional sense, the researcher is consultant, actor and builder, and the actor is no longer the object of observation but participating subject to the research.' (Creti 1994, p. 240)

This paragraph contains some general methodological conclusions drawn from our research experiences in Umbria over the last four years. We refer to our introduction for a summary of the methodological implications of the different types of analysis used.

Any method designed for the identification and reinforcement of endogenous rural development potential implies intervention in a well-defined area. There are two major conclusions to be derived from this notion. The intervention aspect means that the research underlying such a method must first recognize and elaborate its own modifying impact and second, it should take into account the dynamic involved in the changes taking place in the area. The territorial aspect means that the focus must not be exclusively on agriculture or single farms. The critical issue is how to integrate agriculture into the rest of the local economy in order to make the whole more sustainable and self-determinant, meaning designed according to the long-term values of the local population. In other words, how can the structurally weak position of farmers be strengthened in the process of rural development so that economic pressures will not impinge on local natural resources and the quality of agricultural production.

Our first two points reflect major methodological dilemma's. First, we will consider the discrepancy between the way in which the researcher describes the factual status of a situation, on the one hand, and the dynamic of actions undertaken by local actors and super-regional actors, on the other. Change often occurs more rapidly than research can assimilate and the immediate complexity of a situation is often difficult to grasp. At worst, results which might have been used for intervention may be found to be outdated as soon as they become available. The question here is how can research be designed to accurately come to terms with the

dynamic of a situation and identify the strategic variables for endogenous regional development, which can be internal as well as external to the area or region.

The second dilemma concerns the paradox of intervention and inputs from outside agencies such as researchers and public officials, for example, that aim to strengthen the use of local resources and local self-control. How can outside support be effective and structural dependency be avoided? To begin with scientists and public officials could improve their animating role and leave their desks more often. It should also be recognized that the necessary resources and clues are often already buried in what farmers do and know. It is of utmost importance to treat farmers and other local entrepreneurs as experts and ask their opinion. If this is not done even the most well-intentioned intervention may be counter-productive, as the next example shows.

Recently the Umbrian government has applied for DOC status[13] for several olive oil producing areas, amongst them Lago di Trasimeno, Orvieto and Trevi-Spoleto. The production regulations focus on olive tree varieties and these must be present in all DOC yards in fixed proportions. Local olive growers and *frantoio's* (olive mills) were amazed by these regulations which ignore essential variations in soil and micro-climate. Still the regulations will be imposed because officials and scientists have designed it that way.

Farmers can be outsiders too. In Umbria we have seen that farmers who move into the area from elsewhere often play a revitalizing role in rural development. They bring in new ideas and are less caught-up in local social and political relations. This was observed both in beef cattle breeding and in biological agriculture. Paradoxically, these new-comers tended to valorize local resources rather than draw on external inputs.

If our research is meant to be both analytical and effective, researchers will have to take part in regional and local initiatives. 'Learning by doing' is not restricted to direct producers alone. If researchers wish to engage in the process of regional rural development, the importance of *intermediate research goals* has to be taken into account. Short-term objectives which coincide with the interests of the local actors will have to be formulated. Such research can provide just as much insight into the local situation as long-term enquiries and without losing the overview which is the pre-eminent quality of the scientist's contribution. A good interplay between 'description' and 'action' can be achieved by centring fieldwork around the major bottlenecks identified by local experts. To give an example:

The reinforcement of local networks of high-quality beef production and distribution in Umbria is endangered by the planned closure of local slaughter-houses. Therefore, the relevance of the *artisan* or *Chianina* type of production – particularly in terms of meso-economic spin-off and synergy – must be demonstrated to the regional authorities. In a recent

document they did, in fact, recognize the irreplaceable role of local slaughter-houses.

The pursuit of short-term and practical objectives is not synonymous with a commitment to small-scale interventions, nor does it mean choosing for impact at the expense of scientific insight. The two can develop together.

To summarize, the methods of analyzing endogenous rural development used must be flexible in terms of space (scale-level) and time (scope) and be able to deal with the three basic issues. First, the need to focus on the territory or region while studying farming styles, food circuits or districts. Second, the discrepancy between formal scientific knowledge and the specific features of the local situation and third the interventionist and policy-making scope of the research. These last two issues, in a sense, raise the question of the sometimes problematic dialectic between operations aimed at reducing complexity (description and regulation) and actions designed to create complexity and room for manoeuvre.

Bottom Up or Top Down?

In this chapter we have observed that the intensive use of local (endogenous) resources may have positive results but can also create negative effects such as soil depletion, and that heterogeneity in the sense of a wide variety of farming styles and food circuits does not in itself guarantee sound rural development. We repeatedly stressed that choices have to be made and that the methods of analysis discussed here proved themselves well suited or were actually designed for this purpose. The scenario study is the most evident example of this. Design methods for endogenous development are meant to support initiatives and interventions which favour the use of local resources rather than external ones and control the way these resources are reproduced at the local level to the ultimate benefit of the local population. What is important then is *how* the promotion of good practices and the blocking of bad practices should be organized. There are, generally speaking, two options. The first is to support small-scale, bottom-up initiatives by farmers or other rural residents. The second is to design a higher level political framework and propose regulations that will create the right opportunities and the right limitations.

Bottom-up

Bottom-up actions sustaining endogenous development are expected to emerge from the autochthon population. However, the concept of endogenous does not exclude the fact that an important role may eventually be played by the outsider such as farmers who move into an area for

example, who are able to provide a particular impetus to local development because they are less affected by or are blind to the customs, conventions and power relations of local institutions.

Identifying the 'hot seats' of rural development and spontaneous actions by local residents which can be taken up in regional policy and scientific research is critical for the support of bottom-up action. Farming styles research is very effective, not only because it reveals how farmers reason and work, but also because it brings researchers into contact with rural people. It is often on the basis of these contacts that joint initiatives develop, such as the introduction of a regionally typical cheese, farmer cooperatives for managing the landscape or the organization of study groups and excursions. If such local initiatives become successful, they may be adopted by other (groups of) farmers and together generate an effective lobby able to pressure experimental stations (influencing the definition of the research agenda) and influence public authorities (subsidies, adjustments in environmental regulations). They may even challenge and re-direct high-level agricultural policy.

As we have stated above, support for bottom-up action must not be seen as the creation of as much diversity as possible or the maximum amount of room for manoeuvre for farmers. Support has to be selective. On the other hand, we observed that sometimes groups of farmers decide to limit their own freedom of action in order to be able to exploit some unique opportunity. This is the case in high-quality food production, a phenomena very prevalent in Umbria[14] (van der Meulen and Ventura 1994). Particularly in areas were traditionally there was no option but to produce quality, the arrival of fertilizers and tractors enlarged the range of possible farming practices. People realize, however, that if the typical and high-quality character of the local product is to be preserved, increased command over nature must be replaced by increased social control in the form of production regulations, surveillance, certification and careful marketing.[15] Thus, high-quality production may even lead to a reduction of differences between farmers within a limited area whilst simultaneously adding to diversity within the region as a whole.

Top-Down

From a methodological point of view, it must be noted that the creation of diversity in agriculture means, by definition, the work of the 'grass roots'. The process of working top-down can, at best, stimulate and direct: it cannot enforce. You can lead a horse to water but you cannot make it drink.

What then are the instruments for top-down actions which will favour endogenous rural development and reduce the risk of us loosing our way in local conflicts. One major policy instrument is the '*re-territorialization*'

of agriculture. In the paragraph on agroindustrial districts above, the negative aspects of extreme specialization have been demonstrated. These include the depletion of local natural resources and the danger of a complete break-down in the local economy.

An example of a policy measure which re-distributes agricultural activity geographically is the EU regulation that stimulates a maximum of two livestock units per hectare. Possible measures at the regional level to enforce this regulation could include subsidies to breeders who maintain the landscape in marginal areas or the introduction of a regional brand for beef which, for instance, requires that a certain percentage of the feed must be produced on the breeder's own farm. At the same time, policy that aims at the re-territorialization of agriculture should try to achieve a more even distribution of other functions, such as residence and recreation. Negative examples here would be the planned establishment of so-called A-zones within natural reserves which would exclude the pasturing of livestock and ensure that there were disincentives for part-time farming. It is not always clear what is the most adequate level of public intervention. Sometimes Brussels shows itself more perceptive to regional development needs than the local authorities themselves. The discrepancy between the EU premiums on (indigenous) breeding cattle and regional interest subsidies on cattle purchases (abroad) is a point in question.

However, the regional administration, at least in Umbria, seems to us to be the most appropriate level for researchers to address their proposals because it has an essential role to play in mediating and articulating local initiatives with macro-economic and political developments. At this level it seems possible, at least in Umbria, to ensure a balance between external challenges and bottom-up actions. Thus, we argue in favour of an integrated territorial approach and recommend that more study be done on the potential regulating role of the regional public administration.

Appendix 1 Differences in traditional mixed farming between two zones of the Orvieto area (in Italian lire)

	ZONE 1 - San Giórgio				ZONE 2 - Sugano			
	Mean	Min	Max	Farms No./ %	Mean	Min	Max	Farms No./ %
Farms in sample				11				12
Altitude	300	200	360		480	350	580	
Soil type	'Flysch': stoney and loamy				'Tufa': deep and fertile			
Total acreage	17.4	5.5	33.0		11.0	3.7	26.0	
Ha of vineyard	1.3	0.2	2.7		0.6	0.1	1.6	
of which new vines	0.3	0	2.3		0.1	0	0.7	
Olive trees				10/90				7/60
Wheat				9/82				8/67
Barley				9/82				8/67
Oat				4/36				2/17
Corn				3/27				3/25
Meadow				11/100				9/83
Pasture				2/18				1/8
Potatoes				0/0				5/43
Cattle (nr)	9.2	2.7	24.2	8/72	3.8	0	7.2	5/43
Sheep (nr)	32	16	70	5/45	24	15	32	3/25
Sows				4/36				3/25
Cropping intensity:								
Trend last 10 years	1.8	1	3		1.3	1	3	
Perceived intensity	1.7	1	2		2.1	1	3	
More mechanization[1]				9/82				4/33
Herbicides kg/ha	0.61	0.42	0.73	5/	1.10	0.35	2.12	6/
Luzerne yield kg/ha	5,510	4,000	7,800	7/	6,370	5,400	7,000	6/
Viticulture:								
production value /ha[2]	8,300				11,000			
variable costs /ha	680				1,170			
sulphate kg/ha	85				125			
Land purchased				9/82				4/33
Land from *mezzadria*				5/45				3/25
Perceived debt burden	2.7	1	3		1.9	1	3	
Age farm-head	51	39	63		59	35	78	
Family labour units	3.4	1.4	5.0		2.6	1.5	5.0	
Fam. members on farm	5.6	5.0	8.0		4.8	2.0	9.0	
Help neighbours				9/82				6/50
Lamb sold to butchers				0/0				8/67
Lamb sold privately				8/75				4/33
Lamb price in Lire/kg	5,125	4,900	5,450		4,750	4,400	5,000	
Quality mark O.K.	2.4	2	3		1.3	1	2	
Possible value-adding	1.5	0	2		0.9	0	3	

Scope: high quality Scope: survival				7/64 2/18				2/18 7/64
Total prod. value /ha	2,400	1,200	3,900		3,500	1,100	12,300	
Variable costs /ha	420	200	1,200		840	280	3,400	
Fixed costs /ha[1]	190	100	400		410	170	1,200	
Net profit /ha	1,800				2,240			

[1] Number of farms which have intensified cropping mainly through mechanization introduced in the last ten years
[2] Profit drawn from on-farm processing and sale included
[3] Interests and depreciation on capital excluded

Appendix 2 Characteristics of the main styles of viticulture in the Orvieto area (in 1000 Italian lire)

	part-time farm	traditional mixed farm	specialized family farm	capitalist farm	wine-making estate
Number of farms[1]	1500	500	100	30	15
Total ha of vineyard[1]	600	500	500	300	750
Ha of vineyard per farm[2]	0.2-1.0	0.2-2.0	5.0	10	50
Family labour units on farm	1.5	3	4	1	2
Altitude (metres a.s.l.)	120-450	200-450	120-350	150-400	200-300
Grape yield per ha (kg)	12,000	11,000	15,000	12,000	8,500
Grape price per kg[3]	563	587	516	563	850[4]
Production value per ha	6,760	6,460	7,740	6,760	7,230
Fertilizer use	low	(manure)	high	medium	zero
Type of pesticides[5]	trad.	trad.	modern	modern	trad.
Costs chemical inputs per ha[6]	450	300	700	400	350
Salaried labour per fam.lab. unit	0	1/30	1/2	4/1	10/1
Salary costs per ha	0	200	1,200	2,300	2,300
Variable costs per ha (incl. fuel)	550	600	2,200	2,900	2,850
Gross margin per ha	6,210	5,860	5,540	3,860	4,380[7]
% of grapes processed on farm	20%	15%	1%	0	100%
Type of processing technology	trad.	trad.	trad.	-	modern
Processing costs	low	low	low	-	high
On-farm bottling	-	5%[8]	-	-	95%
Bottling costs	-	low	-	-	moderate
Farm wine production per ha (kg)[9]	1,600	1,000	100	-	5100
Price of wine (farm gate)	1.5	1.5	1.3	-	4.5
Production value per ha	2,400	1,500	130	-	23.000
Marketing costs final product	low	low	low	low	high

1) Deduced from 1992 Agricultural Census
2) Vineyards without DOC status included
3) Based on the cooperatives' off-farm price for DOC non-Classico in 1992 = £578/kg; price for grapes beyond 12,000 kg/ha = £413/kg; bonus/malus for sugar content = £25 per vol.%
4) Estimated internal price, not the market price
5) Traditional pesticides are Cu_2SO_4 and S_2; modern pesticides are systemic ones like DECIS
6) Use of chemicals is positively affected by the altitude (the higher the farm, the fewer chemicals needed)
7) There are fewer shoots to bind and grapes to pick, but every operation needs more attention
8) Some farmers make 'spumante' (foam-wine) or make white wine aged in bottles
9) Average pressing rate is 65% (100 kg of grapes yielding 65 kg of juice)

Source: own survey (N=50) and INEA farm accounts 1991

Appendix 3 Modeled economic performance of Chianina farms and industrialized feedlots at 1992 and 1994 prices

	Artisan breeder (closed cycle)		*Industrialized feedlot* (open cycle)	
Fully-empl. Labour Units (LU)	1.5		2.0	
Fodder crops	2 ha corn (non-irrigated) 6 ha barley 15 ha lucerne & hay		15 ha silage maize (irr.)	
Feed self-sufficiency (in FU)	70%		40%	
Livestock	34 cows (*Chianina*) 7 heifers 15 male calfs 12 fattening-bulls		300 fatting-bulls (*Charlaise*)	
Adult Livestock Units (ALU)	**50**		**180**	
Scale of breeding	33 ALU per LU		60 ALU per LU	
Livestock density	2.17 ALU per ha		12 ALU per ha	
Initial live weight of bull	170 kg (5 months)		230 kg (7 months)	
Price per kg live weight	£ 7,000	£ 8,000	£ 5,500	£ 6,500
Market value of young bull	£ 1,190,000	£ 1,360,000	£ 1,265,000	£ 1,495,00
Real costs of young bull	**£ 900,000**	**£ 900,000**	**£ 1,265,000**	**£ 1,495,000**
Daily Weight Gain	1.20 kg		1.10 kg	
Final live weight	720 kg (20 months)		600 kg (18 months)	
Price per kg live weight	£ 4,400	£ 5,200	£ 4,000	£ 4,800
Market value of adult bull	**£ 3,168,000**	**£ 3,744,000**	**£ 2,400,000**	**£ 2,880,000**
Production Value Increment			£ 1,135,000	£ 1,385,000
per bull	£ 1,978,000	£ 2,384,000	£ 3,068	£ 3,743
per kg growth	£ 3,596	£ 4,335	**£ 3,068**	**£ 3,743**
per kg growth incl. breeding	**£ 4,124**	**£ 5,170**		
Feed Conversion factor	6.7		6.7	
Average feeding costs (real)	£ 310 per Fodder Unit		£ 310 per Fodder Unit	
Feeding costs per kg growth	**£ 2,077**	**£ 2,077**	**£ 2,077**	**£ 2,077**
Veterinary costs per kg growth	£ 10	£ 10	£ 20	£ 20
Incidental variable costs per kg	£ 198	£ 216	£ 182	£ 217
Fixed costs per kg growth	£ 1,000	£ 1,000	£ 800	£ 800
Total non-factor costs per kg	**£ 3,285**	**£ 3,303**	**£ 3,079**	**£ 3,113**
Net Value Added per bull	£ 461,450	£ 1,026,850	-£ 4,070	£ 141,710
Net Value Added per kg gr.	**£ 839**	**£ 1,867**	**-£ 11**	**£ 383**
Net Year Income (incl. breeding)				
per farm	£ 6,921,750	£ 15,402,750	-£ 1,220,100	£ 42,513,000
per Livestock Unit	£ 138,435	£ 308,055	-£ 6,783	£ 236,183
per Labour Unit	***£ 4,614,500***	***£ 10,268,500***	***-£ 610,500***	***£ 21,256,500***
EU premiums on suckling cows	£ 5,100,000	£ 9,180,000		
EU premiums on male cattle	£ 1,430,000	£ 3,037,500		
Regional interest subsidies	---	---	£ 28,956,000	£ 33,534,000

Comments to Appendix 3

The two models presume farms that are efficiently managed in terms of fodder production costs, breeding costs and feed conversion. Daily weight gain is kept at a reasonable level, in order to reflect real farming conditions in Umbria.

European *beef prices* were at a low in 1992 and continue to be so (1995). Italian agriculture, however, profited from the sharp devaluation of the lira in October 1992 (25 percent) and a still sharper decline of the so-called 'green ECU'. Prices of Italian beef followed the increased prices of imported beef. At the same time cattle imports became more expensive. Prices of fodder and concentrates remained constant. EU premiums, because they are paid in ECU, augmented in terms of the Italian lira.

Feed self-sufficiency is expressed in fodder units not money. In the case of the latter, it would be still lower for the industrialized feedlot.

Adult Livestock Unit is rather an awkward standard (1 suckling cow = 1 ALU; 1 fattening-bull = 0.6 ALU etc.). It is supposed to reflect the animal burden on the land (feed requirement, dung).

Initial live weight of the imported Charolaise bulls is set at (an economically favourable) 230 kg, although nowadays they usually weigh more than 300 kg. A Chianina calf is usually taken away from his mother at 5 months when it has a weight of about 170 kg if it is a bull.

Breeding costs here include everything. Not only the costs of keeping and feeding suckling cows but also the gains from selling young females (assumed to be 150 kg here but are often at 350 or 600 kg) reducing real breeding costs still further.

Daily weight gain (DWG) is higher, per definition, for Chianina than for Charolaise or Limousine cattle. In addition, the Chianina matures later. DWG is low at the beginning (0.5 kg) and highest right before maturity (see Appendix 2). Here an average has been taken.

Feed conversion, expressed in fodder units (1 FU = 1 kg barley) consumed per kilo of growth is equal in both scenario's. Feed conversion increases (worsens) as the animal grow older. Here average weight and age is about the same for Chianina and Charolaise.

Feeding costs per fodder unit are, on average, equal. The expensive purchase of concentrates by feeders is compensated by the low production costs of irrigated silage maize. The profit of Chianina breeders from producing fodder and concentrate on their own farm is cancelled out by the luxurious ration they use (barley, corn, erba medica, fodder beans).

Prices for Chianina cattle are 5 percent higher than for other breeds. In addition, feedlots have periodic difficulties when it comes to selling their animals: they get fat and fetch a low price. This effect is discounted in the selling price.

Veterinary costs include standard vaccinations only.

Incidental variable costs can be the loss of an animal through illness or depreciation through inflation (when beef prices do not keep up with general inflation). These costs are assumed to be a fixed percentage (4 percent) of the average livestock capital present during the fattening period.

Non-factor costs are defined as the remuneration for labour, land and capital. It excludes interests on capital and the costs of external labour. It includes, instead, depreciation on machinery and buildings.

Net Value Added to local production factors is equal to net income. It is calculated as production value minus non-factor costs.

EU premiums for keeping male fattening cattle went from 54 ECU per head in 1992 to 90 ECU in 1994, with a maximum of 90 head per farm. Only farms with less than 2 ALU per hectare could apply. Calves should be kept for at least 9 months at the same farm. Another 90 ECU can be obtained at 24 months. The premium for suckling cows went from 85 ECU (150,000 lire) in 1992 to 120 ECU in 1994. (In 1992 1 ECU was worth £ 1,765; in 1994 it was £ 2,250.)

Interest subsidies on cattle purchases (8 percent) are not always available to feeders; funds are limited and temporary. Moreover, application rules change continuously. Breeders with good contacts in the regional administration will profit more than others. Appendix 3 shows the maximum amounts. On average only 60 percent of it will be acquired.

Notes

1 Endogenous is defined here as a) the use of local resources (physical and human) rather than external ones, b) control over the direction of development by the local population and c) the return of benefits to that same population.

2 Transactions costs are more than the cost of drawing up a contract or making a trip to France. They include, for example, the efforts large-scale feeders have to make to get hold of regional interest subsidies on cattle purchases or costs they incur keeping themselves inform about changing cattle and beef prices.

3 Other examples from the CERES-CAMAR project are the spontaneous creation of local farmer groups in the Netherlands for the management of landscape and nature and the peasant movement in southern Spain that is trying to get usufructuary rights to land. Both must be understood as efforts to get the necessary manoeuvring space in order to be able to continue farming and develop some style.

4 Still to discuss affairs, study groups may function better in the Netherlands than in Umbria, where people prefer in the *piazza* and the local bar.

5 In the recent years, attention in farming styles research has widened from the input side to include the unravelling of direct and indirect prescriptions relating to farming techniques and technology used by the industry, government and science and the social organization of output distribution.

6 An intermediate (semi-industrialized) form is represented by the *sistema agricola locale* (SAL), which is defined as 'a form of organization of production in which the primary sector of a relatively well-defined territory specializes in a typical product, destined for a specific segment of demand.' (Carbone 1992, p. 142).

7 The term industrial district was introduced by Marshall (1927) to describe a situation in which a large number of small, localized enterprises achieved the same efficiency of production as a large industrial plant, through synergies. Iacoponi was the first to introduce the concept of district into agricultural research. The *distretto agro-industriale* is made up of specialized farms, supplying enterprises and processing industries within a well-defined area. All enterprises are bound together in a sort of collective production process, in which semi-finished products are exchanged at very low transaction acts in a quasi-market (Iacoponi 1990).

8 The traditional, mixed farms exchange labour between themselves.

9 Local pedological conditions have, until now, inhibited the mechanization of harvesting. Further, selection and *cernitura* is done manually, the unequal quality of the leaves making the American type of bulk processing unprofitable.

10 In 1985 the FAT company decided to orient production towards quality, taking the less well adapted lands out of production despite protest from the farmers concerned. In the early 1990s the Italian government, under pressure from the EU, urged the national tobacco processors to draw up a common plan aimed at reducing production. Quotas were established on the basis of the production volumes of previous years and a proportional cut was agreed by everybody except FAT, which claimed that it could not be blamed for the problem of over-production.

11 In order to avoid this situation Favia suggests that the system's capacity to establish relationships with the outside be developed whilst maintaining a certain internal bargaining power in the relationships upstream, towards local farmers. This, however, hardly seems compatible with endogenous rural development as we see it. Rather, external dependencies should be reduced and farmers should get a fair return for their craftsmanship. If not, outside pressures will lead to the over-exploitation of local resources.

12 The concept of farming style was first introduced by Hofstee (1985), who used it to address the phenomenon of a particular socially enforced way of farming in a specific area which, in the past, because of isolation, was able to develop into a local style. Today van der Ploeg uses the concept to distinguish between groups of farmers who use different farming logics within the same area i.e. in a physically and socio-economically more or less homogenous situation.

13 The 'Denominazione di Origine Controllata' (French: Appellation Contrôlée) is already vigorous in the wine sector.

14 Lentils from Castelluccio, celery from Trevi, olive oil from Spoleto, black truffles from the Valerina, red potatoes from Colfiorito, sausages from Norcia, peas from Bettona, wine from Sagrantino di Montefalco and spelt, a wheat-like grain, from Farro di Monteleone, to mention just a few.

15 High-quality food production, in a sense, can be seen as a social defence against technological acquisitions (van der Meulen 1993).

8 The Future of the Countryside

Bernard Kayser

For some decades now rural areas in Europe, whether peripheral, central or peri-urban have been fully integrated into the physical and human networks which make up society. They are as much a part of the social fabric as towns, suburbs and infrastructure. Not only do rural areas interact constantly with every part of the system, all the factors which affect the system also have an impact on them.

It is therefore impossible to predict what the future holds for rural Europe without taking account of the dramatic economic downturn which has brought a period of seemingly inexorable growth to such an abrupt end. We can neither rely on European integration nor on an economic and monetary union which is foundering before it has really taken off. Nor is it possible to ignore the new order (or rather the new chaos) in international trade, relocation trends or the uncertainties thrown up by recent developments in Eastern Europe.

As the century draws to a close, the emergence of a global economy, technology and culture is producing a tidal wave of new competition that is sweeping across the industrialized world and beyond. This trend is set to spread to major powers such as China, Indonesia and Brazil which, until recently, were not taken seriously. The rules of the game are changing. In addition to the global economic slump, the West is going through a period of social upheaval as the gap between those with jobs and those without jobs grows wider. The increasing numbers of young people staying on in higher education, the lowering of the retirement age, higher life expectancy, a consequent increase in health care costs and, lastly, unemployment all call for social transfers at a time when expenditure on welfare is not being allowed to expand.

Changes – some dramatic, others more gradual – will have to be made. These will involve the first real fall in living standards since the end of the war, two generations ago. How will they affect the rural areas of Europe? The answer is – in every possible way. Partnerships and alliances built on an expansionary agricultural policy will be put to the test. Controlling production collectively will become impossible as tight budgets make the cost of managing surpluses prohibitive. Purchasing power and demand will decline, reducing people's choice as to where they live. Above all, the

changes will exaggerate the effect of competition, marginalizing or driving out the weakest, whether they are individuals, businesses or communities.

Unfortunately rural communities, even prosperous ones, are among the weak. They have a low population density, are poorly provided with services, have low productivity and little power to resist the growing tendency towards concentration in town and country planning. Their basic economic activity – agriculture – which determines the shape of the rural environment, is potentially a victim of its own success.

The Myth of Abandonment

It is fashionable to talk of the 'abandonment of the countryside'. Together with images of fallow fields and other such tragedies, this abandonment has become a popular myth. The conscientious expert can point out that SEGESA studies only identified 434 rural districts in France as being in a state of serious decline having a low and steadily shrinking population density. These districts account for only 17.5 percent of the country's total surface area. According to INSEE (the National Economic Studies and Statistical Institute), only about two million people can be unconditionally classified as belonging to the rural population, or belong to communities without their own basic services and amenities and whose inhabitants have to travel some seven kilometres to find them. Whatever the facts, people's perceptions will not change.

For all that, the idea of a deserted French countryside deserves serious attention. There are areas where the situation is genuinely difficult, if not to say critical. One of the main crises regions stretches across France from the Pyrenees to the Massif Central, then on to the southern edge of the Paris basin and from there to Lorraine and the north-eastern border. There are also isolated spots in central Brittany and lower Normandy. The problems facing these areas raise three major interrelated questions, relevant not only to those most immediately involved but also to local government and society in general.

Demographic trends are emptying farms, hamlets and villages of their inhabitants. What has not yet been abandoned will be in ten years' time. The people who traditionally took care of the land – the *paysans* – are a dying breed, and, where there is no one to succeed them, 'untamed nature' will take over.

Three issues become clear here. First, the environment. It takes several decades for forests to grow, meanwhile scrub takes hold, causing many problems including the risk of fire, blocked paths, and the proliferation of unwanted animals. Something ought to be done .... This brings us to the second issue. People who abandon their property do not give up their rights to it. Property owners, who often have inherited their property, maintain their claim on it and defend it. Even if were required by law to

ensure it was maintained or looked after voluntarily, the authorities would still need to develop an effective way of taking appropriate action. By definition, there are no more stewards of the environment in these areas. This raises a third issue: local authorities need to take responsibility for this work themselves by contracting it out to private businesses.

No area which has been deserted or which faces abandonment in the future is without an oasis. Even in the very poorest regions, there is a village, a community or a business hanging on, developing its own special qualities. The conservation of the local natural and architectural heritage is as essential for these oases as it is collectively for the country at large. There is still hope that, as long as communities are kept alive, they might at some stage when circumstances change, bloom again.

The Crisis in Agriculture

The health of a rural community is usually judged by the situation in the agricultural and service sectors and how well these sectors are likely to perform in the future. Emotions, fed by politicians and union leaders and amplified by the media, can get in the way of such objective analysis and detract from its credibility.

The crisis in agriculture is manifest. It is clearly due to structural overproduction in almost all areas, caused in turn by tremendous rises in productivity. Despite warning signs that the historic achievements of the Common Agricultural Policy (CAP) were about to be undone, the unwieldy production-incentive machinery could not be stopped in time. As a result, businesses now find themselves in a precarious financial situation, fighting to survive. The CAP is, at the moment, limiting the damage done by current tight budgetary policy which effectively rules out any increase in stocks or subsidies. Against this background, Europe, with France in the front line, appears to be in a difficult position in the GATT negotiations, given the attempts to reorganize world markets and the United States' efforts to win back market share taken away by European exports. However, the crisis is not the result of CAP reforms or of the GATT talks. On the contrary, it is the cause.

Current problems are not the same for all French farmers, far from it. The romantic myth that all farmers are united by a common bond leads to the deceitful claim that all farmers share common interests. This is a strategy that impedes the search for sensible solutions.

In reality the French agricultural sector is made up of some 100,000 'agrimanagers' and 500,000 'family farmers' and 200,000 marginal farmers – all with different attitudes, interests and prospects. The agrimanagers – such as the cereal growers in the Paris basin, for example, have been the main beneficiaries of increased production and subsidies from the European Union. Their sales figures have undoubtedly been

affected by falling prices, and they are now quietly preparing to adapt. Their strategy is to draw on the wealth they have accumulated from their financial and property investments to buy second-rate land at low prices, leave it fallow and collect set-aside premiums for it. At the same time they are diversifying, making inroads into new vegetable markets to the detriment of traditional producers. The agrimanagers are delighted when these small farmers demonstrate because protests lead to higher subsidies.

Family farmers are far from backward. On the contrary, they are modern producers with medium-sized farms. But they find it extremely difficult to contemplate making the necessary changes. Many have made losses for the past two or three years, and the bleak outlook for the future offers no incentive for the next generation to stay on the land. If these families stay afloat, it is thanks to extra money earned from non-agricultural activities, such as direct sale of products, income from tourists and, most important, premiums and transfers. The future of family farming hangs in the balance and, with it, the way the countryside functions, how it is to be maintained and the way it looks. Planning is clearly a major issue here.

The geography of French agriculture is changing rapidly. A few specialized regions already use the bulk of their capacity to produce one or two main products, and the spread of soilless culture is unstoppable. Studies have shown that the whole of Europe could be fed by the strip of coastal hinterland that runs from Brittany to Denmark. Not only does this concentration give rise to destructive competition between regions, but it also poses a serious threat to the environment. These two drawbacks may, at some point in the future, stop the concentration from going any further. Even so, it leaves the land outside the concentration area, more than two-thirds of the surface area of France, in a state of dangerous uncertainty. How is it to be managed and maintained and what other agricultural methods are to be used.

The present situation and prospects are as follows. The 'agrimanagers' and the family farmers have an almost equal share of the cultivated area of the country. The family farmers occupy around 13 million hectares. There is every reason to think that after the year 2000 there will only be 300,000 of them left, since 200,000 will have already stopped farming during the nineteen nineties. This will be for demographic reaons alone. Moreover, only 10,000 young people at the most are expected to enter farming each year and even this figure has not been achieved in recent years. Increases in farm size are not expected to be great; each family farmer will cultivate an average of 43 hectares. The question is whether or not this will be enough to provide family farmers with an income and to allow them to adopt a productive strategy adapted to changing market trends? Because this is very doubtful there is a need for a deliberate policy of support and encouragement.

Either the old methods will die out because traditional farmers are unable to survive, in which case an empty countryside, fallow fields and

a decaying heritage are waiting just around the corner, or a new agricultural policy will have to be developed which is able to take into account the different requirements of the two types of farming and provide family farmers with a reasonable living. In doing so it will ensure that the countryside remains attractive, which is essential if rural life is to have a future: neither people nor business will move to a countryside in a state of decay. There is no doubt that for business executives and the new urban middle classes – the potential future inhabitants of rural France – the quality of life in the villages and small market towns is a most attractive feature.

The revitalization of the countryside depends on the family farm to a far greater extent than it would appear if one simply takes the small proportion of farmers in present day village society into account. The quality of the environment depends mainly on the farmers and on the way they organize their activities. The same goes for the landscape and for the quality of products and services these farmers offer.

The farmers themselves are also becoming more and more dependent on this revitalization. On the one hand, the newcomers form a local market for high quality farm products. On the other hand, the income derived from farming can often be increased by service activities either on a personal or group basis, despite often intractable organizational problems. Finally, many farmers who might otherwise be affected by problems of isolation can maintain and even reinforce their social networks thanks to the diversification of the population percipitated by the newcomers. It is diversification that constitutes one of the principal conditions of development for all concerned.

Services

Like agriculture, the issue of services in the countryside is surrounded by myth and confusion. Opinion makers at all levels are unanimous in thinking that people have left the countryside because services there have shut down. Maintaining adequate services is therefore seen as absolutely essential if rural communities are to survive. Despite the studies, endorsed and published by DATAR, the Agency for Regional Planning and Action, and despite the profusion of local experiments carried out in this field, the same tired old phrases are still repeated whenever these issues are debated.

In fact, services are an issue only in those areas with a low or diminishing population, that is in about one quarter of the countryside in terms of surface area and one seventh in terms of population. There are quite simply not enough potential customers to operate some services profitably in these areas. It is only natural that the withdrawal of services is a sensitive issue in rural communities. Schools, post offices and groceries not only meet people's basic needs, they are also places where people meet

and socialize. They are symbols, and when they disappear it feels as though the local rural community has received a death warrant and as if government has turned its back. The local reaction to these crises, blown up by politicians and the media, can be used to justify measures which are clearly temporary and designed to win popularity, such as bans on the withdrawal of public services and decisions to refuse planning permission to new supermarkets.

Furthermore, the rest of rural France – the majority of it – probably has more and better services and facilities now than ever before. Comparing present day roads with those of fifty years ago proves this beyond any doubt. Country dwellers are undeniably more mobile, and communication with the outside world is far easier. Education is a good example. Schooling has changed out of all recognition since the days when farmers' children, wearing clogs, had to overcome mountains of material and cultural obstacles before they were able to get a school-leaving certificate, let alone any higher qualification.

Any rational assessment of the present situation must take into account the fact that 99 percent of rural districts have at least one doctor, 97 percent have a chemist, 90 percent a bank and 89 percent a solicitor. Comparing an INSEE survey carried out in 1980 with the one carried out in 1988 shows that there has not been any overall decline in the services available in rural areas. While it may be true that only 49 percent of communes have a general grocery compared to 59 percent in 1980 and only 72 percent have a café against 77 percent in 1980, there has been a definite rise in the number of communes with a doctor, nurse or ambulance, even in the very remote parts of rural France. Home help too is available in many more communes than it used to be (73 percent in 1988 against 44.8 percent in 1980).

The rural population have, in most cases, the same expectations as the town-dwellers'. Some of the things country dwellers have come to expect can be obtained locally. But for most, a journey into town is necessary. Surveys have demonstrated that journeys of twenty minutes are perfectly compatible with village life styles, even if they have to be made frequently. What is more, travelling reinforces the feeling among country-dwellers of being on an equal footing with the rest of the population. Mobility is seen as evidence of equality of opportunity.

Who amongst the rural population lacks this mobility? Old people? Probably less than is commonly thought. Except in the case of the seriously disabled, local support networks and organized outings fulfil most of their needs. Mobility is probably a greater problem for women at home in one-car households: they can only wait impatiently for a trip into town at the weekend. It is the young people who most clearly suffer from isolation.

Country dwellers find that, when the density of population is high enough and the process of urbanization has begun, the provision of

modern, everyday services is sufficient to satisfy their requirements. This is certainly the case in those communities that are having no difficulty in surviving. Elsewhere, a certain amount of organization is required if needs are to be met and, in fact, solutions to these problems are being sought. The national education system is setting a good example in this respect, making full use of the freedom of action the central authorities allow their local staff.

Choice of Location

To make the most of all its resources, which are potentially quite considerable, rural France needs help. Today's problems is an unstable economy and one that is too small. One of the fundamental questions facing planners is the extent to which society, the bulk of whose population lives in towns and cities, is prepared to provide the necessary assistance.

There are other questions too, however. Are people more or less likely to move to the country as a result of the economic and cultural problems facing France? Do general concentration and relocation trends have a direct affect on whether businesses set up or stay in the countryside? Is the prospect of pleasant surroundings and a close community becoming more attractive as people attach more importance to nature and the environment and should this be seen as a permanent or a temporary shift?

When people are choosing where to live, their decision is influenced both by conscious personal preferences and objective, quantifiable economic factors. A recent study has shown that living in the country is not any less expensive than living in town. Lower net housing costs are almost completely offset by higher transport costs (the Paris region was not included in this particular study). Whether or not potential country-dwellers really take notice of the results of such studies, the result of which are expressed in average, is unknown.

People do, however, pay attention to information relating to jobs and the relationship between where people live and where they work. Comparing the results of the 1982 census with that of 1990 showed that the tendency for jobs to move to the city has continued unabated in recent years. Most rural areas saw a population growth of one percent but at the same time lost 13 percent of their jobs. The population in peri-urban rural areas expanded by 8 percent but employment increased by only 3 percent. In the major cities, however, population increased by 3 percent with 5 percent growth in employment.

Despite the disappearance of jobs in agriculture and the spectacular collapse of traditional industries, the employment situation in rural areas is not as critical as might be expected. According to SEGESA's estimates, some 100,000 non-agricultural businesses were established in rural areas

and small towns throughout France each year between 1981 and 1988. However, 60 percent of them did not employ any paid staff.

Small businesses have gone through successive phases of modernization and concentration, followed by a period in which budget funds were spread thinly in accordance with the policy of decentralization. The question now is whether or not conditions have changed in such a way that it will be easier for small businesses to operate in a rural environment. Surveys carried out at grassroots level as well as statistics suggest that this might be the case. The odds are quite good when external conditions such as sufficient population density and proximity to a major conurbation or transport link are good and the right person happens to be in the right place when a niche in the market needs to be filled. A critical factor is a link to the outside world. An electronic link is hardly a problem these days but it is not enough. The stimulus provided by personal contacts with other people is also needed.

Most new businesses in rural areas are to be found in the service sector. Many of them, especially those in the health care or welfare sector, provide a solid anchor for the community because of the number of jobs they offer for women. These businesses generally serve the needs of a fairly large area, and the decision to establish them is not made locally. They would be unable to succeed, however, without local support. It is difficult to identify what part is played by external factors and what part by internal factors in the development of such businesses.

Commuting, already commonplace, is becoming an even more established part of country life. In the most rural parts of the country 41 percent of working people travel an average 19 km to work, either on a daily or weekly basis. In peri-urban areas 65 percent of working people commute and in small towns the figure is 55 percent. Obviously people are influenced by the location of their work when chosing where to live, but the number of daily commuters show that, as more people become mobile because they have their own private transport, the 'trapped' feeling is slowly fading. The countryside is gradually losing its image as a place where movement is restricted and is becoming associated more and more with freedom. Journeys in the countryside are indeed far easier and less stressful than those made in town.

Teleworking is sometimes put forward as a credible alternative to commuting. In the 1970s a Utopian vision was elaborated in which computers would enable people to combine work with life in the countryside. The dream failed to materialize, however, except for a small number of intellectuals and artists in fashionable areas such as Provence and Périgord. On the other hand, teleworking has succeeded where it makes sense from a financial or organizational point of view. The introduction of distance working via computer has lead to real savings. The practice of sending out secretarial work through computer networks to pools, contractors and individuals working at home will continue to become more

commonplace, held in check only by international competition offering, as in Asia for example, low prices and high quality.

Planning Projects

Having examined all these arguments, the planner is faced with a real dilemma. Should he use planning theory to reorganize land use to ensure maximum efficiency or should he concede that economy, society and individuals do not conform to rational models imposed from above and therefore adopt a liberal, non-interventionist approach? Or perhaps he should reject both of these simplistic alternatives and accept liberalism on condition that the order it produces cannot be improved on?

In practice, the difference between these various options is not as great as might be expected. Everyone knows that it is unrealistic to hope to break down the traditional administrative and political framework in a country such as ours and replace it with something new and that developing abstract strategies aimed at optimizing land use by sweeping away existing structures is utterly pointless. Areas overlap, borderlines cross, pieces refuse to fit together, authorities block each other and one pole competes with the other. An inhabitant of one place belongs to many different entities at the same time. While one person may feel more attached to one entity at a particular moment, his or her neighbour might feel more part of another.

In the interests of reason, common sense and efficiency, it is essential to abandon splitting hairs about the shape and size of territorial units when the ideas behind a project for a particular area are being discussed. Basically, there is no need to specify the exact area to be covered by a development project even though it is obvious that a project cannot exist independent of the place for which it is desired. This brings us to the definition of what is meant by 'project'. In order to be taken seriously by the planning authorities, a project must have a certain scope and complexity and cover a given space. This does not have to be specified exactly, but it must correspond to a recognized, identifiable area and the project must be discussed both at local level and at a higher level with the appointed representatives. Lastly, a project needs people to implement it, leaders are necessary as well as a clearly defined strategy regarding the principles that underlie it.

The temptation to fall back on self-reliance, protectionism and corporatism – a tendency to which the the champions of local identity are often prone – seems only to affect a small segment of public opinion today. Even so these sentiments are still allowed to influence actual policy. The crisis has helped to bring it home to people that they have more to gain from openness than closing in on themselves. Fewer and fewer people now live and work where they were born. However, country

planning and the institutions responsible for it are caught in a time warp – the same time warp that causes such a large discrepancy between the image rural areas have in their own and the State's eyes on the one hand and modern socioeconomic realities on the other. If, when applied to a geographical area, the concept of 'identity' is used merely to keep an area exactly as it was, then it can lead only to exclusion in one form or another. In this sense, 'identity' is diametrically opposed to the will to develop. Identity can be an asset, however, particularly if it is used non-exclusively to refer to the area's special place and function in society. Potential improvements or projects, are thus far more important than the area *per se*.

The stakes have been upped. The battle is no longer about individual, local achievements, even though these are still important, but about the role played by particular areas in the national economy, and the contribution they make to society in terms of added value. We need to find a way of reconciling private interests with the collective interest. Rural areas have the potential to be the place where this convergence of interests occurs, but as yet there is no theory, no model to work on. In view of this, a pragmatic approach, centred around what *can* be done, definitely seems appropriate. Partnerships with outside agencies, such as the various levels of government, are essential. Such partnerships involve more than mere administrative and financial cooperation; they also imply a genuine sharing of responsibilities. For some, partnership entails nothing more than help with infrastructure. That is the engineer's approach. The politician's approach ought to focus on more complex forms of action at all levels to help local communities fulfil their full potential.

The size of a project is measured not so much in terms of the area it covers as in terms of the resources that can be brought together and harnessed to produce synergy. It is essential therefore that resources from at least one town or several small towns or villages be used in addition to those provided by the rural areas themselves. An association of communes could provide an administrative structure for the project. However, experience shows that cooperation between communes is so limited in scope that it very rarely offers the opportunity for substantial projects to take off. The Territorial Administration Act does confer new powers on such commune groupings in the field of planning and economic development, and it does entitle them to all the revenue from the local business tax, thus giving them a certain internal cohesion. But for all this, most of them do not extend beyond the borders of existing cantons or associations of communes. This is unfortunate since the current situation in rural France calls for larger groupings, within which major transfers of skills and resources can take place. Only then will it be possible to divide an area up according to specialization, to make a real difference to the way the land is used, to formulate a development strategy and to enter into contracts with regional, national and European partners. If we start thinking on this kind of scale,

there is a chance that awareness of collective interests may motivate people to act and ensure that Utopian visions of solidarity are delegated to where they belong.

To say that solidarity is thin on the ground in the world of politics and administration might well be considered an understatement. In rural communities, old feuds, rivalries between local dignitaries and conflicts between reforming zeal and underlying conservatism all work against it. Nevertheless, there is sometimes a consensus of opinion in favour of a good plan. That consensus is all the stronger if contacts at the political, non-political, public or private level are frequent, intense and necessary enough to create a solid basis of support for a project. The system developed for the regional nature reserves, though not directly transferable, might provide some useful ideas: first a project is devised jointly by all those involved – from local authorities and associations right up to central government – then an agreement is signed laying down funding arrangements, the organizational structure, project duration, and an executive authority to manage the project.

Determining the Future of Rural Life

To the surprise of commentators on rural life, recent surveys all indicate that, with the exception of farmers affected by the crisis in agriculture – and this constitutes a small minority even in rural areas – country dwellers are very satisfied with their lot. More than 70 percent of people living in villages and small towns said they were happy with their surroundings and their lifestyle and did not want to change. Pensioners were the most contented. On the other hand, mothers who were not in paid employment, living in households with only one or no car, often felt marginalized, and the under-25s complained of isolation.

The future of rural society, which needs to attract more people and more human resources, is very dependent on the picture the city-dwellers have of the country and this is an ambivalent one. On the one hand, there is an idyllic vision of being surrounded by the beauties of nature and warm village communities. On the other, people are afraid of being trapped and of the incestuousness of country life. Each person's image is influenced by their own personal experience of the villages and regions they know best. These images are strong in the individual and collective conscience because they correspond closely to the crude stereotypes presented by the media.

However, reluctance to move to the country (with the exception of peri-urban areas) is actually based on sound, objective reasoning. First, even if villages – people and authorities – welcomed 'outsiders', they are often not very good at showing it. Potential residents have to face very real problems, including a scarcity of rented accommodation, the difficulty

of finding jobs for partners, the prospect of having to send the children away from home for their secondary education and a less easy access to cultural activities of the type found in urban areas.

These are the needs of the middle classes, the group most likely to move to the country. However, there is also talk of a new stream of migration from the towns to the villages this time, involving the urban underclass. As yet, there is no indication that this really is a trend. Social exclusion is a problem for rural mayors, but only because poverty and marginalization exist in the countryside, even if they are less visible. Who is to say, however, that the countryside might not develop into a kind of refuge?

It is now quite clear, although the idea is still a new one and as yet not apparent to everyone, that the rural areas are a resource waiting to be developed and not a lame duck in need of assistance. Rural development has become an issue in society, but we are all aware that rural areas are incapable of fulfilling the demands and aspirations of society unaided. Political will is indispensable, and that means radically new budget priorities to promote sensible planning.

9 Irrigation in Two Contrasting Agrarian Development Patterns in the Northern Portuguese Mountains

Adri van den Dries and José Portela

Introduction

In this chapter we will demonstrate that local resources in Trás-os-Montes, our study region in northern Portugal, are currently being used in very different and often contrasting ways. We focus on irrigation water which is a scarce and highly valuable resource in this area. In Trás-os-Montes two categories of contrasting farming styles are found: the so-called 'traditional farming styles' and the newly emergent farming styles which are the product of different factors such as intervention programmes supported by the EU.

In the newly emerging exogenous styles, irrigation water is used far less efficiently than in the former, more endogenous farming patterns. Modernization has resulted in a growing counter-productivity as far as the use of scarce water resources (irrigation water) is concerned.

We argue that the consequences of this growing inefficiency and counter-productiveness tend to be masked. This is due to the externalization of the implied transformation and transaction costs which are shifted from the level of the farm enterprise to local, national, or supra-national levels. At the same time benefits are also redistributed unequally amongst the farming population.

Further, we will show that impact, or more specifically the effect irrigation programmes have on employment, is highly dependent on the farming approach in which irrigation is embedded. Within an endogenous approach the results will be significantly higher than in an exogenous approach. We have paid particular attention to one specific aspect of current modernization projects, that is the considerable transformation costs they involve. These costs are especially high in the so-called marginal or less favoured areas. It should be noted that these transformation costs go far beyond the boundaries of individual farm enterprises. For the modern farm, an environment needs to be created in which it can develop. To create this environment massive state intervention is needed and an increase in competition between farmers over scarce resources can be expected.

These statements will be illustrated in the context of a comparison between irrigation practices embedded in traditional (or endogenous) farming systems and farming systems which have emerged as exogenous farming patterns as a result of the modernization paradigm applied in the mountainous areas of Trás-os-Montes.

Our point of departure is the irrigation practice of the agro-pastoral farming systems which have developed over time in the mountains of Trás-os-Montes, particularly in Barroso. We have analyzed the structure of this particular traditional farming system because, in contemporary farming and irrigation practises, we still find fundamental traits of this farming system. This is particularly true of the endogenous development pattern in which meat is produced on the bases of natural forage (see Christóvão *et al.* 1994 and Oostindie *et al.* 1994)

The exogenous farming pattern that has emerged since the early 1980s reflects a deep and many-sided rupture with traditional farming patterns. This is particularly true as far as water use and irrigation practices are concerned. In traditional farming, water demand is adjusted to natural water supply. In the exogenous farming pattern, however, the balance between farm water demand and natural water availability has been disturbed.

Water is a serious constraint to the development of the exogenous pattern of the 'intensive milk producers' or 'modernizers' described by Christóvão *et al.* (1994) and Oostindie *et al.* (1993). Therefore, in this agrarian development pattern, irrigation interventions are required to increase the amount of irrigation water in the summer. Dams and individual water sources, for example, need to be developed to meet the increasing demand for water. Because the social and economic base of the modern farms in this region is too small, these expensive interventions must be wholly financed or heavily subsidized by the state.

Analysing and comparing the farm irrigation requirements of these two contrasting farming patterns, we suggest that as far as irrigation interventions are concerned the endogenous farming pattern is more adequate and cost effective than the exogenous one. Careful thought should, therefore, be given to which development pattern is most suitable for future agriculture in Trás-os-Montes.

Water Use and Irrigation in the Historically Created Agro-Pastoral Farming System

In this section we describe the structure of the agro-pastoral farming system and the logic of the way it uses natural resources, particularly the use and mobilization of irrigation water. This farming system was widespread in the mountainous areas of Trás-os-Montes during the first decades of the twentieth century[1]. The physical isolation of this area and the

absence of other ways of earning compelled local communities to be self-sufficient in meeting their consumer and reproduction requirements. Thus, production for household consumption and reproduction was the basic objective of each annual farming cycle and the major preoccupation of the traditional farming system. In addition to fulfilling basic subsistence and reproduction needs there was often a surplus. The large farmers (*lavradores abastados*) in particular produced a considerable number of marketable meat calves.

In the mountainous areas of Trás-os-Montes and in Barroso particularly, natural conditions are relatively unfavourable for agricultural production. The physical environment is characterized by steep slopes, high altitudes and a harsh climate which offers sub-optimal growing conditions. Rainfall is high in the cold winter months but in the short, hot summer period the region dries out. Most soils are acid, thin and stony and they are only marginally suitable for agriculture. Arable land is scarce and up to now there have been large extensions of common lands (*baldios*).

A fundamental condition for the survival and development of this farming system was the availability of abundant wage and exchange labour. This cheap labour force was the result of the socio-economic structure of the agro-pastoral society and a weak external development which meant that there were no ways of earning a living apart from agriculture. Social stratification and the diversity of farming reflected the unequal access to land. The *cabaneiros* or the poor did not have access to enough land to produce cereals (rye) to meet their subsistence needs and to reproduce seeds and animal feed essential for autonomous farming. The *cabaneiros* depended on the larger farm holdings for the use of such necessities as draught animals, for example. In turn the *cabaneiros* provided the abundant and cheap labour force needed for the great variety of permanent and seasonal work carried out on the larger farms.

The *lavradores* can be divided into two categories: a group of farmers who tended to be self-sufficient in land and labour as far as their own consumption and reproduction needs were concerned and the *lavradores abastados*. The former group distinguished itself from the *cabaneiros* because it possessed at least one pair of draught animals and enough hay meadows (*lameiros*) to feed them in the winter. The *lavradores abastados*, however, had enough arable land to produce regular surpluses of rye and enough meadows to provide winter forage for a number of cattle, much above draught needs.

The Use of Natural Resources in Farming

Farming was geared to an optimal use of local natural resources and was adapted to ecological and physical conditions. The farmer's strategy was to make the best use of dispersed plots each of which had its own particular land qualities, soil properties, microclimates and hydrological conditions. On these plots the farmer produced the diverse combination of

products necessary for the farm household and for reproducing farming conditions. This led to a specific combination of agriculture and cattle breeding. Not being integrated into external input markets, farming and its reproduction required cattle for draught power and for manure in order to maintain soil fertility. The scarcity of arable land obliged the farmer to adopt a pattern of land use which maximized the production of crops for human consumption. Animal feed was secured by different forage components and from the by-products of food crops such as vegetable wastes, rye straw and stubble and maize stalks which were unsuitable for human consumption.[2] Thus, cattle rearing, the herding of small ruminants and the production of forage crops were based on land resources whose use was not competitive with the needs of human subsistence.

In this farming system different types of land are assigned particular uses. The most important land types and uses, ordered according to accessibility to the farmstead, are:

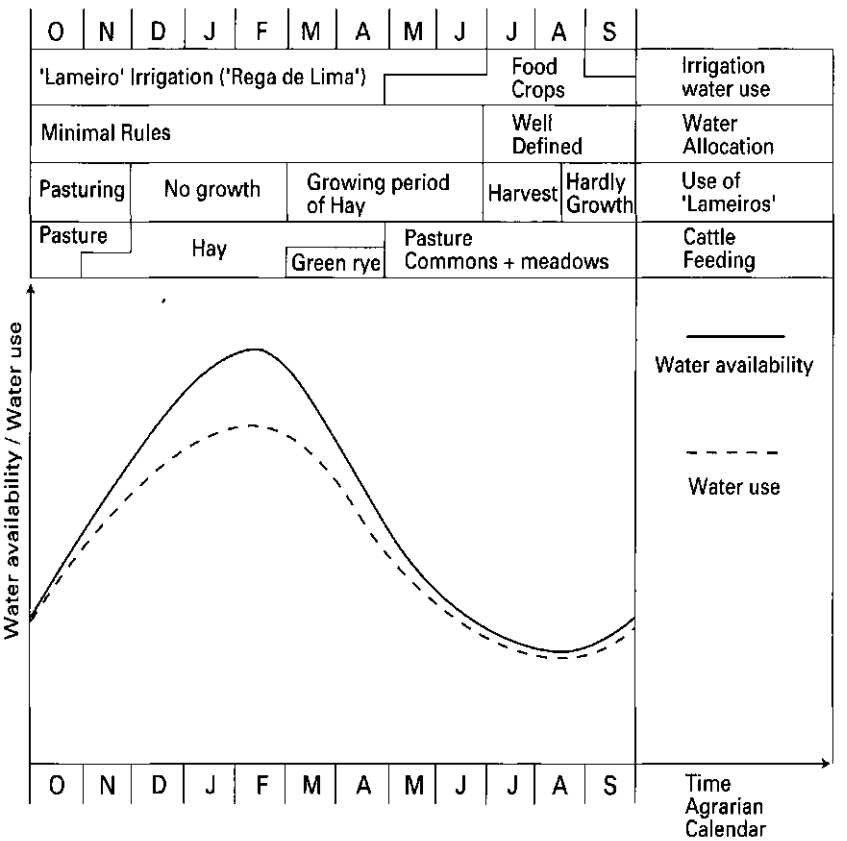
- Small fertile areas close to the villages which are used for food production. These areas are intensively cultivated and usually irrigated in summer. They are largely man-made, soil fertility and landscape being the result of intensive manuring and terracing.
- Permanent natural meadows or *lameiros* used for pasturing and to produce hay for the winter months. A considerable part of the *lameiros* are irrigated during winter and spring. They are located upstream of the summer irrigation areas and can be found near springs and along all permanent and temporary streams.
- Rainfed arable lands, principally used for rye production. Usually the two-year rotation used in these fields is rye and fallow. A small part of the rye crop is used for grazing and collecting green fodder (*ferranha, ferra*) in March and April when cattle forage is most scarce (Lima e Santos 1992: 20; Portela 1988)
- Common lands or *baldios*. Cattle and small ruminants graze on the commons for a large part of the year. Besides being a crucial forage resource, the commons are still used in the age old way for collecting firewood and – very important in farming – raw organic material for cattle beds and organic manure indispensable for the reproduction and fertility of arable lands (Portela 1994). The use made of the commons provides an outstanding example of the local resource base of this type of farming system.

To conclude, the farming system involves the unique social organization of time and space. It also incorporates a meticulous cooperation based on social differentiation. These two elements allow for an optimal use of local resources. Irrigation slots neatly into this framework. It relates to spatial and temporal organization, to differentiation and cooperation, and finally it is an essential mechanism in optimizing the use of scarce resources.

Irrigation in the historically created agro-pastoral farming system

The logic of the farming system with respect to the use of natural resources also reveals itself in the irrigation practices of these farmers. Farm water use and its specific pattern over time is a perfect illustration of how farmers realized their production objectives by making optimal use of available natural water resources (see Figure 1).

Figure 1 Irrigation water use and the agrarian calendar in the traditional agro-pastoral farming system (schematic representation)



The seasonal pattern and availability of natural water in Trás-os-Montes is not favourable to arable crop production. In summer, when growing conditions for food crops are good, irrigation water is scarce. From the logic of the farming system the summer period from July to September is one when the limited amount of water available should be used exclusively to produce the food crops on which the reproduction of the household and the labour force depends. In the period October to June unfavourable food crop growing conditions coincide with an ample supply of water. During this period, water can be used for purposes other than producing arable crops and irrigating the natural meadows or *lameiros* is

a useful and profitable alternative way of using water during this period. Hay produced on the irrigated *lameiros* provides vital forage for the winter months.

To realize the mobilization and use of water, numerous irrigation facilities have been constructed by the people of the mountain communities. These are owned on an individual, family (*herdeiros*), group (*consortes*) and communal (*rego do Povo*) bases. The traditional, communal irrigation systems are particularly important in the mountain environment and they are the most important source of water in the mountain villages. Socio-economic inequalities are strongly reflected in unequal access to scarce irrigation water in the summer and the unequal distribution of the benefits of winter irrigation. This is directly linked to the ownership of the *lameiros*.

Irrigation strategy in the agro-pastoral farming system is strongly dependent upon when and in what quantity water is available. Season-dependent water mobilization and use is also reflected in the spatial configuration of irrigated land resources, the features of irrigation facilities and system management. Irrigation practices and related labour input, irrigated crops, and the location and quality of irrigated plots are adapted to the natural scarcity or abundance of water. Table 1 summarizes the differences between lameiro irrigation and the summer irrigation of food crops.

Irrigation is essential for the quality of a *lameiro*. Local farmers say: 'One never sees a good meadow above the channel' (Jacinto 1993). Two periods can be distinguished in meadow irrigation: the winter period and March-June when the hay grows. In the winter, irrigation protects against the risk of frost. Moreover, the water has considerable manuring value because, with high winter precipitation, fine soil particles and manure are taken up, transported and deposited by the water. This sediment is highly valued by farmers. Furthermore, it is believed that meadow irrigation plays an important role in controlling the growth of vegetation and in determining the composition of the flora (Gonçalvez 1985). The maturing of the hay and its harvest coincide with the period of greatest water scarcity (July-August) when water is being used for arable crops in the summer. After the hay harvest, renewed grass growth – dependent on precipitation, temperature regime and supplementary irrigation – may allow additional pasturing in September-October.

Lameiros are located along all surface streams and in the vicinity of springs. To a large extent, they are quite independent of soil and land qualities. Critical factors, however, are the proximity of water and the topography: gravity irrigation must be possible. The irrigation of meadows is characterized by the use of large quantities of water continually supplied and spread by a dense network of contour ditches. A minimum amount of labour is used. The shared use of irrigation channels by groups of farmers (*consortes*) dominates and within these groups access to water

is often undefined in terms of quantity and time in the 'winter'[3] but it is strictly regulated in the summer when water is scarce.

Table 1 Comparison between Lameiro and Summer Food Crop Irrigation

Characteristics	*'Lameiro'* irrigation	Summer crop irrigation
1 irrigation period	- October-June (the end of this period in many mountain schemes is rigidly fixed)	- July-September (before this, irrigation is hardly necessary)
2 objective(s)/goals	- * protects against frost (in winter) * grass growth (March-June) * manuring value	- water requirements of food crops
3 available water	- abundant	- increasing scarcity in the summer period
4 preferential sources	- * springs (higher temp. in winter) * streams (quantity)	- most productive and constant sources (springs, streams)
5 nature of irrigation	- continuous flow	- intermittent
6 field irrigation method	- overflowing contour ditches (wild flooding)	- furrow/ controlled flow irrigation
7 channel conveyance efficiency	- not relevant	- depend of channel length and improvements (lining)
8 field application efficiency	- not relevant	- near 100% (under-irrigation)
9 labour input	- minimal	- intensive and arduous
10 property regime of irrigation facilities	- small groups (consortes), individual	- the majority of farmers are coowners of communal systems and/or group systems and/or individual facilities
11 access to water/ water rights	- free, minimal rules (except for water mills)	- in communal systems mostly well-defined in quantity and periodicity, in group systems somewhat looser rules

Summer irrigation makes careful use of the small quantities of water available by applying it to the best lands. In many cases, productive water sources[4] are quite far away, and therefore, long supply channels are necessary. Water rights in the summer are well defined in terms of quantity (in units of time or area) and periodicity (irrigation interval). In addition to communal water sources, farmers have also made investments in exploring additional sources of water for individual and group use such as shallow wells and galleries (*minas*). However, water source development was something additional and it was not pursued if it was detrimental to the communal systems. In many villages in the Barroso area, it is still strongly prohibited to explore and develop water sources for individual use if this could affect the water available to the communal irrigation systems (*rego do povo*).

Thus the structure of the historically created agro-pastoral farming system is reflected in the farmer's irrigation practices. Diversity in farming is based on differential access to land resources and farming itself

is based essentially on the use of abundant labour which exploits local natural resources. Prioritizing subsistence and reproduction needs, the farmers use of irrigation water reflects its availability in terms of time and space. This in turn affects the nature of irrigation management and the configuration of the physical infrastructure.

Fundamental traits of this farming system are reflected in the diversity of present day agriculture in Trás-os-Montes. The traditional use of natural resources such as *baldios* as an important forage resource, the use of irrigation water for food crops being given priority when water is scarce in summer and the use of irrigation water outside the summer period on *lameiros* for the hay production that provides the winter fodder are all features of current farming practises. These traits are most clearly seen on the farms that use natural fodder to produce meat as we will see in the following section.

Recent Trends in Agrarian Development

In the last decades, various internal and external factors have undermined the foundations of the historically created agro-pastoral farming system. The natural resource base available to rural people was seriously affected by the implementation of state afforestation schemes which were established on large sections of the commons. These schemes also affected the subsistence of the poor who herded sheep and goats and/or cultivated small plots on the *baldios* and exacerbated the effect of the very limited employment available in Trás-os-Montes outside the agricultural sector. Together these factors, combined with the demand for cheap labour in Western Europe, stimulated the boom in emigration from these areas which has been going on since the late 1950s.[5]

This massive emigration has transformed the social landscape and labour scarcity is one of the starkest realities facing farming in Trás-os-Montes. As the wage labour upon which large farmers depend becomes scarcer, wages increase. At the same time labour resources within farm households have also decreased considerably. Not only was there a decline in the total number of farming households but there was also a clear shift in their composition. The *lavradores abastados* and *cabaneiros* began to disappear and the number of autonomous farmers who worked mainly with family labour increased considerably. In the 1970s, many emigrants returned and invested in setting up and developing farms. Today, members of many farm households are engaged in more than one activity and there is more than one source of income. The economic strategies of rural households are increasingly influenced by incomes that can be generated outside agriculture.

Since 1980, the modernization efforts of the Portuguese government through such programmes as PDRITM (Integrated Rural Development Project of Trás-os-Montes) and PEDAP (Specific Programme for the Development of the Portuguese Agriculture) have stimulated the emergence of

other farming styles and the building of collective milking parlours at village level has considerably increased milk production on small and medium-sized farm in some parts of Trás-os-Montes. The PDRITM farm assistance component and the later '797' projects (investment grants) financed by EEC funds have selectively encouraged a milk production-orientated farm development by introducing technological packages aimed at modernizing farming. Larger farmers whose farms met minimum requirements in farm size and irrigated area could apply for grants and special credit to finance on-farm investments. In the following section we will analyze the irrigation practices and requirements of this exogenous farming pattern and compare it to the endogenous pattern.

Mobilization and Use of Irrigation Water in Two Contrasting Farming Systems

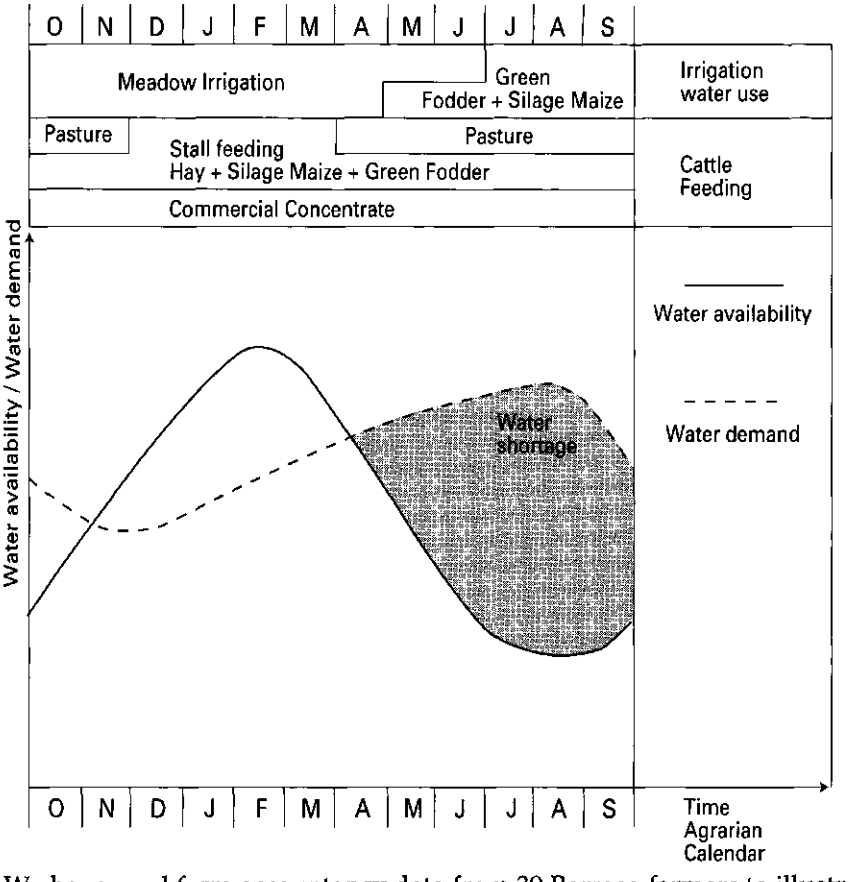
As we have demonstrated before, traditional irrigation practices are intimately linked to the structure of the historically created agro-pastoral farming system. The role irrigation plays cannot be isolated from the direction of agrarian development. In this section we have chosen the two most sharply contrasting agrarian development patterns in Barroso in order to compare the way irrigation water is mobilized and used. Here we depart from the diversity of farming identified in the Barroso area by Cristóvão et al. (1994). Intensive dairy production is a clear representation of the exogenous, modernization-orientated development pattern whilst intensive meat production is closer to the endogenous, traditional development pattern.[6]

The two contrasting agrarian patterns employ very different strategies and sets of practices in the way irrigation water is used and mobilized. These strategies are closely linked to differences in forage production. The endogenous pattern makes intensive use both of *baldio* forage and hay produced on the irrigated *lameiros*. Summer irrigation water is reserved mainly for food crops and forage crops take second place. Concentrates based on rye and maize flour, crop by-products and potatoes are prepared on the farm itself. In fact the use of irrigation water closely resembles the way it is used in the historically created agro-pastoral farming system analyzed in the section before.

The irrigation strategy of the modern milk producers is very different. A direct effect of the exogenous development pattern is an increased need for irrigation water in the summer. In contrast to the endogenous pattern, *baldio* forage is superfluous on these farms. There are various reasons for this. First, pasturing in the *baldio* involves too much walking for a milk cow and this is detrimental to production. Second, compared to the traditional meat cow (Barrosão) the modern milk cow (Friesian) is not adapted to the harsh *baldio* conditions. Third, the *baldio* forage is not optimal fodder

for milking cows. To compensate for this source of forage, forage crops need to be cultivated in the summer on arable land. To achieve a high milk production, these crops must have a high nutritional content. Silage maize and the temporary meadows are preferred[7] because, with a high volume of external inputs, they produce higher yields and demand less labour. However, to grow high-yielding summer forage crops, irrigation is essential. Thus, in the exogenous farming pattern, the balance between water availability and demand is weighted in the direction of a greater scarcity of water (see Figure 2 and compare with Figure 1).

Figure 2 Balance of Water Availability and Demand in the Exogenous Farming Pattern (Schematically)



We have used farm accountancy data from 39 Barroso farmers to illustrate the difference in irrigation water use in these two contrasting farming systems.[8] This data came from the archives of the farm accountancy office, *Centro de Gestao*, in Salto. An analysis of this data (see Oostindie *et al.* 1993) resulted in the identification of various farming patterns in which the modern intensive dairy producers (exogenous farming pattern) and the

intensive meat producers (endogenous farming pattern) are clearly recognizable. In order to compare them we calculated parameters and indicators of irrigation water use. Relationships between the use of irrigation water and farming characteristics as well as between the use of irrigation water and the economic results of these groups were estimated. The calculation model with its variables, assumptions and algorithms can be found in Appendix 1. Table 2 summarizes the results of irrigation water use in the contrasting farming patterns.

Table 2 Comparison of Irrigation Water Use in Contrasting Farm Patterns

Parameters/ Indicators	Unit	Endogenous N=12	Exogenous N=6
a % SAU irrigated total	%	56	70
b % SAU irrigated *lameiros*	%	38	33
c % SAU irrigated summer crops	%	17	35
d % SAU irrigated summer forage	%	13	30
e irrigated *lameiros*/summer forage acreage	-	2.9	1.1
f % silage maize+temporary meadows acreage of SAU irrigated summer crops	%	3	38
Acreage per cattle unit			
g non-irrigated *lameiro*	ha/CN	0.17	0.14
h green rye (*ferra*)	ha/CN	0.07	0.01
i. irrigated *lameiro*	ha/CN	0.21	0.37
j irrigated summer forage	ha/CN	0.07	0.32
k total irrigated land	ha/CN	0.28	0.69
l silage maize+temporary meadow	ha/CN	0.00	0.13
m use of *baldio*		yes	no
Purchased cattle feed per cattle unit			
n purchased concentrate	ct/CN	9.6	34.2
o purchased forage	ct/CN	0.5	0.3
p scarce summer water requirements per cattle unit	m3/CN	140	650
q net income per total irrigated acreage	ct/ha	200	100
r net income per summer forage irrigation acreage	ct/ha	1350	230
s gross income per m3 scarce summer water	esc/m3	660	210
t net income per m3 scarce summer water	esc/m3	500	110

Notes:
- Average values of the two groups of farmers, based on data for 1989.
- Abbreviations.
  N: size of the sample
  SAU: 'Superficie Agricola Util' or farm acreage
  ct: 'conto'. 1 ct=1000 escudos (165 esc.=1 US$ in 1989)
  CN: 'Cabeça Normal' or cattle unit (1 milk cow = 1.5 CN and 1 meat cow=1 CN)

When the data in the table is examined, marked differences in the way the two types of farming use irrigation water become apparent.

- The percentage irrigated farm acreage (parameter a) in the exogenous pattern is about 15 percent higher than in the endogenous pattern. This difference increases if we compare the average SAU irrigated per cattle unit (parameter k): 0.28 ha/CN in the endogenous vs 0.69 ha/CN in the exogenous pattern – a difference of 150 percent. This demonstrates clearly that 'modern' farmers are more dependent on forage produced using irrigation water and on irrigable land.
- The dominance of the irrigated *lameiros* (parameter e) in the endogenous pattern points to the firm linkage between natural water supply and actual water use. In the exogenous pattern a clear shift towards summer irrigation takes place, making increasing demands on irrigation water when it is most scarce. This becomes more obvious when the estimated summer irrigation water requirements per cattle unit (parameter p) in the different 'patterns' employed to produce irrigated fodder are compared, an average of about four times more scarce water per cattle unit is needed on the 'modern' farms than on the 'traditional' farms.
- Another striking phenomenon in the exogenous pattern is the considerable use of silo maize and temporary meadows: about 40 percent of the summer irrigation acreage (parameter f). These crops are scarcely present in the endogenous pattern in which the main irrigated summer crops are maize for grain, potatoes and green forage maize. The traditional use of green rye (parameter h) is largely absent in the exogenous pattern.
- In addition, irrigated acreage per cattle unit is much higher and the exogenous farming pattern also depends much more heavily on purchased concentrate (parameter o).
- If we suppose that feed requirements per cattle unit are more or less equal in the two patterns then it follows that there is an intensive use of *baldio* forage in the endogenous pattern. The second important forage resource is the irrigated *lameiros* which occupy an average of 75-80 percent of irrigated land resources (parameter b/parameter a) and about 40 percent of total land resources (parameter b). The irrigated summer forage (with 10 to 15 percent of the total SAU: parameter d) has clearly only a supplementary role.

Economic Returns of Irrigation

We will now compare the productivity of irrigation in the two farming patterns in economic terms (see Table 2). To estimate the productivity of the irrigated area we link this parameter to net farm income. We can conclude that, on average, for the same net income per farm, about twice as much irrigated land is needed in the exogenous pattern as in the endogenous pattern (parameter q). Linking the net incomes of the farms to the estimated, irrigated, summer forage area (parameter r), the difference increases by a factor of about 5 or 6.

The productivity of irrigation water can also be estimated. This requires a clear distinction between the irrigation of *lameiros* and summer irrigation. Because water in *lameiro* irrigation is not a scarce resource, its productivity is a meaningless parameter. This is not the case in summer irrigation where scarce water is used. The principal difficulty in estimating the productivity of summer irrigation water is the lack of data about the actual amounts of water used. Here we have estimated total irrigation water requirements for summer forage crops (see Appendix 1) according to the empirical cropping patterns of the farms. Using this as a proxy for actual water used can be justified in this case because our main objective is to show that there is a clear productivity difference between the two patterns. It is perhaps not unreasonable to expect that the difference in actual water use between the farming patterns is more than the difference in calculated crop water requirements because the crop mix in the exogenous pattern is more sensitive to water stress than the crop mix in the endogenous pattern.[9]

The calculated water requirements are linked to net farm income (parameter t). We can therefore conclude that, on average, for the same net farm income, four to five times more scarce irrigation water is required in the exogenous pattern than in the endogenous pattern. In many respects the data presented here contradicts the assumptions upon which the dominant modernization model is built including the argument that there is a linear cause-effect relationship between increased water use and farm development: 'More water yields more and improved forage; this allows for a higher animal production; this raises the productivity of both land and labour and will result in higher farmers income. It also gives room for investment and modernizing production methods etc.'.

Impact of Contrasting Farming Patterns

Potential Impact of Contrasting Farm Development Patterns on Resource Use

A rather simple technique has been used in a first attempt to reach an impact assessment of exogenous and endogenous development involving an extrapolation to the regional level of the hidden potentials of the contrasting farming patterns.

On the basis of an analysis of farm accountancy data (see Table 2), we can compare the potential impact of the contrasting farm development patterns on resource use and employment (see Table 3). We will do this by comparing the land and water resources required by the two patterns in order to obtain the same income per labour unit. In other words, how many labour units could earn a reasonable income from a certain area given its land and water resources and assuming the presence of one farming pattern in that area.

From Table 3 it follows that to obtain the same labour income in the endogenous pattern as in the exogenous pattern (540 ct/l.u) requires – *ceteris paribus* (i.e. the same price relations milk/meat, input prices, management etc.) – an acreage per labour unit of (540/412)*3.8= 5 ha or 12 cattle units per labour unit, corresponding to an increase of scale of ((540/412)-1)*100=30 percent. Under this condition, the same labour income as in the exogenous pattern may be realized in the endogenous pattern using about 25 percent (=100*(1-5/6.9)) less land and about 75 percent (=100*(1-1680/7180)) less scarce water than in the exogenous pattern. Extrapolated to a regional level this means that the endogenous pattern potentially offers about 40 percent (=100*(6.9/5-1)) more labour opportunities, given the same average labour income, than the exogenous farming pattern.

Table 3 The Potential Impact of Contrasting Farming Patterns Based on the Differential Use of Land and Irrigation Water Resources

Parameters	Unit	Endogenous (N=12)	Exogenous (N=6)
(1) Acreage per labour unit (l.u)	ha/l.u	3.8	6.9
(2) Net income per labour unit	ct/l.u	412	540
(3) Cattle density	CN/ha	2.4	1.6
(4) Cattle units per labour unit	CN/l.u	9.1	11.0
(5) 'scarce' water requirements per cattle unit	m3/CN	140	650
(6) 'scarce' water requirements to realize (2): (4)*(5)	m3	1280	7180
Suppose that the net income per labour unit in the two farming patterns is equal (540 ct/l.u) then the outcomes are:			
(1) Acreage per labour unit	ha	5.0	6.9
(4) Cattle units per labour unit	CN/l.u	12.0	11.0
(6) 'scarce' water requirements to obtain net income	m3	1680	7180

Note: values are averages of the two contrasting patterns.

Before commenting on these findings we will first discuss a number of interrelated issues. These include increasing competition over scarce water, the development perspectives of the exogenous farming pattern in relation to actual irrigation resources, and how far actual irrigation interventions are adequate to accommodate the demands for irrigation in the exogenous farming pattern.

Competition over Scarce Water

The greater water requirements of the modern milk producers can be a serious constraint both at farm and local level. At the village level, the introduction and development of this modern farm pattern with its need for considerable amounts of water in the summer months competes with the need other farmers have for irrigation water.

We will illustrate this by an example which, although hypothetical, is close to a real-life situation. In an ordinary mountain village with 50 resident families (125 persons) we assume an average water consumption per person in July and August of 200 l/day. This also takes into account the water needs of emigrants on holidays. For these two critical months this means a total of 0.2*60*125=1500 m3. Suppose that an equal amount of water is required for the cattle and assume that the irrigation water requirements for the village's food production amounts to: 0.20 [ha/fam.]*50 [fam.]*2500 [m3/ha]=25000 m3. Combining household, cattle and irrigation water requirements results in a demand for a net continuous stream flow of nearly 6 l/s in these months. This volume does not take into account the needs of irrigated summer forage. There is enough empirical evidence from source and channel flow measurements taken in 1992/1993 (van den Dries *et al.* 1994; Marques *et al.* 1994) to indicate that the majority of traditional communal irrigation systems in Barroso and other mountain areas cannot deliver this quantity of water during the summer months.

This is a hypothetical example abstracted from the complexity and diversity of local situations, the availability of other water sources and local adaptations to water scarcity but it clearly indicates that the global balance between water demand and water availability at village level in the summer is very precarious. According to our analysis of farm accountancy data, the introduction of one 'modern' farm with 20 milking cows requires about 30 [CN]*650 [m3/CN] =19500 m3. That corresponds to a net continuous stream flow of 4 l/s in the two driest months, more than 50 percent of the vital water needs of our hypothetical village.

Therefore it can be expected that the policy of support to the development of exogenous farming patterns will lead to an increasing competition for scarce water resources. Taking the increasing demands for drinking water and other uses into account, the consequences of this competition could be to increasingly undermine traditional irrigation systems, over exploit groundwater supplies and the introduction of an 'underhand' redistribution of available water resources. These processes are still felt less in Barroso than in other parts of Trás-os-Montes (in particular the milk basin in the high valleys) because 'modernization' has not penetrated there with the same intensity as in other parts of Trás-os-Montes. Also the traditional 'communitarian' institutions in Barroso are not yet so eroded as they are elsewhere.

The Exogenous Farming Pattern: a Frustrated Development Perspective

The exogenous farming pattern involves a competition for scarce water and its development is often seriously constrained by the physical lack of water and the lack of access to scarce summer water. Water is a limiting factor in exogenous farming. Room for increasing the supply within existing irrigation facilities is generally limited and farmers frequently refer to these problems. In some cases there are simply no physical possibilities of securing more water, in others exploring new sources of water has produced few results. For instance, a young 'modern' farmer with 20 milk cows in the village of Bosto Frio explained to us the problems he confronts. The 'lameiros' he exploits (all rented) are not providing enough hay for his cattle and he needs to buy considerable additional quantities of hay. The production of silage maize is far under the potential production because of lack of water. He has not the quantity and quality of fodder which the cows need so they give less milk. Other farmers have already made attempts to find more water by constructing new sources (shallow and deep wells) but these attempts failed. He depends on the communal irrigation system (*rego do povo*) so his only hope of more irrigation water is that this system will be improved. However, this probably will not solve his problem for three reasons: first, water availability at the water source of this system is limited (measured in August 1992 it has a stream flow of about 7 l/s); second, this implies that potential water gains as the result of any improvement are also limited (probably in the order of 2-3 l/s); third, this additional water must be shared by all households in the village. For instance, a young 'modern' farmer with 35 milk cows from the village of Morgade has tried to increase and individualize access to water by constructing one deep well, two shallow wells and two reservoirs. He has succeeded only partially and still depends on the traditional irrigation system (rego do povo) for the irrigation of 13 plots. Even in this situation, he is strongly dependent on neighbours who lend water to him (*emprestimo de vizinho, pede se ao vizinho*). Some farmers, in fact, find the investments needed to explore for new water sources too high or too risky even with the help of subsidies. To be eligible for subsidy a deep well needs to yield more than 0.5 l/s. But it is only possible to know this after the deep well has been constructed and the costs (about 200 to 300 contos/deep well) have already been made. If the deep well yields less than 0.5 l/s one does not receive the subsidy.

The demands for irrigation in the exogenous farming pattern is not limited to higher irrigation water requirements. Factors closely linked to limited water availability in traditional irrigation systems are labour intensive irrigation practices and irrigation management designed to secure the distribution of a scarce resource. A successful implementation of the exogenous pattern implies the imposition of other organizational principles and practices that differ from those present in the traditional irrigation systems.

In the first place, an optimal production of modern fodder crops such as silo maize and temporary meadows require a type of irrigation scheduling in which the crop's water requirements determine irrigation applications in time and quantity. However, this crop-based irrigation is in contradiction with the supply-driven character of traditional irrigation systems. In these systems, irrigation practices are bound to traditional rules reflecting social agreements over sharing scarce resources. This implies that irrigation schedules and distribution sequences are fixed. The length of the irrigation interval, the duration of an irrigation turn and the moment of field application are predetermined by the distribution of irrigation water according to defined water rights. Some flexibility is possible but involves high transaction costs such as those involved in negotiating water exchanges. Therefore, in the exogenous farming pattern there is a strong tendency to individualize access to water. Second, traditional irrigation practices are very labour intensive. This clashes sharply with the lack of labour which is the most limiting factor in the exogenous farming pattern (Ribeiro 1992; Lima e Santos 1992).

We can therefore say that there is no room to accommodate the irrigation demands of the exogenous pattern within the traditional irrigation schemes because of the shortage of irrigation water, a supply-driven irrigation management that is focused on the distribution of a scarce resource and labour intensive irrigation practices. To develop the exogenous farming pattern further it would be necessary to create a favourable irrigation environment which in turn would require huge investments in water resource development.

Actual Irrigation Interventions

Irrigation interventions are an important part of the programmes aimed at modernizing agriculture in Trás-os-Montes. Since 1982, the Portuguese government has been involved in modernization programmes financed by World Bank loans (PDRITM) and the structural adjustment funds of the CEE (PEDAP). In these programmes, irrigation development is considered a *basic condition* in transforming traditional agriculture into a more modern form.

The government have created and support three different irrigation intervention programmes:

- *Improvement of traditional irrigation schemes* (MRT). Until now, this intervention programme has been the most important in terms of impact. MRT: *Melhoria de Regadios Tradicionais*. By July 1992, about 150 irrigation systems had been improved in Trás-os-Montes, and another 100 schemes are scheduled before 1996. The PDRITM intervention programme for the improvement of communal farmer-managed irrigation schemes aims at developing intensive dairying based on increased forage production. The type of interventions are conceptually not very different from the initiatives which the farmers communities had

already undertaken themselves. This approach respects the existing local situation with its intricate complexities and does not change the functioning of the irrigation schemes but focuses on the improvement of their physical infrastructure, essentially by limiting water losses through lining irrigation channels and reservoirs.

It was assumed by PDRITM planners that MRT would contribute substantially to the modernization of agriculture but this was not the case (van den Dries *et al.* 1993a and 1993b). The most important reason for this was that the expected benefits from the MRT intervention in terms of increases in irrigation water, irrigated land and irrigated fodder were grossly overestimated. It has been concluded that the MRT intervention is only marginally suitable to respond to the development needs of the exogenous farming pattern. However, for the development of endogenous farming systems, the improvement of traditional irrigation systems could be a meaningful intervention (see next paragraph).

- Creation of individual irrigation facilities (PRI). In 1991, 152 projects have been implemented in Trás-os-Montes with an average area of 4.6 ha/project and average investment costs of 610 ct/ha (DRATM 1992). The development of individual water resources has been stimulated by subsidies from state funds. This programme is highly selective because eligibility for subsidy is linked to investments already carried out in the context of '797' projects. There are no criteria when selecting projects for subsidy that cover interference with traditional water sources. Thus, potentially, these interventions could contribute to undermining traditional irrigation facilities and effect an underhand redistribution of the water available. Whilst interventions may well have harmful effects locally, they are unlikely to make a significant contribution to the water requirements and development demands of the exogenous farming pattern. That is because the sources have generally low water yields (mostly: << 1 l/s), thus a multitude of individual sources are needed to respond to the water requirements of one 'modern' farm (as has been shown above, a 'modern' farm with 20 milk cows requires a net continuous stream-flow of about 4 l/s at least in the two driest months). Even if water requirements could be covered by individual sources, it does not mean that other problems linked with irrigation are resolved, for instance, the high labour demands of irrigation activities. Even new irrigation methods such as sprinkler irrigation (recently being introduced) have a reduced labour saving potential because of the scattered and small size of the farm plots (much labour is required to move pumps, tubes and sprinklers from one field to another field for example).
- New, collective irrigation perimeters (NRC). 12 schemes are planned (Pinto 1991), two of which are actually functioning. Recently a shift has taken place from the MRT intervention towards this type of intervention. This intervention will create new water by storing excess winter

precipitation. In these schemes, summer water availability will increase enormously as the result of constructing medium-sized dams and storage reservoirs with capacities in the order of a million m3 per scheme sufficient to irrigate somewhere between 100-300 ha. This intervention seems the only adequate response to the water requirements of the exogenous farming pattern. However, even when the problem of water availability is resolved other problems will emerge such as the scattered nature of plots which inhibits efficient water distribution and labour-saving irrigation practices.

It is clear that the exogenous farming pattern requires huge investments in water resource development. According to data from the Regional Director of Agriculture in Trás-os-Montes, the new collective irrigation perimeters have cost about 2100 contos/ha (DRATM 1992) of public investment. Compared to the average MRT-investment costs of about 240 contos/ha, NRC investment is nearly nine times more expensive.

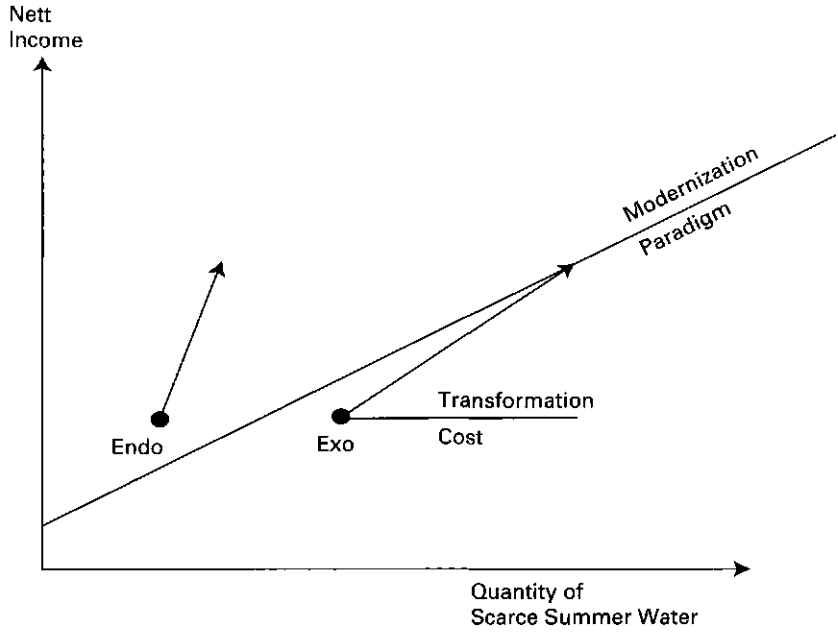
Implications for Interventions and Policy

The two contrasting farm development patterns have different implications for irrigation interventions. Figure 3 shows the relationship between the increase of net income and the increase of scarce summer water for the two contrasting farming patterns. We have shown in Section 3 that an increase of net incomes in the endogenous pattern depends to only a very small extent on increases in scarce summer water. The development of the exogenous pattern, however, is very much dependent on increases in scarce summer water.

The exogenous pattern claims to increase farmers incomes by transforming farming and production conditions. As far as irrigation is concerned the exogenous development pattern marks a rupture with the traditional use and mobilization of water. It requires a supply of irrigation water far beyond the amount of water available during the summer months. In the foregoing section, it has been shown that there are serious social and physical constraints to increasing the quantity of scarce summer water to any substantial degree. Thus, the development of this pattern implies high transformation costs, both internally and beyond the boundaries of the individual farm.

Earlier (see Table 3) it has been shown that the endogenous farming pattern has the potential to create more income and employment on a regional scale than the exogenous pattern. Given the same budget, a higher impact can be achieved by developing endogenous farming patterns through suitable interventions (irrigation and others) than by developing exogenous farming patterns which require high transformation costs such as the construction of NRCs.

Figure 3 Relation Between Net Income and the Availability of Scarce Irrigation Water in Two Contrasting Farming Patterns (exogenous and endogenous)



There are also other reasons why the viability of the exogenous agrarian development patterns and their contribution to regional agrarian development in Trás-os-Montes conditions are questionable. First, this type of farming is dependent on external input and output markets for bulk products. Increasing competition at global level and the marginal production conditions in Trás-os-Montes offer gloomy perspectives for farms dependent on such markets. Second, the development of the exogenous pattern requires voluminous resources in the institutional and financial sphere. Moreover the number of farms which profit from the support given to modernization is very limited because only farms with a minimum quantity of land and irrigated areas are eligible and this automatically excludes the great majority of farmers in the region (Oostindie et al 1994).

The farm sample showed that the average net income per hectare for the endogenous pattern (121 contos/ha) is higher than for the exogenous pattern (103 contos/ha). However, the reverse is true for the net income per labour unit (see Table 3). Earlier in this chapter we saw that an increase in net incomes per labour unit in the endogenous pattern is related first to an increase in scale (acreage per labour unit, number of cattle per labour unit). If this increase in scale is possible it follows that in

the endogenous farming pattern the same labour incomes can be achieved as in the exogenous pattern but on a smaller area and with less use of scarce irrigation water If, moreover, the meat will fetch higher prices because of its better quality (beef produced under ecological sound conditions that help maintain the landscape) then the advantages and profitability of the endogenous pattern when compared to the exogenous pattern become clearer still. A low external input combined with higher output prices implies a higher local added value. Essentially, there is potential for increasing incomes and employment in the endogenous farming pattern and this is a crucial condition for preventing the further desertification and abandonment of the rural areas.

We have shown that in Barroso and in other mountain areas in Trás-os-Montes, building on and developing endogenous farming patterns has a greater potential impact for regional development than the development of exogenous farming models. This statement has far reaching implications for policy and interventions. First, state support which up to now has been almost exclusively concerned with the development of exogenous farming patterns, must be reorientated to support the development of endogenous farming. Second, it raises a number of questions: which support actions to farmers are the most effective? What technology and mechanization could be developed for profitable farming in the mountain areas? How could institutions support the process of marketing and commercializing quality meat?

In terms of the irrigation development wanted in this area, it can be said that as far as the development of endogenous farming patterns is concerned it is neither necessary or desirable to make huge investments in water resource development by constructing dams. In addition, it would be potentially dangerous to support the development of individual sources of water because this stimulates the redistribution of available water resources and undermines traditional irrigation systems.

To develop the endogenous pattern of quality meat production, two specific support actions in the sphere of rural engineering and irrigation seem to be particularly important. These support actions are primarily aimed at increasing scale and/or labour productivity.

Development of Adequate Technology and Mechanization

To increase both scale and labour productivity, the mechanization of farm activities is crucial. One of the most labour intensive activities in the endogenous pattern is the production of hay. In our opinion, it is one of the activities in which gains in labour productivity can be achieved. Overwhelming evidence exists to show that the labour requirements related to the management, maintenance and harvest of the lameiros is an important limiting factor. This lack of labour has led to a gradual marginalization, extensification (for instance using the *lameiros* only for pasturing) and abandonment of many *lameiros*, in particular those that

require too much labour to harvest them. Farmers abandon their own low quality lameiros and at the same time hire good lameiros from other farmers (Jacinto 1993). The existing supply of mechanization is not adapted to the field conditions of steep slopes, precarious drainage, difficult access and small plots.[10] A crucial support in increasing scale and/or labour productivity would be to design and develop a proper supply of technology.

Revitalization of Traditional Irrigation Systems

In contrast to the exogenous farming patterns, the demands that the development of the endogenous farming patterns pose to irrigation can be realized within the framework of existing, traditional, physical and social irrigation infrastructure. However, the way traditional irrigation systems and practices function need to be revitalized. These systems and practices have been created over long periods of time by the local society and its agriculture. However, local society, agriculture and the environment in which they are embedded have changed a great deal over the last decades. The most drastic change affecting rural society and agriculture in recent years continues to be the massive emigration from the rural areas resulting in an ageing rural population, a decrease in the importance of food production, an extensification of land use and the increasing importance of off-farm work and pluriactivity. To recapitulate, traditional agriculture has faced an overwhelming lack of labour and, in fact, labour has become the most scarce farming resource. In particular, labour scarcity clashes with the labour intensive and arduous nature of traditional irrigation practices.[11]

Although conditions have changed considerably, irrigation facilities, and water management in particular, lag behind in adapting to these new conditions and there is a need to develop actual irrigation systems and irrigation practices further. Adequate improvement plans for traditional irrigation systems must focus on lowering the amount of labour and the drudgery involved in irrigation activities. The amount of labour time made available in this way could be used for other farming activities (a scale increasing potential).

Although irrigation interventions have not had the response that programme planners would have wished,[12] the MRT intervention is an important step in the direction of a meaningfully improvement in traditional irrigation systems. Water users are appreciative of the multiple benefits of the MRT-interventions (Portela *et al.* 1985, 1987; Portela 1990). Water availability has increased, especially during the summer period, and this protects crops from wilting. Another important effect is that the labour burden associated with irrigation has diminished: irrigation is less time consuming and involves less physical effort and hardship and the labour input needed for maintaining and reconstructing temporary weirs has decreased.

But the impact of the MRT intervention is limited by the nature of MRT itself. The actual MRT intervention can be characterized as a means-centred intervention rather than a goal-centred intervention. This means that MRT-interventions are limited to the use of a priori, fixed, uniform means (reducing water losses through lining irrigation channels and other infrastructure) that assume that the desired goals (related to agricultural development) will be realized in a deterministic linear way through increased water use. Because of the diversity present in the local environment this means-centred approach has resulted in rather heterogeneous outcomes and a limited impact. The effects of intervention are far from equal for the different systems and water users. The impact in terms of production appears to be limited.

MRT interventions have been confined to a standard repertoire of technical measures to increase water availability. However, there is room to improve the functioning of the traditional systems by creating more adequate irrigation facilities and by improving traditional water management practices so that they are better adapted to changing farmer's goals, resources and conditions. Broadening the scope of MRT technical measures in this way signifies a step forward when compared to actual intervention. This broadened MRT intervention which is more focused on realizing local development potential, will have more impact than actual intervention. The improvement of traditional irrigation practices and its translation into technical measures and management changes are outside the scope of this paper but will be elaborated in a forthcoming publication by van den Dries (1995).

Conclusions

We have tried to show that the way irrigation water is used and the role that irrigation plays cannot be isolated from the direction of agrarian development. The farming patterns which show the most contrasts in terms of exogenous and endogenous development contain very significant differences in terms of irrigation water use and mobilization. The main conclusions we draw here are:

- the requirements of summer irrigation water per cattle unit are much higher in the exogenous than in the endogenous farming pattern. The exogenous pattern needs relatively large amounts of irrigation water in the period when water is most scarce.
- the input/output relations in terms of economic returns per unit of scarce irrigation water are much more efficient within the endogenous pattern.

These conclusions are of particular relevance because although the exogenous farming pattern is an inefficient water user, the transformation and transaction costs necessary for its development are shifted from the

level of the farm enterprise to the local and/or national level. At the local level, the development of exogenous farming patterns lead to an increasing competition for scarce water resources. A consequence of this competition could be the undermining of traditional irrigation, over-exploitation of water resources and an 'under-hand' redistribution of available water resources. At the national or supra-national level, massive public investment is required to create an environment in which the modern farm is able to develop, for example, by constructing dams and huge storage reservoirs.

It can be concluded that, in terms of impact, the endogenous farming pattern based on the sustainable use of natural resources is the most adequate development pattern. Extrapolated to a regional level, endogenous development produces a higher added value and more employment opportunities. However, it does mean that in policy, a shift from support for exogenous development to endogenous development is necessary. In particularly, irrigation interventions need to be reoriented to support this type of agrarian development.

ANNEX 1 Calculation model used for the comparison of water use in the exogenous and endogenous farming patterns. Variables, assumptions and algoritms

* VARIABLES:	UNIT
- v1 : SAU total	(ha)
- v2 : SAU irrigated	(ha)
- v3b : SAU potato	(ha)
- v3c : SAU green forage maize	(ha)
- v3d : SAU fodder beets	(ha)
- v3e : SAU corn maize	(ha)
- v3f : SAU green rye forage	(ha)
- v4 : SAU silage maize	(ha)
- v5 : SAU temporary meadows	(ha)
- v3 : SAU 'lameiros'	(ha)
- UHT : Labour unit	(UHT)
- v25 : Sold potatoes	(ct=1000 esc.)
- v9 : Standard unity meat cattle	(CN)
- v9a : Standard unity milk cattle	(1.5*CN)
- v17 : purchased concentrate	(ct=1000 esc.)
- v18 : purchased forage	(ct=1000 esc.)
- v29 : output meat production	(ct=1000 esc.)
- v30 : output milk production	(ct=1000 esc.)

* ALGORITMS AND ASSUMED RELATIONS

(1) Cattle density: (v9+1.5*v9a)/v1 (CN/ha)

It is assumed that 1 milk cow=1.5*CN and 1 meat cow=1 CN

(2) % SAU irrigated: 100*v2/v1 (%)

(3) SAU irrigated summer crops: v3b+v3c+v3d+v3e+v4+v5 (ha)

(4) % SAU irrigated summer crops: 100*(3)/v1 (%)

(5) SAU irrigated 'lameiros': v2-(3) (ha)

(6) % SAU irrigated 'lameiros': 100*(5)/v1 (%)

(7) proportion lameiro/summer irrigation: (5)/(3) -

(8) SAU non-irrigated lameiros: v3-(5) (ha)

(9) % SAU non-irrigated lameiros : 100*(v3-(5))/v1 (%)

(10) acreage irrigated lameiros' per Cattle unit: (5)/(v9+1.5*v9a) (ha/CN)

(11) acreage non-irrigated lameiros per Cattle unit: (8)/(v9+1.5*v9a) (ha/CN)

(12) SAU irrigated area for subsistence needs: 0.15*UHT (ha)

It is assumed that 1 UHT need about 0.15 ha irrigated summer area for subsistence needs.

(13) SAU potatoes sold: v25/240 (ha)

It is assumed that average yield potato crop is 10,000 kg/ha and average price for potatoes sold is 24 esc./kg

(14) SAU irrigated summer forage: (3)-0.15*UHT-v25/240 (ha)

under the condition that (14) >v3c+v3d+v4+v5

(15) acreage irrigated summer forage per cattle unit: (14)/(v9+1.5*v9a (ha)

(16) % SAU irrigated summer forage: 100*(14)/v1 (%)

(17) SAU irrigated 'modern' summer forage crops: v4+v5 (ha)

(18) % irrigated 'modern' summer forage of total area summer irrigation:

100*(v4+v5)/(3) (%)

(19) area modern irrigated summer forage per cattle unit:
(v4+v5)/(v9+1.5*v9a) (ha/CN)

(20) area green rye forage per cattle unit: v3f/(v9+1.5*v9a) (ha/CN)

(21) purchased concentrate per cattle unit: v17/(v9+1.5v9a) (ct/CN)

(22) purchased forage per cattle unit: v18/(v9+1.5*v9a) (ct/CN)

(23) irrigation requirements of summer forage: 1500*v3b+1500*v3c+2500*v3d+
2500*v3e+2500*v4+2500*v5-2500*0.15*v7-1500*v25/240 (m^3)
under the condition that (23) > 1500*v3b+2500*(v3d+v4+v5)
Estimated average net crop irrigation requirements in the summer period in Barroso are:
potato and green forage maize: 1500m^3/ha; other crops: 2500m^3/ha

(24) 'scarce' summer water requirements per cattle unit:
(23)/(v9+1.5*v9a) (m^3/CN)

(25) bruto income per unity scarce water: 1000*(v30+v29)/(23) (esc./m^3)

Notes

1 This historically created agro-pastoral farming system found its clearest expression in Barroso in the period before 1940 and is described and analyzed by José Manuel Lima e Santos (1990, 1992). However, the main structural features of this traditional farming system have existed in other parts of Northern Portugal and have been referred to by geographers such as Taborda (1932) and Ribeiro (1987). Case studies by O'Neill (1978) and Portela (1988) describe in detail similar farming systems in the *Terra Fria* ('cold land') that are made up of the *concelhos* of Vinhais and Braganca. Black (1992) does the same in a study of the Alvão mountain chain. The fundamental structure of this traditional farming system remained unimpaired until about the end of the 1950s when massive emigration took place. At this time the most important pillar of the historically created agro-pastoral farming system collapsed, i.e. the presence of cheap, abundant labour. But traditional farming practices continue to have a great influence in present farming.

2 The following data is given by Lima e Santos (1992: 85) on the composition of cattle feed consumption (in terms of energy equivalents) in the agro-pastoral system:
- Pasture in the *baldio*: 77%
- Pasture in the *lameiros*: 5 %
- Hay in the *lameiros* 13%
- turnip and potato 3%
- concentrate of rye 2%

This data shows clearly that in the agro-pastoral system cattle hardly competed for arable land resources as far as the production of cattle forage is concerned. The data also illustrates the dominant role of the *baldio* as forage resource.

3 One general rule is that if a farmer is present on his *lameiro*, it will be considered an offense if another water user cuts off the water flow to this *lameiro*. The other water user has to wait till the first farmer leaves his *lameiro*.

4 Local topography and the localization of productive sources are crucial factors in the configuration of traditional irrigation systems. In the mountain areas two situations are frequently found: a) the water from permanent streams is channelled or b) the water yielded by a combination of springs localized in upstream *lameiros* and/or *baldios* are

canalized to the summer areas (as local people say: *'a agua nasce nos lameiros de cima'* or 'the water is born in the upstream meadows').

5 The population of the district of Vila Real decreased by about 19 percent between 1960 and 1981. In the rural area of Barroso the population decreased by nearly 35 percent in the same period (Census data in Ribeiro 1992). According to preliminary data from the 1991 census, in the last ten years the population of Trás-os-Montes decreased by more than 50,000 persons, this being more than 10 percent of its total population. In some rural zones decreases of up to 30 percent have taken place in the same period.

6 However, induced by recent policy changes, a clear tendency to produce meat by more exogenous farming practices has emerged. In terms of external inputs this means pesticides, fertilizers, fattening of meat calves on the basis of milk powder etc., fodder crops (silo maize etc), technology and investment subsidies ('797' projects) so characteristic for the modern milk producers. In the category of milk producers, essential differences in farming practices exist between the modern milk producers and the small milk producers linked to a collective milking parlour (SCOM) which represents a more endogenous farming pattern.

7 In this respect it is relevant to note that within the category of farmers oriented to milk production a clear difference in farming practices and forage production strategies exist between the 'modern' and the small/medium milk producers linked to collective milking parlours (or SCOM: *'Sala Collectiva de Ordenha Mecanica'*). SCOM-farmers incorporate important traditional practices in their farming. For instance, hay from the *lameiros* remains the basic fodder. This is supplemented by other traditional forage crops cultivated on irrigated and non-irrigated land. In the mountains green rye, fresh grass (*lameiros de erva*), green forage maize and turnips are the most important. In the high valleys, a greater variety of annual forage crops (green rye, oats, green forage maize, turnip, fodder beet, mixtures of rye, barley and grasses, annual grasses) can be cultivated because of more favourable ecological conditions (higher temperatures). Basic features of the SCOM farming pattern are: a very labour and land intensive (two crops/year) cropping system, finely regulated, flexible crop husbandry and agronomic practices adjusted to an optimal use of the small quantities of scarce water available (in August, for example, only for the germination of turnips). A relevant difference between the 'modern' milk producers and the small milk producers is, for example, the importance of turnip in the forage production system. For the small milk producers turnip is a strategic crop. First, it is a fresh fodder that complements hay feeding. Second, turnip is the crop with the highest growth potential in the winter period. However, daily harvesting is a very labour intensive activity. That explains why small milk producers (2-3 cows) consider turnips a more suitable crop than the 'modern' milk producers with 20 or more cows. If the latter group of farmers had the opportunity to choose – which implies the availability of an adequate quantity of irrigation water – they would prefer to cultivate silage maize rather than turnips.

8 These farmers are not representative of the 'average' farmer in the region but they constitute a group for which farming has a more development-orientated perspective than for most farmers.

9 The dominant summer forage crops (green forage maize and parts of the potato and maize grain harvest) in the endogenous farming pattern are less dependent on an abundant water supply. A traditional farming characteristic in Trás-os-Montes is the adjustment of agronomic practices to water scarcity (van den Dries *et al.* 1994). A recent survey (Malta *et al.* 1993) contains very interesting details concerning these practices. The 'modern'

crops (and varieties) like silage maize (hybrid varieties) place more demands on ecological conditions and water supply than traditional crops and varieties (for example, traditional varieties of maize).

10 As an example we will describe what we observed at the end of July 1993 in Pitões de Junio, a lively village in which 'traditional' farming, oriented to meat production, is very dominant. Many farmers in Pitões are well equipped with tractors, bailers and other material for hay preparation and harvesting but the productivity of this type of mechanization is terrible low compared to its productivity in conditions for which the equipment was originally designed. During one hour we observed the process of hay bailing (*enfardar*) on a plot of about 0.1 ha. The plot had a considerable slope and was quite small so that the tractor and the bailer were not able to drive further than about 30 metres. Turning around was impossible so the combination of tractor and bailer only could drive backwards and forwards with difficulties. Seven people were involved in the work, one on the tractor, two others gathering and casting the hay in the bailer, two people pulled hay and bales away from the combine and guided its backward voyage and two others raked the hay which was lost in the process. The neighbouring plot was so steep that a tractor and bailer combination could not get into it. So the workers raked all the hay from the highest point in the field to the lowest point close to the road where it was gathered and loaded onto a cart and transported to the village. There the cart was unloaded and the hay was bailed by stand-by equipment. These situations are not exceptional in large parts of Trás-os-Montes.

11 Irrigation activities could be very labour demanding. Water users have frequently to walk long distances to the water source, open it, guide the water along the earthen canal whilst doing small routine maintenance to the plot inlet before the water could be applied to the field. In some schemes, source and canal patrolling is necessary to prevent other users from taking water. Because of small canal discharges, field irrigation needs a very intensive labour input. In other schemes (without night storage) it is necessary to irrigate food crops at night. The scattered and small size of the plots and the fragmentation of irrigation times are additional factors that explain the labour intensive nature of traditional irrigation.

12 PDRITM Phase II official documents clearly recognized that 'the adoption of improvements by farmers such as changes in cropping patterns in newly irrigated areas has been slower than expected' (World Bank 1989).

10 Styles of Beef Cattle Breeding and Resource-Use Efficiency in Umbria

Flaminia Ventura

Introducing the concept of endogenous development into agriculture at the micro-economic level of the farm economy means that we must reassess the concept of resource-use efficiency. Any such analysis must take account of the effectiveness with which more complex and diverse goals are achieved. Analysis should not restrict itself to questions of economic efficiency and ignore the processes involved in the reproduction, management and valorization of endogenous farm resources. We can define 'endogenous or self- centred' development as a pattern of development that is based on the use of those on-farm resources and inputs controlled by the farmer himself.

Farm resources include tangible resources such as the factors of production defined by neo-classical economic theory which can be further categorized into the three sub-systems of land, capital and labour, and intangible resources such as the knowledge available within the farm enterprise. Knowledge and skills are either products that emerge from the process of production itself (thus at zero cost) or are acquired through specific investments in professional training, specialized agents and research and development. In the case of the former, intangible resources are the product of learning by doing while in the later they derive from the process involved in the internalization of external knowledge. Both processes are closely interlinked and make the intangible resources of each farm quite specific.

Knowledge which is internal to the farm can be considered on three levels. First, the operational level including those daily routines that can be adapted to the variables imposed by agro-meteorological and biological conditions and which are peculiar to the process of agricultural production. Second, the 'tactical' level as it relates to the skills needed to operate and work with equipments and technologies. The third level concerns the capacity to introduce new technologies and new organizational patterns into the farm. It is clear that operational, tactical and strategic options depend on the farmer's knowledge.

Intangible resources at the three levels described above, have a direct effect on the decision-making process as far as choice, use and the organization of tangible resources are concerned. Through their specific combina-

tion, tangible inputs are converted into outputs, which are partly allocated within the market and partly re-orientated towards the farm to be re-used as inputs in the following cycles. In agriculture, the quantity, quality and composition of the inputs used in subsequent cycles are decisive for performance and are also closely associated with management style. This is true for both tangible and intangible resources.

In every agrarian cycle resources become depleted. Consequently they have to be actively reproduced or renewed. This does not only affect soil fertility and the wear and tear on equipment and machines. The agronomic requirements for certain crop rotations and the (changing) composition of the herd, for example, must also be taken into account. In neo-classical theory and analysis such requirements are not independent targets. At best they are considered constraints. The limited attention that was given to those 'constraints' mirrors, as it were, the practice of modernization. Through the modernization of agriculture the indicated 'constraints, were actually 'eliminated' by the massive introduction of chemical fertilizers, resistent varieties, pesticides and embryo-transfer. That is the 'constraints' of the past were converted into a widening range of 'choice' concerning the reproduction of resources.

Here I proceed from the assumption that natural resources can no longer be considered as unlimited goods. They should be regarded as a common good and we should learn how to manage their exploitation and ensure their reproduction. Therefore, the strictly economic assessment of farming should be replaced by a multi-faceted approach which also takes into account the environmental variables of the system in the ecological and social sense. In particular, this concerns the definition of the farm enterprise's target function. The definition of goals should not to be interpreted as the task or prerogative of the individual entrepreneur, but should be 'constructed' at the level of the systemic inter-linkages between different actors and according to the prevailing scale of values.

Research carried out in Italy and the Netherlands, for example, has shown that farmers are not single-goal oriented. In this sense neo-institutional theory helps us to understand farmers behaviour by replacing the neo-classical assumption of optimization-oriented farmer attitude (which assumes that each farmer has unlimited information) with the empirical attitude of farmers (bounded rationality and incomplete information) who aim to achieve a particular utility even though their competence in formulating and solving complex problems and in processing information may be limited. Thus utility cannot be defined in purely economic terms but depends on how the farmer is embedded in his or her social and natural environment and is directly influenced by the way formal and informal networks of relationships have developed within farming.[1]

The 'business unit' in the relational network becomes *meaningful* to the actors involved only if certain needs are met and satisfied. The activity of mobilizing, combining and using factors of production creates profit for

investors and job opportunities for the community. Moreover, it influences the balance of payments and makes goods and services available to many. An assessment of farming activity, therefore, depends on the positive and negative effects it has on the system given the rules as formulated by the system's members themselves. However, the rules for these goods and services have changed considerably. Eco-environmental factors associated with recovering and maintaining the quality of the natural equilibrium as well as social-environmental factors that ensure the maintenance and strengthening of local networks have entered the debate. These new criteria are now generally recognized as positive and are therefore increasingly used to judge entrepreneurial activities in general and the development of farming in particular. This is done by the 'scientific' community and by politicians and public administrators at many different levels. All these factors have to be kept in mind when performing a comparative assessment of the many different farming styles that can be identified within comparatively small areas.

Energy Balance

The adoption of energy saving criteria parallel to ordinary financial budgets is a first step towards an assessment which takes into account the overall 'sustainability' of farming activities from an economic perspective. The first step involves, as it were, the capacity to remunerate factors of production, thus assuring their re-employment in the farm-enterprise and, as far as the environment is concerned, the capacity to pass on to future generations the same set of resources that are available today.

In this perspective the farm is seen as an agro-ecosystem or a set of components which either belong to the natural environment (climate, soil) or to the technical and socio-economic environment (crops, livestock, management systems). Although this set of components is orientated to the production of goods and services, the reproduction of natural components should also be seen as an output.

Besides the biomass allocated to the market or to in-farm consumption, there are other outputs such as the preservation of the soil fertility, its structure and microflora and the conservation of local plant and animal life. The farm is therefore designed as a system where matter, energy, capital and information flow in and out. These components are transformed according to well-defined procedures that depend on the technological level reached by the farm and on its organizational structure which, in turn, is the cause-effect of farm-market relationships created, amongst other things, by a careful consideration of transaction costs.

Organizational and technological models as applied in farming should be seen as the result of goal-oriented strategies: they are not determined in a unilinear way by overall economic structures.[2] The choice between

'make or buy' (see Chapter 1) that produces the desired balance between market transaction costs and the costs of managing a hierarchical organization (firm) may involve both the single phases of the production process itself and the different entrepreneurial functions. This is due to increasing opportunities for breaking down the process itself into space and time[3] with direct effects on inputs. For instance, the seed used in autumn and winter cereal crops may come from the seed industry but may also have been produced on the farm the previous year. In much the same way, beef-cattle breeding – which this paper specifically deals with – can be based on breeding fattening calves and either producing feed for them on the farm itself or on buying the raw material from the market. If we consider the farm as part of an ecosystem we see that these different options have immediate effects on the flows of matter, capital, energy and information as well as the components that define the system and its boundaries.

Let us now look at what happens in cattle breeding. Farm-produced feed comes from locally produced raw material and this greatly reduces the consumption of what we may call non-renewable energy i.e. energy that is not directly derived from biological and biochemical processes, such as chlorophyll photosynthesis. It is an energy, therefore, which requires mechanical or industrial intervention.

From the point of view of final energy consumption or the energy used by livestock, the nutritional value of one fodder unit of industrial feed is equivalent to one fodder unit of feed produced on the farm itself. However, both differ in terms of cost, origin and the flows of energy and matter required to produce them. This is partly due to the distribution of industrial by-products that cannot be used as they are but must undergo physical and chemical treatment and be combined with vitamins and chemical growth stimulators. Another important aspect is the transportation costs involved and how they translate in economic and energy-saving terms.

The balance of farm inward-bound and outward-bound energy flows appears to be rather limited when compared to a pattern that takes account all those components that are subject to change during the course of the productive cycle. The circulation of nutritional elements in the soil, for example, combined with the values that this process acquires at the various stages of the soil chemical-electrolyte equilibrium, may provide a another starting point for surveys and assessment. This is particularly so when water (aquifer) pollution has to be prevented and when fertilizer effectiveness must be optimized.

Below I describe the results of a comparative analysis of the economic and energy-saving aspects of three different cattle breeding styles. The energy balance of beef production always shows negative results because the transformation of vegetal biomass into animal biomass is not energy efficient. However, the method referred to here allows[4] us to differentiate

non-renewable energies (derived from the non-agricultural sector) from renewable energies (derived from biochemical processes in agriculture itself). In the case of the former we have to make a distinction between direct energy inputs such as fuel and electrical power, for example, and indirect energy (land investments). Renewable energy flows can be classified into those generated in farm transfers and those purchased on the agricultural products market.

Although the focus of beef production is stock raising, the farm system as a whole consists of three sectors: crops, livestock and soil. These are in a continuous relationship with one another to use Tellarini's words and are structurally linked in small and large circulations. The former involves the exchanges between crops and soil (water, minerals and polluting agents) and the latter consists of exchanges of biomass between crops and livestock, where biomass is partly employed as an input (manure).

In turn the three sectors interact with the outer world, which is identified by the term 'market'. Here too some differentiation is required. We have to take into account both the sector generating inward-bound flows and the distance from market as far as inward-bound and outbound-bound flows in the agricultural sector are concerned. This allows us to consider the farm and the local agricultural system to which it belongs.

Beef Production in Umbria

Beef cattle breeding in Umbria is characterized by a considerable diversity. Only a fraction of this diversity can be attributed, however, to the variety of geographical conditions found in the region. Umbria lies at the centre of the Italian peninsula. The Tiber river runs through the region to the east and the Apennines dissects it to the west. The landscape is a mixture of irrigated land basins (Tiber valley and Umbrian valley) and hills and mountains. Cattle breeding styles differ markedly and this can be seen in the way farms are organized, the role played by livestock on individual farms and the number and qualifications of the labourers employed. The way the farms are inserted into different marketing circuits is also strategic. Over 96 percent of beef cattle farms in the region are family farms with a surface area of between 10 and 30 hectares.[5] The two extreme styles found in the area can be characterized as:

a Small-scale artisan Umbrian beef cattle breeding: raising beef cattle of the local Chianina breed; producing winter fattening calves (closed cycle), predominantly farm-produced fodder particularly hay and fodder grain cereals (barley and corn).
b Industrial breeding, mostly in imitation of the Padana valley farms: farms specialize only in the fattening phase of beef production and use silage corn or industrial by-products in feeding. Cattle come from a variety of places and are mostly French breeds or crossings.

All styles can be considered as evolutionary forms of the traditional breeding practised by share-cropping farmers at the beginning of this century. In those days, livestock was used for draft power and for fertilizing the ground. Once these functions began to be taken over by machines and chemical fertilizers, all livestock produced was destined for market. The two breeding styles which can be identified in the Umbrian region today and which are described above have emerged from two separate evolutionary patterns along the variables of 'space' and 'time'. In this chapter we refer to these styles as the small-scale artisan style and the industrial style.

The small-scale artisan style is strongly conditioned by space and this affects farm size and product destination. The number of cattle kept is closely related to the local availability of fodder. Farm size in itself is not a limiting factor as cattle can be fed on pasture land belonging to other landowners or on the commons. Cow sheds are of the traditional type and each animal has its own place. Farms are closely related to local output markets. The farmers act in an environment that is well-known to them: relationships are easier, transaction costs lower and opportunistic behaviour is inconceivable. However, this style is not a closed or a completely localized circuit. Livestock is often sold on distant markets and breeding animals are exported to the United States, Argentine and Australia although always through local agents or middleman. Beef cattle are also sold in the same way on the Rome market where there is a particular demand for Chianina meat.

In the industrial style, space has quite a different function. Farm size is more dependent on the labour-saving technology employed. The cow shed must be modern with enough space for the mechanization of all major operations. External farm relations need not be close but are chosen with an eye to securing the best advantage. Better informed farmers may act opportunistically taking advantage of a situation in which contracts are written down but are often incomplete. Thus it is possible for them to finalize transactions in ways that are more beneficial to themselves. However, a broader market structure means that information about prices and selling rules are available to everybody at lower cost. This information is held by private and public institutions such as the Chamber of Commerce and is disseminated via the media. In the industrial style of production, beef is an anonymous commodity and the farmer does not participate in the definition of the quality of his product. The notion of quality is derived from the market.

In between these two opposing poles a third style of cattle-breeding must be discerned. Throughout the following analysis I will refer to this third type as the cow-calf line.

The cow-calf line was the traditional breeding found in the mountain areas of the region and was based on summer pasture in the common meadows. Calves were fattened during the winter in the farms in the hill

and plain areas by the same cattle owners. As the market for beef increased in the seventies, the demand for calves became stable. Cow-calf breeding became an economical alternative to the closed cycle, expecially when the size and soil fertility of the farm could not guarantee self sufficiency of fodder supply for the young animals who demand more protein and concentrate than the suckling cows. Cash flow rotation is quicker and more flexible than in the case of a closed cycle and more fully corresponds to the requirements of both the farm and the farming family. The fattening of Chianina calves to the average selling weight of 250-300 kilograms involves the use of powder milk. This is the specific task of the farmer's wife.

Debate on Results

In order to assess resource-use efficiency as entailed in the three breeding styles, three representative Umbrian livestock farms,[6] each of which represent a particular breeding style, have been analysed. All three farms specialize in the production of beef cattle but differ in end-product type, breeding techniques and market relations as defined in terms of dependency on external inputs. They also differ in the extent to which they are dependent on the circuit through which the product is marketed. Moreover, each farm is 'integrated' in a different way into the local agricultural and socio-economic system. However, all three farms are quite similar as far as physical size and climatic conditions are concerned. Throughout the year they have an available agricultural surface of between 8 and 10.5 hectares and an irrigated surface of between 2 and 4 hectares.

The closed-cycle farm corresponds to what we have called the small-scale artisan style, while open-cycle fattening practices provide the stereotype for the industrial style. The cow/calf line can be considered as an evolutionary form of traditional breeding which, in recent years, has had to adapt itself to the turbulence of the beef market.

Financial data for the year 1992 has been used to study these three farming styles. In 1992 beef prices where relatively low because of an increase in slaughter cattle from France and Eastern Europe. In the regional market, however, particularly around Perugia, the price of upper quality Chianina breed rose by about 5 percent but because the local market is closely linked to domestic market trends it was affected by the overall fall in prices. In contrast, the regional market for calves showed a remarkable price stability – if not growth in 1992. This was caused by an increasing demand for calves from 'accessory' farms where it was customary to raise one or two animals for family consumption or for sale to friends and relatives.

In 1992 some farmers, therefore, preferred to switch from cattle raising to raising winter-fattening calves and increased their stock of suckling

cows whilst waiting for the domestic and local beef-cattle market to re-establish itself. Farmers who bought pedigree Chianina cattle were financed by the regional authority.

Flexibility or the capacity to externalize or internalize entrepreneurial functions and production stages and secure innovations in farm organization is a competitive factor in both the medium and long term. One of a farmer's major goals is to ensure the reproduction of his farm over time and the flexibility encountered in the small-scale artisan breeding style is crucial to this reproduction.

Industrial farmers are the most 'production-oriented' and responded to the depressed 1992 market by making contracts with feed producers and importers of winter-fattening calves. In this way they integrated their farms into quasi-market organizations. It was impossible for them, however, to reduce their production cost. Given the level of technology they had built up on their farms, they were locked into long-term mortgage committments and mechanical and building expenses. Therefore, industrial farmers tried to reduce their transaction costs and contractual forms that could reduce these costs were preferred. These would have been higher if the farmer had to resort directly to a non-local market. Cumulatively these maneouvers led to an increasing neglect of certain farming practices, such as the purchase and sale of cattle which, whilst giving temporary advantages, actually weakens the farm as we can see if we analyze its responsiveness over a longer period (see Van der Meulen and Ventura 1995).

We have adopted four different criteria in our analysis of the various farming styles. The results of using the traditional economic and technical indexes for assessing farm-performance are given in Table 1.
We first consider income data for labour employed in production (LU) and then the product itself (ALU). Some elements are useful in assessing the paying power of the productive unit as far as its most important production factor, labour, is concerned. We have also calculated the added value per kilogram of the beef produced. This index allowes us to evaluate the contribution of each productive unit to the regional agricultural income.

From an economic perspective, the most striking differences between the three farming styles are found along the activity dimension: the number of cattle per unit of labour force, the cost structure and finally in the eventual income (and added value) per unit of output. As far as scale enlargement was concerned, the small-scale artisan style appeared to be handicapped because raising techniques where characterized by the specific attention and skill required in tending cows and suckling calves, 'caring for' the livestock and the individualization of operations. In such a situation it is impossible to achieve abrupt and large-scale enlargement. The industrial style, however, focuses on economic viability and the standardization of operations and is orientated to achieving economies of scale.

Table 1 Comparision of Three Different 'Styles' of Cattle Breeding in Umbria

Style typology	*Small-scale artisan style Closed Cycle*	*Industrial style Open Cycle*	*Intermediary style Cow-calf line*
Cattle breed	*Chianina*	*French crossing breeds*	*Chianina*
Agricultural Utilized Land AUL (hectars)	20.5	10.5	8.4
AUL under irrigation	3	4	2
AUL under seasonal rent	10	0	0
Labour units (LU)	1.6	1.04	1.2
Adult livestock units (ALU)	38	40	20.1
Suckling cows	25	1	15
Livestock density (ALU/AUL)	1.9	3.8	2
Scale of breeding (ALU/LU)	21.6	38.6	15.4
Meat produced (kg)	12,120	15,458	4743
Gross Production Value (GPV)	46,514,360	51,410,459	25,989,177
Proportion of EU premiums in GPV	4,798,410	4,288,950	3,298,410
GPV per LU	29,071,475	49,578,220	21,800,016
GPV per ALU	1,224,062	1,285,261	1,293,005
Gross income per LU	19,538,373	25,211,239	9,982,177
Net income per LU	7,931,586	7,480,000	4,344,701
Gross income per ALU	764,545	630,281	592,064
Net income per ALU	322,119	187,002	257,694
Net value added per Kg of meat	2584	1458	2599
Net income per Kg meat	1079	484	1083
Technical aspects			
Average starting weight (kg)	30	320	30
Average selling weight (kg)	670 male - 450 female	600	350
Average selling price per Kilogram	4200	4000	5000
Feed self-sufficiency	0.69	0.51	0.63
Feed conversion index (FU/produced meat)	6.9	7.1	5.8
Daily growth in kg	1.16	1.03	0.92
Daily feeding cost per kg of meat produced	2368	2747	1230

Cost structure analysis can explain the two strategies. In artisan breeding, variable costs[7] have a limited weight with respect to gross product (about 33 percent compared to 50 percent in industrial fattening). In the industrial style, the percentage of fixed costs[8] is lower (40 percent in the artisan style farm and 35 percent in the industrial style). This is the result of the higher level of gross production (large scale) achieved in this style.

Generally speaking there is not a great deal of difference in terms of absolute value in the fixed costs of the two styles because the cost of highly mechanized stabling facilities and the mortgages incurred in relation to the buildings on industrialized farms are balanced by the higher cost of the social security premiums paid for a somewhat larger labour force, the cost of insurance and the interest on livestock capital. The strategy of the industrial farm is clearly one of cost reduction but this may only be achieved by reducing fixed costs through economies of scale, since variable costs (mostly the price of feed) cannot easily be reduced. In this way, the size of the farm as measured in hectares could became a serious constraint given the environmental norms for livestock which are based on a fixed ratio ALU/surface.

Energy efficiency has been analyzed using indexes related to money and energy flows (as reported in Table 2). These indexes have been divided into two groups: those used to assess the degree of dependence on money and energy are calculated as the net input/output ratio over a year (inputs being from agricultural and non-agricultural sectors). These indicators are efficiency indexes. The same is true for the indicators that have been calculated for each style of farming and which express the energy required to produce a kilogram of beef.

The net profitability of energy and the net energy productivity of money belong to the second group of indexes. The net profitability of energy is obtained by the money value input/energy output ratio and allows us to assess the cost of the energy generated by farm production processes using various energy sources. The net energy productivity of money is obtained by the energy input/net money value output ratio, or the money value produced by each energy unit input in the production process. This index allows us to assess the extent to which the farm is capable of converting the energy derived from other sectors and from in-farm transfers into money value.

The energy efficiency of small-scale, artisan farms developed around the 'closed cycle' is higher than that of industrial farms and this is true in both absolute and relative terms. On small-scale traditional farms the production of one kilogram of beef requires 8800 Kcalories and on industrial farms more than 10,000 Kcalories. However, the most interesting features here are the exploitation and profitability of non-renewable resources and the profitability of plant-generated energy transferred to livestock.

Table 2 Monetary and Energy Flows

	Closed cycle		Open cycle		Cow-calf Line	
	(Lire)	(joule)	(Lire)	(joule)	(Lire)	(joule)
Input from other sectors (non renewable)	31,006,823	836	41,807,394	1144	14,901,070	390
Input from agriculture	2,871,000	15	2,123,000	51	5,285,700	150
Total non-farm input	33,877,823	851	43,930,394	1195	20,186,770	540
Farm internal transfers	23,019,000	2821	23,650,000	2694	12,538,600	2095
Total input	56,896,823	3732	67,580,394	3889	32,725,370	2635
Net output	46,514,360	167	51,410,459	205	25,989,410	66
Net income (net output-non-farm input)	12,636,537	-684	7,480,065	-990	5,802,640	-474
Net output/ALU	1,224,062	4.39	1,285,261	5.13	1,293,005	3.28
Monetary and energy dependency level						
Total input (transfers included)/net output	1.22	22.35	1.31	18.97	1.26	39.92
Total non-farm input/ net output	0.73	5.10	0.85	5.83	0.78	8.18
Input from other sectors/ net output	0.67	5.01	0.81	5.58	0.57	5.91
Farm internal transfer/ net output	0.49	16.89	0.46	13.14	0.48	31.74
Energy needed to produce 1 kg meat						
Total input (kcal)		8817		10086		14156
Non-renewable input (kcal)		8661		9655		10224
Net productivity of energy Input(in value)/output (in energy) Lire/Joule						
Total input (transfers included)/net output	340,376	100.00%	329,660	100.00%	495,839	1.00
Total non-farm input/ net output	185,670	54.50%	203,939	61.90%	225,774	0.46
Farm internal transfer/ net output	137,838	40.50%	115,366	35.00%	189,979	0.38
Net productivity of money Input(in energy)/ output (in money) Joule/Lire						
Total Input (transfers included)/net output		19.18		18.08		24.23
Total non-farm input/ net output		4.30		5.32		3.59
Farm internal transfer/ net output		14.80		12.52		19.27

Beef production in artisan farms has mainly developed on the basis of endogenous resources. These farms use less non-renewable energy and this becomes clear when measured in both energy and monetary terms (54.4 percent compared to 62 percent in the first instance and 185,000 lire compared to 204,000 lire in the second). In addition non-renewable energy has a lower cost per unit on small-scale artisan farms than on industrial ones. The energy productivity of money is always higher on small-scale artisan farms. This index refers to the energy derived from in-farm transfers such as the transformation of endogenous inputs (crops into beef, for example) and is always higher for non-industrial farms whether they are of the closed-cycle or of the cow/calf type. In other words every lira spent on purchasing energy is converted into money value more efficiently on a farm that purchases non-renewable energy in, percentage terms, lower quantities.

This is the case even though the money value of non-renewable energy is lower on small-scale artisan farms where it is less efficiently transformed. In fact, for each non-renewable energy unit purchased, the industrial farm produces 5.32 lire as compared to the 4.30 lire generated on the closed-cycle small-scale artisan farm and 3.59 lire in the cow/calf small-scale artisan farm.

This latter result relates directly to the fact that each farm purchases different inputs from the non-agricultural sector and reflects the different prices paid for each source of energy. The industrial farm usually purchases direct energy in the form of fuel. Indirect energy includes the costs of building and wear and tear on machines. Because breeding and cultivation practises involve mechanization on this type of farm, they require larger cow sheds and more room per/head of cattle than small-scale artisan farms. Cattle feed is purchased on the market, especially protein-rich raw materials such as soya meal and industrial feed which does not differ in terms of energy value from cultivated raw materials such as soya beans and cereals. All the energy employed in industrial transformation is, in a sense, undervalued in our calculation because we have used the energy conversion table developed by the National Research Council (Italy) where added energy value is generally standardized.

From an economic point of view, the difference in the organization of production processes and the degree of market dependence is shown in the balance as net income per labour unit. This is almost the same in both the artisan and the industrial farm. Gross income, however, is 25 percent higher in the industrial farm. In other words both styles are economically efficient.

As far as energy saving is concerned, the money value of non-renewable sources is directly influenced by the price system. Non-renewable energy is cheaper than renewable energy. This represents an incentive to farmers who tend to resort to markets and to non-agricultural sectors more than they do to the production and reproduction of renewable agricultural

resources. One hundred kilograms of fertilizer costs as much as 100 kilograms of cereal grains but their value in energy terms is less than the half.

Conclusions

The results presented here have been generated during the course of analysing three farms. This is admittedly a very small sample. Research on energy values is also only at an experimental phase, making it difficult to offer a correct assessment of energy values. Therefore, the results presented here are extremely tentative. However, we can draw a few general conclusions.

Agriculture modernization, as van der Ploeg (1993) has shown, has involved the disconnection of agricultural production processes from local agro-systems. Raw materials are produced and delivered by the relevant industrial sectors of the agro-business network. From an energy-saving point of view, such trends have led farmers to become increasingly dependent on non-agricultural and thus non-renewable energy sources, and this process has led to an ever increasing differentiation between economic profitability and energy efficiency in farming. In fact industrial styles of breeding, in contrast to the artisan breeding, demonstrate lower energy efficiency and profitability in the use of endogenous energy resources. The industrial style of breeding also exhibits a higher dependence on external (non-farm and non-local) inputs and the price system encourages the use of non-renewable energy sources as has been shown in the case of fertilizers.

I believe that the growing use of non-renewable energy and efficiency loss are important issues and should be considered in any discussion concerning the role of agriculture in the general economy of industrialized countries. Agricultural is, in fact, the only sector that is expected to produce more energy than it consumes because it employs the sun as a primary resource and makes use of the potential contained in whatever natural resources are available. Optimizing the use of these 'free' or endogenous sources should be a primary target. The equilibrium of natural resources has to be maintained in order, for example, to ensure the reproduction of various potential such as the chemical and microbiological equilibrium essential to soil fertility. Retrospective interventions can often reduce damage but will never restore the situation to its original state. The energy balance is always negative because non-renewable energy resources are allocated in activities where natural, renewable energy could easily be used with more efficiency by re-employing specific knowledge and skills. This would allow farming not only to regain its place in the local agro-ecological and social environment but also to contribute to the global struggle to contain resource depletion.

Notes

1 These influences directly affect the farmer's scale of preference, the range and quality of information available and thus the cost of transactions.

2 As far as Umbria is concerned this has been made clear in the farming-styles analysis as applied to meat production (see van der Meulen and Ventura 1994), and also Chapter 7 in this book).

3 This break-down is one of the consequences of the agricultural modernization process (see van der Ploeg 1993 and of the globalization trend of modern agro-marketing systems.

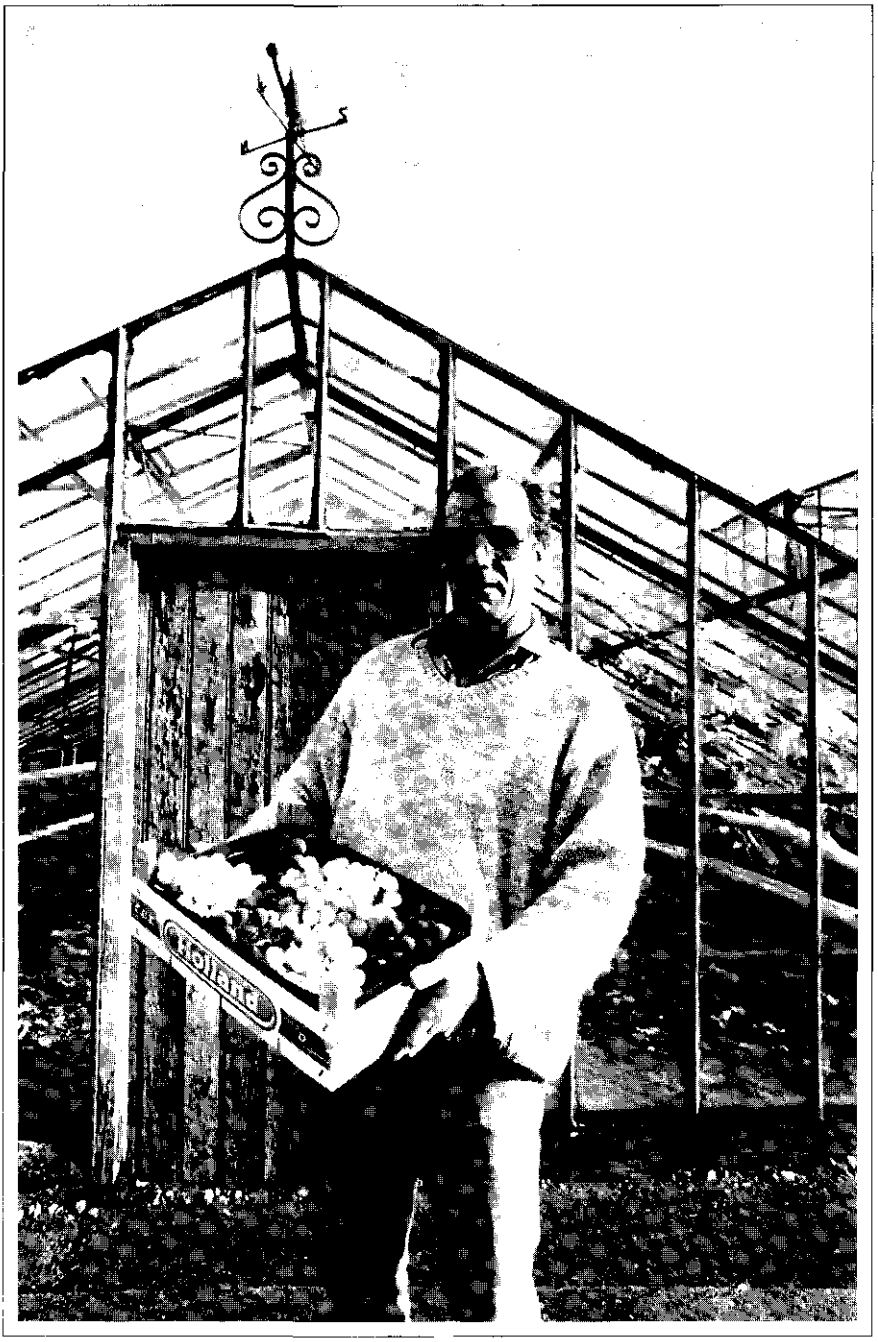
4 The methodology adopted has already been used by Tellarini and Caporali (1991) in their proposal for an energy-saving pattern for the relaunching of agricultural practices compatible with the environmental protection requirements of the Tuscany parks area.

5 We refer here to Agricultural Utilized Land owned or rented for long periods and available to farmers over the whole year. In Umbria, especially in the hill-side areas, land tenancy is a widespread practice as far as fodder cultivation meant for pasture or for the production of hay is concerned. This phenomenon is the result of the presence of large numbers of part time, small- and medium-size farms with arable land characterized by a clay or tufo soil, where alfalfa is still considered the best possible crop and rotation. In most cases fodder is sold 'in the field' to cattle breeders who reap the hay with their own machines and divide the production with the landowner, reserving for themselves the right to purchase the latter's half, so that they can monitor the quality of fodder they are going to use.

6 Farms were chosen from a sample of about 50, all of which took part in the Management Accountancy Programme carried out by the Istituto di Estimo e Contabilitá Agraria of the University of Perugia, financed by regional administration.

7 Here, variable costs are all those that arise from the purchase of production means that end up in the production process and directly relate to the various farming activities.

8 Here, fixed costs are only the explicit expenses that cannot be distributed over the various activities, such as depreciation quotas, insurances, interests, taxes and contributions. The cost of family labour or of land benefits is not included.



11 Arable Farmers: A New Interpretation of Sustainable Baking Wheat Cultivation

Han Wiskerke

Introduction

After the Second World War the nature of Dutch agriculture changed quite radically and yield per hectare increased by more than 100 percent during the next 50 years. In the same period the scale of farming increased, farms were enlarged and labour input per hectare fell. A third characteristic of post-World War II agricultural development was specialization. The traditional mixed farm with its combination of arable crops and cattle largely disappeared. Farmers began to specialize producing either arable crops, dairy products or meat. Within arable agriculture cereals (mainly winter wheat), potatoes and sugar beet emerged as the main crops. A fourth important change that took place after 1945 was the externalization of tasks. Jobs that once belonged to the domain of the farmers such as cheese making and the production of seeds and planting materials, for example, were transferred to or taken over by specialized institutions. The specialization and externalization of tasks was strongly interrelated.

This very brief description of post-World War Two agricultural development suggests that Dutch agriculture became very homogenous. However, this was not the case. Not all farmers specialized to the same extent and at the same rate. Furthermore some farmers concentrated on intensifying production, while others focused on scale-enlargement. At the same time there are many farmers who are again undertaking tasks that, in the post-war period had been transferred from the farms to specialized institutions. Despite the considerable degree of intensification, scale-enlargement, specialization and externalization, Dutch agriculture remained heterogeneous and according to van der Ploeg (1987) diversity within Dutch dairy farming, for example, began to increase from the late 1960s onwards.

Contemporary diversity within Dutch agriculture has been thoroughly described and analyzed using the concept 'styles of farming' (van der Ploeg 1994). This approach has been used to understand heterogeneity in dairy farming (van der Ploeg and Roep 1990; de Bruin and van der Ploeg 1992; van der Ploeg *et al.* 1992; de Bruin 1993), horticulture (Spaan and van der Ploeg 1992) and arable farming (Wiskerke 1994; Wiskerke *et al.* 1994). This approach has also been successfully applied in other European

countries to describe and analyze diversity in farming practices (van der Ploeg and Long 1994).

The four central issues in contemporary Dutch and European agriculture are: sustainability of agricultural production, overproduction (wheat, dairy products and meat), the low income of many farmers and the public demand for nature conservation. A large number of farmers are of the opinion that many of these problems are the result of post-World War Two agricultural policy. In their view it is therefore the responsibility of government to solve these problems. This is a line of reasoning I often come across in many of my interviews with farmers: '*The government stimulated us to increase production per hectare and strongly advised us to do this by using high-yielding varieties, more chemical fertilizer and more pesticides. This resulted in overproduction, leading to lower prices and to a lower income for the farmer. Furthermore, it resulted in what is now considered to be unacceptable environmental pollution. Public opinion is turning against us and all of a sudden the government considers environmental pollution and overproduction to be our fault, our problem and our responsibility. This is unfair, as it is in fact the government who has created these problems by stimulating us to increase production in the way we did*'.

However, the styles of farming studies have shown that there are also farmers who have a different opinion about the question of responsibility. Furthermore, an even larger number of farmers do not intend to wait for the responsibility-dispute to be settled but have taken the bull by the horns. In several parts of the Netherlands groups of farmers have made plans to solve the struggle for land between farmers and nature conservationists and in doing so have tackled the problem of environmental pollution themselves (Hees *et al.* 1994; Renting *et al* 1994). In close collaboration with conservationists and ecology groups, these farmers are trying to integrate agricultural production, nature conservation and landscape preservation. In addition, they aim at sustainable agricultural production. Not all these farmers groups try to solve their problems in the same way. Some groups concentrate on the integration of farming and nature conservation, some on sustainable agricultural production and others on increasing the price of their products by producing high quality goods.

One of the common characteristics of these initiatives is the 'bottom-up' approach. Farmers themselves are developing new ways of tackling the problems they face. Another similarity is the complex and sometimes counter-productive government regulations these groups face as well as the lack of support from farmers' associations. In addition these groups find that there is a lack of information about the problems they face and that researchers at experimental farms, agricultural research institutes and universities have ignored the farmers' approach to these problems for a long time. Their demand for new and different technologies have been ignored in the same way.

In this chapter I will describe and analyze a new approach that tries to solve the problems of plummeting prices, increased dependence on the agroindustry generated by the externalization of tasks, and the environmental pollution caused by the use of chemical fertilizers and pesticides. This new route involves the sustainable cultivation of baking wheat by twenty arable farmers in the province of Zeeland in the south-western part of the Netherlands. The project was initiated by a couple of farmers in the late 1980s and eventually led to cooperation between twenty wheat growers (both conventional farmers and organic farmers), more than a hundred local bakers, the Dutch consumers' organization, the union of ecology groups (ZMF), two millers, the three regional farmers' associations (ZLO), the regional association of young farmers (ZAJK), the technical organization for arable agriculture and the regional experimental farm (De Koeijer and Wiskerke 1994).

Here I will describe the way the project began and its development and go on to discuss the motives of the farmers involved. I will also analyze what this method of wheat cultivation means in terms of income and sustainibility at farm level and what its potential impact can be at national level. Finally, I will briefly describe another approach to baking wheat cultivation, i.e. the new agroindustrial approach, and discuss its potential impact on the project itself.

To understand the project, a brief background sketch is necessary. In doing so, the developments in wheat breeding, wheat cultivation and government regulations and policies relating to these issues since the Second World War have to be examined.

Beyond the Theoretical Production Limit: The Productivist Era in Wheat Cultivation

Commercial plant breeding in the Netherlands began in the early twentieth century. It was initially an activity carried out mainly by a small number of farmers. Farmers who used new varieties were free to multiply and sell seeds and planting materials without having to pay the original breeders. As a result plant breeders became reluctant to put much effort and money into breeding new varieties. This worried the farmers' associations because they believed that a continuous flow of new and better plant varieties was essential to the modernization of Dutch arable agriculture. During the 1920s several measures were taken by the farmers' associations in collaboration with the NAK (the Netherlands General Inspection Service for Seeds and Seed Potatoes) to protect and reward breeders' efforts (Wiskerke 1995). However, these measures proved to be insufficient, resulting in a growing demand for legal protection in the 1930s. In 1940 the Minister of Agriculture appointed an 'Advisory Com-

mittee for Breeders' Ownership'. The work of this committee resulted in the 'Breeders Decree 1941'.

After World War Two this decree was reconfirmed by the Dutch parliament, though it never became law in this form. In 1967 the decree was replaced by the Seeds and Planting Material Act. This law regulated breeder's rights and the trade in seeds and planting materials. Breeders right were based on the International Convention for the Protection of New Varieties of Plants (Young 1984), better known as the UPOV-convention (Union pour la Protection des Obtentions Végétales) which was signed in Paris in 1961 by France, Italy, Germany, Belgium and the Netherlands. In the context of this Act, a breeder can obtain breeder's right if the variety meets the criteria of distinguishability, uniformity and stability (van Beukering 1992). Furthermore, the variety has to be new and have a name. If these five conditions are fulfilled, the variety can be registered as a new variety in the Netherlands Register of Varieties. This means that for a period of twenty to twenty-five years – depending on the crop – no one else is allowed to produce or reproduce this variety commercially without paying the breeder.

Earlier measures taken in the 1920s, were also intended to protect and reward the breeders' labour. One of those measures was the Descriptive List of Varieties of Agricultural crops, hereafter referred to as the List of Varieties. The List of Varieties was published for the first time in 1924 and had two objectives (De Haan 1949): to provide a guideline for the choice of varieties, and to provide recognition for the seeds and planting materials of these varieties. The List of Varieties has been published annually since 1924 with a break during the Second World War. Although several changes have taken place over the last seventy years, especially at the institutional level, the structure, intention and the workings of the List of Varieties has remained fairly unchanged over the years (Wiskerke 1995). The Committee for the Compilation of the List of Varieties (CRL) decides whether a new variety should be placed on the List of Varieties on the basis of agricultural-value research. Today, this research is undertaken at the Centre for Plant Breeding and Reproduction Research (CPRO) under the auspices of the CRL. Two criteria are used by the CRL in deciding whether a new variety will be placed on the List of Varieties. First, a new variety has to be of sufficient value to Dutch agriculture, and secondly, a new variety has to be better than existing varieties.

Varieties placed on the List of Varieties are categorized to provide a guide to farmers when they come to make a choice. Table 1 provides an overview of these categories together with an explanation. Within the A-, B- and O-categories varieties are arranged in terms of recommendation. Together with the N- and T-categories these are the common categories into which wheat varieties are subdivided. When the Breeders' Decree 1941 was confirmed, the status of the List of Varieties changed. From that moment on it was no longer a guideline, it took an obligatory form and

became binding. In other words, only seeds and planting materials of varieties that were on the List of Varieties were admitted for domestic trade (Sneep 1976). The 'obligatory' status of the Dutch List of Varieties lapsed in 1975 with the introduction of the equally obligatory EC List of Varieties. Since then all varieties on the EC List of Varieties are admitted for domestic trade. During the years when the Dutch List of Varieties was binding, variation (the breeding of new varieties) and selection were strongly coupled. At this time the List of Varieties can best be described as an obligatory point of passage (Callon 1986): varieties could only enter the selection environment when judged and approved by the CRL. When its binding status lapsed, the List of Varieties was no longer an obligatory point of passage. However, variation and selection remained coupled through the List of Varieties. The List of Varieties can therefore be understood as an institutional nexus (Schot 1991; Van Lente 1993): '*Connections .... are created in which the processes of variation and selection are brought together. These connections are maintained by certain actors or institutions that are responsible for translating certain .... requirements into criteria and specifications used in developing technology*' (Schot 1991: 85).

Table 1 The Categories in the List of Varieties in 1994 (Source: List of Varieties 1994)

Category	Meaning
A	General recommendation: variety for general use
B	Limited recommendation: variety for special circumstances or for limited use
O	Variety *considered to be* of limited meaning or for local use and which, *as a rule, is incompletely described or not described at all* (my emphasis)
N	New, recommended variety
T	Newly admitted variety with sufficient value for cultivation
UB	Variety intended for export, although it is also admitted for domestic trade
U	Variety intended exclusively for export to countries outside the EC
R	Variety admitted for domestic trade in accordance with the principles of the Directive of the European Community of September 29 1970 regarding the Common List of Varieties of Agricultural crops (PbEG1970, L 225)

This coupling of variation and selection can be illustrated by two examples, one related to variation, i.e. the plant breeders, and the other to selection, i.e. the arable farmers. Breeders have to apply for breeder's rights to the Council for Breeder's Right. The Council for Breeder's Right then orders the CPRO to conduct 'identification research', which

includes research into the criteria associated with distinguishablity, uniformity and stability. If all conditions are met, a variety will be registered in the Netherlands Register of Varieties and the breeder has obtained breeder's rights. In practice, however, breeders apply for breeder's right and placement on the List of Varieties at the same time. This means that identification research and agricultural-value research take place simultaneously. In other words, an applied variety is judged with respect to the criteria that have to be fulfilled with regard to the breeder's rights and with respect to its agricultural value. This reduces the costs to the breeder. However, the main reason for simultaneous application is that the breeder's rights gain value if accompanied by placement on the List of Varieties because the List of Varieties is the entity that connects variation and selection. That's why plant breeders often break-off their application for breeder's rights as soon as their variety is rejected for placement on the List of Varieties by the CRL. This was especially the case in the years when the List of Varieties was binding.

The second example relates to the sources of information used by farmers to select the varieties they want. In the beginning of 1995 I conducted a survey among 160 arable farmers in the province of Zeeland. This survey showed that the List of Varieties and the advice of seed-suppliers and wheat-buyers were the two main sources of information farmers used when selecting wheat varieties. Approximately 65 percent of the arable farmers use the List of Varieties as a source of information. More than 75 percent of the arable farmers also use the advice of the seed-suppliers and wheat-buyers. (Very often the seed supplier is also the wheat buyer. In Zeeland this is usually the CZAV, a farmers' cooperative organization involved in the provision of seeds and planting materials, the delivery of fertilizers and pesticides and the storage of agricultural produce.) The seed suppliers and wheat buyers usually only recommend wheat varieties that are registered in the A-category on the List of Varieties. The survey also showed that more than 90 percent of the arable farmers in Zeeland select wheat varieties that are registered in the A-category. Together the examples illustrate the nexus role of the List of Varieties, in the sense that the producers of variation and the selection environment are brought together.

However, this is only part of the story. What still needs to be explained is the content of the List of Varieties as far as wheat varieties are concerned, or in the criteria used by the CRL, when was a variety of sufficient agricultural value and when was it better than existing varieties? To answer these questions we enter the domain of agricultural policy. The main goals of post World War Two agricultural policy were (Schaap 1983): to guaranteed food supply and stimulation of the export of agricultural products in order to improve the balance of payments.

In the years following World War Two, the first goal was considered to be the most urgent. A guaranteed food supply was secured within ten to

fifteen years after World War Two and attention was then focused on advancing the export of agricultural products. One and the same policy instrument was used to achieve both goals: intensification of production. Intensification characterised agricultural production until the late 1980s and this period can be seen as the productivist era (Roep 1993). From the perspective of increasing the export of agricultural products, the productivist era has been very successful. The Netherlands has become one of the largest exporters of agricultural products in the world.

Intensification of production as a central theme in agricultural policy after World War Two implied a specific interpretation of the term 'sufficient agricultural value'. This meant that a new variety had sufficient value for Dutch agriculture if it contributed to the main goal of Dutch agricultural policy: the stimulation of export by intensification of the production. A new variety was therefore considered to be better than existing ones if it had a potentially higher yield. This is clearly illustrated by the increasing yield potentials of the successive wheat varieties placed on the List of Varieties from 1950 onwards. Yield potential seems to have been the major criterium used by the CRL in its selection procedure. Other variety characteristics, except the winter hardiness of winter wheat varieties, were of minor importance. Resistance to diseases, for example, was of minor importance in breeding programmes because diseases could be controlled by the use of pesticides.

The baking quality of wheat varieties was also of minor importance in breeding programmes. One of the reasons for this was the negative relationship between baking quality and yield potential. Good baking wheat varieties have a relatively low yield compared to non-baking (i.e. fodder) wheat varieties. More important, however, was the EC policy on wheat prices. Since the late 1960s, wheat prices have been set by the EC Minister of Agriculture and this has meant the same wheat price for all member states. As it was generally accepted that the climate in France and Germany was more suitable for the production of high-quality baking wheat and because baking quality did not affect the price of wheat, Dutch breeders focused their attention on breeding higher yielding varieties. Because the EC was obliged to buy all the wheat produced in its member states and because the price differences between baking wheat and fodder wheat were minimal, all actors in the socio-technical wheat network were of the opinion that the increment gained by increasing the yield potential of wheat varieties was the most promising and profitable route.

Increasing yield potential was, therefore, the main issue on the seed breeders agenda and was embedded in the agenda at a macro level (Van Lente 1993). For a long time this could be read as the 'increase of the export of agricultural products through intensification of agricultural production'. At the same time the macro-agenda was endorsed because plant breeders succeeded in producing higher-yielding varieties. A dominant socio-technical framework (Bijker 1990) emerged during the course

of the productivist era: all relevant social groups reached consensus about the route to follow. The interpretative flexibility as far as the important characteristics of wheat varieties were concerned, decreased. A socio-technical framework structures the interaction between actors, but at the same time it is constructed, changed and adjusted through the interaction between them. The higher the degree of inclusion in the dominant socio-technical framework the more the actors interact in terms of that framework. In other words, they are bound to generate conventional inventions including improvements, optimalizations and adaptations. It seems likely that most of the actors involved had a high degree of inclusion in the dominant socio-technical framework, as for several decades most agricultural research and technological development had been concerned with improving and optimizing yield per hectare. Alternative routes were systematically ignored, resulting in a lack or even loss of knowledge on issues that were not related to maximizing the yield per hectare.

In the 1970s several agronomists had calculated that the maximum wheat yield that could theoretically be achieved in the Netherlands was 10 tons per hectare. This yield was considered, theoretically, to be the production limit. For many arable farmers this limit became a central aim. They strained every nerve to maximize yield per hectare and applied all the latest technologies to this end. These farmers became known as the '10-ton-wheat-growers' (Wiskerke 1994). With the introduction of winter wheat varieties such as Ritmo in 1992 and Vivant in 1993 this theoretical production limit of 10 tons per hectare was surpassed. Yields of 12 tons per hectare are no longer seen as exceptional.

Thus the post World War Two period is characterized by a productivistic view of agriculture and as far as it goals are concerned it was its extremely successful era. Yields of most arable crops increased by more than 100 percent and the Netherlands became one of the largest agricultural exporters in the world. However, there have been undesirable side-effects (it took until the 1980s for (some of) the side-effects to be generally accepted as being undesirable), and from this point of view the productivist era can hardly be seen as a success. The productivist model has been copied, to some extent, by other EC countries and has resulted in a huge surplus of wheat at EC level. The price of wheat was lowered under the assumption that it would discourage farmers from trying to secure maximum yields. However, it had the opposite effect and only encouraged farmers to aim for a still greater production. However, farmers minimized the amount of wheat in crop rotation resulting in a decrease of wheat production at a national level. As the price of wheat has dropped by approximately 40 percent over the last ten years, wheat is considered nowadays to be an unprofitable arable crop. Another side effect of the productivist era has been an increase in environmental pressure because of the use of fertilizer and pesticides. A third undesirable side effect, which has only recently been established, is the lack of knowledge about

the breeding, cultivation and storage of high-quality baking wheat. This was an alternative route systematically ignored during the productivist era as it did not match the aims of the time.

The Zeeuwse Vlegel Approach: A Shift From Quantity to Quality[1]

The undesirable side effects of the productivist era mentioned above gave rise to an alternative approach to wheat cultivation in the province of Zeeland: the Zeeuwse Vlegel approach.[2] The foundation of this approach was laid in the beginning of the 1980s. In those days many arable farmers participated in what were known as wheat study clubs. Farmers visited one another to compare different wheat cultivation practices. They discussed the choice of varieties, use of fertilizers, use of pesticides and economic results. After a few years, however, the mutual differences had been explored. The enthusiasm, that was so evident in the early days of the study clubs slowly disappeared and eventually many of the study clubs themselves disappeared too. The few that remained focused attention on the production of baking wheat. Through a selective choice of wheat varieties and other cultivation methods, these farmers succeeded in producing baking wheat of a marketable quality. The milling industry, however, had little interest in this wheat because it preferred the large batches of uniform and cheap French and German wheat. The ambitious study clubs were not getting the rewards for their quality and craftsmanship they wanted and they concluded that the production of good baking wheat was possible, but that the lower yields were not being compensated by higher prices.

During the same period Zeeland's association of young farmers – the Zeeuws Agrarisch Jongeren Kontakt (ZAJK) – and Zeeland's federation of ecology groups and nature conservationists the Zeeuwse Milieu Federatie (ZMF) attempted to start a discussion group. In practice, the farmers and the ecology groups were often opponents. The ZAJK and the ZMF, however, concluded that constant bickering was getting nobody anywhere. Instead they wanted to discuss points of agreement. But as fine feathers do not make fine birds, they decided to put what points of agreement they had into practice.

It took several years of thinking, negotiating and organizing. At the annual meeting of the ZAJK in December 1988 a project relating to the environmentally sound cultivation of baking wheat was presented. In March 1990 a corporation was founded and early in 1991 was given the name Zeeuwse Vlegel. The corporation's objective was – and still is – to realize the ecologically sound and profitable cultivation of baking wheat and establish close contact between producers and consumers. The board of the Zeeuwse Vlegel set up a counselling committee, in which the ZAJK, the ZMF, the three farmers' associations in Zeeland, the organic farmers,

the wheat study clubs, the agro-technical organizations, the bakers and the millers and consumers' organizations were represented. The counselling committee had a temporary status to begin with but recently this has been given a permanent character because the board was of the opinion that the contribution of the counselling committee with it wide range of members, would be of permanent and indispensable value in the future.

Reactions to the Zeeuwse Vlegel approach were initially very sceptical, particularly within the world of agriculture itself. Many farmers and agronomists did not believe in the possibility of cultivating good quality baking wheat, let alone abandoning chemical fertilizers and pesticides. Many questions were raised by the outside world and farmers often found themselves unable to answer them. They turned to organic farmers for help with the problem of weed control, for example. The Board and the counselling committee held long discussions about herbicides[3] and in the end they decided to accept the use of herbicides before the wheat crop sprouted above ground. The use of herbicides, fungicides and insecticides in the wheat crop at later stages was prohibited. Over the years the farmers have gradually gained the experience they needed in this method of weed control.

The next problem confronting the Zeeuwse Vlegel was how to get wheat varieties that suited their objective. The List of Varieties was little help. Most of the wheat varieties on that list were high-yielding non-baking varieties. In addition, the well-known baking wheat varieties were very susceptible to diseases and were, therefore, of little use in the Zeeuwse Vlegel method of cultivation. An extensionist in Zeeuws-Vlaanderen – the area of Zeeland that borders Belgium – was well-acquainted with wheat breeding and cultivation in Belgium itself. He knew that Belgian breeders and farmers had paid more attention to baking wheat than their Dutch colleagues. The Zeeuwse Vlegel farmers compiled a list of the variety characteristics they considered important: baking quality, disease resistance and straw sturdiness. On the basis of this list, the extensionist concerned was able to locate several possible wheat varieties.

In 1990 four farmers started to cultivate wheat and, at the same time, the Zeeuwse Vlegel started to work together with the regional experimental farm in testing different varieties and experimenting with different manuring methods. Several varieties were rejected after they had been tested for a year. In 1991, eight farmers cultivated 25 hectares of baking wheat and again a variety test plot was grown on the experimental farm. Arcade turned out to be the variety that performed best. However, there was a problem. Traditional wheat growers did not cultivate Arcade because its yield was low and the Arcade breeder was therefore no longer interested in maintaining the variety. After a great deal of consideration the Zeeuwse Vlegel farmers decided to take over the maintenance of Arcade themselves in collaboration with Cebeco-Zuidwest (a cooperative in the south-west of the Netherlands). In the following seasons Arcade and

Sunnan proved to be the varieties best suited for the Zeeuwse Vlegel approach.

Besides weed control and the selection of baking wheat varieties, the farmers had to find an answer to the problem of manure: what kind of manure should they use, how much, how should it be applied and when? This problem was also solved through trial and error. After three years of experimentation the Zeeuwse Vlegel advised farmers to apply 25 m^3 pig-slurry per hectare in early spring. From an environmental point of view in particular, spring application is much better than autumn application. In early spring the soil temperature is low and the mineralization of nitrogen is slow. This means that there is a shortage of nitrogen at the beginning of the growing period and this results in rather a lean crop when compared to the conventional way of cultivation. However, because the crop is less dense, it is less susceptible to diseases and pests. In summer, during grain-filling and ripening, substantially more nitrogen becomes available to the plants. As the plants have stopped growing, all the available nitrogen is used for filling the grain. This results in a very high protein content. Experiments on the regional experimental farm and on-farm experiments have shown that the later in spring the slurry is applied, the higher the protein content will be. Late application, however, results in a lower yield. Furthermore, these experiments showed that there was no significant difference between the use of chemical fertilizer (125 kg N) and the use of 24 m^3 pig-slurry (130 kg N) as far as yield per hectare and the protein content of the grains were concerned. The use of pig-slurry results in a shorter straw-length and a better straw-sturdiness than when chemical fertilizers were used. In conventional wheat cultivation the chemical substance CCC is used to improve the sturdiness of the straw in order to prevent flattening of the wheat. The application of CCC is prohibited in the Zeeuwse Vlegel approach because it is unacceptable to their view of environmentally sound wheat cultivation. Therefore the board of the Zeeuwse Vlegel selects wheat varieties with a high score on straw-sturdiness. In addition, the experiments show that the application of pig-slurry has a more positive effect on this characteristic than the application of chemical fertilizer.

In the cultivation of wheat by Zeeuwse Vlegel farmers, the use of chemical fertilizers and the application of pesticides is prohibited. To avoid the risk that some farmers may not comply with these conditions, these aspects of wheat cultivation are inspected by an independent organization, the NAK. More important, however, is social inspection. As soon as the wheat has germinated, every farmer involved in the scheme is obliged to place a large sign which states 'Hier groeit uw Zeeuwse Vlegel' (Your Zeeuwse Vlegel is growing here), in his field. All the neighbouring farmers know that the use of chemical fertilizers and pesticides is prohibited in a wheat field that carries this sign and they will keep an extra eye on that field to make sure no chemical fertilizers or pesticides are applied.

After the harvest, every batch of wheat is stored separately. A sample is taken from each batch to determine the baking quality. In the first years of the project the baking quality was determined by measuring the standard parameters: protein content, Hagberg index (a measure of percentage germination) and the Zeleny sedimentation value (a measure of protein quality). The board of the Zeeuwse Vlegel used the criteria of the Dutch milling industry to classify the different batches (see Table 2). All the batches that fulfilled the criteria of normal baking wheat were mixed together. The others were sold as fodder wheat for the EC intervention price.

Table 2 The Dutch Milling Industry's Classification System for Baking Wheat (Source: Kauderer 1994)

Characteristic	Better baking wheat	Normal baking wheat	Filling wheat	Fodder wheat[1)]
Hagberg index	≥ 220 s	≥ 220 s	≥ 220	
Protein content	≥ 13%	≥ 12%	≥ 11%	
Zeleny sedimentation value	≥ 50	≥ 35	≥ 25	
Milling efficiency	≥ 72%	≥ 72%	≥ 72%	

1) Wheat is classified as fodder wheat if the minimum requirements for at least one of the given characteristics (i.e. filling wheat) are not met.

The milling industry's classification system turned out to be only partly suitable. The 1993 harvest was very good in terms of protein content. The batches with the highest protein content were mixed and milled. Given the milling industry's classification system everyone had reasons to believe that the quality of the 1993-meal would be good, much better in fact than the meal produced in 1992 because the average protein content that year was low (Table 3). The Hagberg index and the Zeleny sedimentation value did not differ significantly. However, the baking test proved everyone wrong and convinced the Board that there was more to the story of baking quality than the milling industry had lead them to believe.

Therefore the board of the Zeeuwse Vlegel decided to conduct separate baking tests and used several batches to do so. Table 4 shows the result of these baking tests and compares them with the result of the baking test carried out on the 1993 harvest. It shows that Sunnan, despite a lower protein content and Zeleny sedimentation value, had a better overall baking quality than the meal from the 1993 harvest.

Table 3 Results of the Analysis of Zeeuwse Vlegel Meal (Source: Stichting Zeeuwse Vlegel 1993)

Characteristic	Harvest 1992	Harvest 1993
Hagberg index	306 s	297 s
Protein content	12.9%	13.6%
Zeleny sedimentation value	49	49

Table 4 Results of the Baking Tests on Four Batches from the 1994 Harvest and Meal of the 1993 Harvest (Source: Stichting Zeeuwse Vlegel 1994)

Characteristic	Batch ZV218	Batch ZV201	Batch ZV204	Batch ZV215	Harvest 1993
Wheat Variety	*Sunnan*	*Renan*	*Franco*	*Arcade*	*mix*
Hagberg index	327	359	359	318	297
Protein content	12.4%	12.6%	11.7%	12.4%	13.6%
Zeleny sedimentation value	42	39	50	42	49
Dough quality	excellent	good	medium	good	good
Bread volume	4200 ml	3900 ml	4100 ml	3800 ml	3600 ml
Colour	8	8	8	8	8
Baking nature	8	7	7	6	6
Structure	8	7.5	6.5	6.5	6.5

This also explains why the overall baking quality of the 1992 harvest, despite the lower protein content, was better than the overall baking quality of the 1993 harvest: the portion of Sunnan in meal from the 1992 harvest was higher than the portion of Sunnan in meal from the 1993 harvest. This implies that the variety itself is a determining factor and not just the parameters used by the milling industry to classify batches of wheat. The Board of the Zeeuwse Vlegel discussed these results with food technologists, baking wheat experts and scientists. None of them could explain the results of the baking tests. All they could conclude was that there was something more to baking quality than the parameters that were, and still are being, used by the milling industry revealed. Moreover, drawing a line between better baking wheat and normal baking wheat at a protein content of 13 percent does not appear to be suitable for all wheat varieties.[4] The same might hold true for the Zeleny sedimentation value.

Despite the result of the baking tests, the Zeeuwse Vlegel Board continues to use the standard parameters – protein content (> 12 percent), Zeleny sedimentation value (> 35) and Hagberg index (> 240) – to determine the baking quality of the batches. All batches that meet the criteria are mixed and, in this way, bakers will be provided with a homogeneous flour mélange for a whole year. The wheat is milled by two traditional windmills in Zeeland and the flour is distributed to bakers in 25 kilogramme bags. Fifty loaves of bread can be made from one bag of flour. Fifty wafers are supplied with each bag of flour. Bakers are obliged to place a wafer on every loaf of bread. Only in this way is it possible to inspect whether Zeeuwse Vlegel flour was actually used to bake a loaf of Zeeuwse Vlegel bread. The size, form, decoration and price of the bread is determined by the board of the Zeeuwse Vlegel. Due to the fact that the bread is slightly more expensive than 'ordinary' whole-meal bread (some 20 cents) and, more important, because there are very few links in the producer-consumer chain, the farmers receive a much higher price for their wheat than the fixed EC price. A higher price is necessary as the cultivation costs are similar and the yield much lower than in conventional methods of wheat cultivation.

Until mid-1994 Zeeuwse Vlegel bread was only baked and sold by local bakers, stressing the fact that preparation followed traditional methods. However, to increase sales, the Board of the Zeeuwse Vlegel decided to permit the sale of Zeeuwse Vlegel bread in supermarkets, provided that the supermarket had a bakery department and that the bread would not be sold for a different, that is lower, price. The decision to put the bread up for sale in the supermarket was taken after extensive research by the Science Advice Centre of the Agricultural University, Wageningen (Ter Beek and Poelman 1994). Their research showed that the specific taste of the bread and the environmentally sound way in which the wheat was cultivation was the main reasons why consumers bought Zeeuwse Vlegel bread. Other important reasons for buying this bread were its healthy character, the regional identity of the product and the artisan process.

On Obstinacy, Curiosity and Money: The Motives of the Farmers Participating in the Scheme

In 1994 the Board of the foundation decided to establish a cooperative and the wheat and bread project is now the domain of the cooperative. The reason for establishing a cooperative was given by the Zeeuwse Vlegel product-manager:

> *'We wanted to apply for subsidies to start new projects. This meant that the bread project and wheat cultivation had to be cut loose from the foundation otherwise it would be unclear as to what the subsidies would be used for: for new projects or for giving financial support to the bread. By establishing a cooperative the bread project*

is now formally separated from the foundation and the cooperative and foundation are financially independent. However, two members of the Board of the foundation are also member of the Board of the cooperative and the trademark 'Zeeuwse Vlegel' is owned by the foundation. So, if the members of the cooperative decide to use pesticides in the cultivation of wheat, the Foundation Board can decide to deprive the cooperative of the privilege of using the trademark. This way, all participants in the project keep a grip on the bread project'.

At the moment the cooperative has 22 members: 21 arable farmers and the regional trial farm. Early in 1995 I interviewed 17 members of the cooperative and asked them about their motives for participating in the Zeeuwse Vlegel project.

Farmers motives varied considerably and there was a particular difference between the farmers who set up the project and the ones who joined later. For the first group of participants the wish to 'turn the tide' was the main motive. They wanted to achieve financial rewards for quality production and take control over the distribution, processing and sale of their product:

'My main motivation for becoming involved in this project was that it offered us the opportunity to determine the price of our product ourselves'. Another farmer adds: *'On top of that, it is a regional product. You know where your wheat ends up and where and how it is milled. You have more insight into the chain that goes from producer to consumer. This is very important as far as I am concerned. Most arable farmers have no idea about the destination of their wheat. They transport it to the CZAV (the regional cooperative grain-storage, HW) and that's where the story ends for them. They don't know where it ends up or what is done with it'*. A third participant had a similar reason for joining: *'Why do I participate? Because this project is a way of getting closer to your product. You can actually taste the wheat you have produced'*.

The environmentally sound way of cultivation is an aspect of the project that binds most participants:

'I became convinced that conventional arable farming was a dead-end street. The increasing dependence on pesticides bothered me. I wanted to change that and the Zeeuwse Vlegel provided me with the opportunity to gain experience with environmentally sound wheat cultivation'.

Some of the participants are interested in organic farming. To them the Zeeuwse Vlegel approach is a suitable intermediary between conventional wheat cultivation and organic wheat cultivation:

'I am interested in organic farming but at the moment organic farming is one step too far for me. The Zeeuwse Vlegel is, in this respect, a good intermediary. I wanted to see whether consumers were prepared to pay a higher price for bread made from environmentally sound cultivated wheat and it gave me the opportunity to experiment with environmentally sound cultivation on a part of my farm'.

This farmer has not yet decided to switch to organic farming. Several participants, however, have used the experience gained in the Zeeuwse Vlegel project to switch to organic farming.

For some of the arable farmers that joined at a later stage, the price of the wheat was the motivating factor:

'My single motivation for starting to cultivate wheat for the Zeeuwse Vlegel was the plummeted price of wheat. I heard about the price of Zeeuwse Vlegel wheat and it interested me. I started to think about the fact that I was constantly trying to increase my wheat yield to compensate for lower prices. I came to the conclusion that a lower yield and a higher price was a good alternative'.

For another farmer the higher price of wheat was also a major motive for joining the project:

'I joined the project because I had heard about the substantially higher price they were trying to get. Furthermore I thought it would be wise to be one of the participants in case the project turn out to be a success. If it did I would profit from already being a member because I think many other arable farmers would like to join then too. However, up to now the substantial higher price has not been realized because of the surplus production of wheat'.

Besides these motives, the challenge of experimenting and cultivating in a way that was generally considered to be impossible appealed to many of the participants:

'Cultivating wheat in a different way was something I felt attracted to. Getting the hang of something new, taking up that challenge; that appealed to me'.

For others experimenting was a way to get answers:

'For a long time I used to work like my father had done. But I started to realize that I didn't understand why I was doing things the way I did. From that moment on I started to experiment with different cultivation methods and strategies to get answers to my questions and getting an answer to these questions was my motivation for joining the Zeeuwse Vlegel. I wanted to see for myself how things worked, why certain things happened and what was possible. By experimenting you get more insight into your own way of farming and sometimes you have to adjust your ideas. You think that some things work in a particular way, but from the results of your own experiments you have to conclude that your ideas were wrong'.

For one of the farmers I interviewed the challenge of experimenting was almost a goal in itself. He told me he would stop cultivating wheat for the Zeeuwse Vlegel when it was no longer a challenge to him:

'A farm has to 'keep moving'. As a farmer you have to keep on experimenting. Searching for new options, routes, techniques – that's what I enjoy most. ... I easily switch from one route, goal or strategy to the other. I do not think about all the financial investments. This should not be the main reason for moving in a particular direction. It has to remain interesting to me, interesting in the sense of challenge. I do hope that the Zeeuwse Vlegel survives and expands. In a few years I will no longer be a member. As soon as something is in smooth water, it is no longer interesting to me. Then I need a new challenge'.

Although the participating farmers had different motives for joining the project they share the idea that farmers themselves have to take the bull by the horns if they want something changed. They condemn the passive and defensive attitude of many of the arable farmers and farmers' associations:

'Many farmers let others decide what they have to do: they let the seed-supplier choose the varieties, the sales representative from the pesticide company chooses the pesticides and the extentionist from the farmers' association chooses the crop rotation and cultivation strategy. Many arable farmers have a very low income or no income at all and most farmers have become very adept at blaming others for their bad financial situation. I resist this because I believe that you first have to look at yourself before you start to blame others'.

As many arable farmers believe that there is no way out of the current crisis, one might think that they support the Zeeuwse Vlegel approach because it is an attempt to find a solution to several of the problems facing arable farmers at the moment. However, the opposite seems to be the case. Many arable farmers are extremely critical of the Zeeuwse Vlegel:

'They see our approach as a personal attack. They believe that we condemn their way of working'.

Another farmer adds:

'Many arable farmers in the neighbourhood are of the opinion that the Zeeuwse Vlegel is a step backwards because our yields are much lower, because we have reintroduced old cultivation techniques, because we have more weeds in our wheat crop than they do, because we put so much time and effort into promoting and selling the bread and because it is a small-scale project'.

Some participants, however, have a different experience with their colleagues:

'The Zeeuwse Vlegel creates room for discussion with colleagues. Normally farmers only talk about the yield when you ask them about the result of the wheat harvest. I am glad that they no longer ask me about yield. They know the yield of Zeeuwse Vlegel wheat is much lower than conventionally cultivated wheat and furthermore, they know that yield is of minor importance in our approach. This means they have to talk about other aspects of wheat cultivation and such a discussion is more fruitful to me than that endless and useless discussion about yields'.

The Economic Impact of the Zeeuwse Vlegel at Farm Level

So far the Zeeuwse Vlegel has not proved to be the goose with the golden eggs that many farmers had hoped for. The Board of the Zeeuwse Vlegel sells wheat at 70 cents per kilo. Due to the fact that the acreage of Zeeuwse Vlegel wheat has increased more rapidly than the sales of the meal, the project confronts a production surplus. This surplus has been sold for the EC intervention price which is approximately 30 cents per kilo. This means

that the average price the farmers received for their wheat is approximately 45 cents per kilo. Assuming that the average yield in conventional wheat cultivation is 10 tons per hectare, gross income amounts to NLG 3000 per hectare. In wheat cultivation following the Zeeuwse Vlegel approach, the average yield is 6 tons per hectare. Over the last years the average price has been 45 cents, resulting in a gross income of NLG 2700 per hectare. As the cultivation costs are not significantly different in both approaches (De Koeijer and Wiskerke 1994), this implies that the conventional way of wheat cultivation is more profitable in terms of gross income per hectare.

However, measures have been taken to achieve a good balance between production and sales. The Zeeuwse Vlegel Board has decided to decrease acreage. In addition, it has entered into an agreement with the participating organic farmers. The organic farmers will supply the extra amount of wheat needed if there is a shortage. This is in accordance with cultivation regulations because organic farmers do not apply any pesticide nor chemical fertilizer. Through this construction it is estimated that from now on farmers participating in the scheme will receive between 65 and 70 cents per kilo. A yield of 6 tons per hectare and a price of 70 cents per kilo will give a gross income of NLG 4200 per hectare. When compared to conventional wheat cultivation, this means an additional gross income of NLG 1200 per hectare. On average the participating farmers cultivate 4.5 hectares of wheat for the Zeeuwse Vlegel. If the wheat price was 70 cents per hectare, this would give an additional gross income NLG 5400 at farm level compared to conventional wheat cultivation.

The Potential Impact of Baking Wheat Cultivation at a National Level: Comparing Conventional Cultivation Methods with the Zeeuwse Vlegel

The farmers participating in the Zeeuwse Vlegel project have made one thing very clear: cultivating high-quality baking wheat is possible in the Netherlands. Moreover, it can be done in a sustainable, almost organic, way. Of course the farmers have to overcome a large number of difficulties, but this is quite normal in a new approach. One of the challenges they face is expanding the sales of wheat. Although sales have not grown at the rate the Board had expected they are nevertheless expanding. At the moment they are negotiating with several bakers in other parts of the country in order to increase the number of market outlets. In addition, the Board is thinking about selling other products that can be made from wheat, such as pancake meal. The Zeeuwse Vlegel also introduced its own beer in November 1994. This beer is made from barley cultivated, distributed and brewed according to the Zeeuwse Vlegel approach: the environmentally sound production of barley, minimal links between producer and

consumer and preparation according to traditional methods. Other crops are likely to follow in the near future.

Many experts believe that food production along the lines of the Zeeuwse Vlegel approach will always be for a specific and small niche market. This may be true to some extent. Nevertheless, it is a fact that in other parts of the Netherlands similar projects have also emerged although in most of them wheat is cultivated in a conventional way. In Zeeland itself, increasing numbers of farmers are producing baking wheat and selling it directly to local bakers. They too receive a higher price for their wheat than the EC intervention price. Furthermore, the number of organic farmers is increasing and they also produce wheat for a specific niche market. Moreover, the Dutch milling industry, working with some of the cooperatives, is promoting the cultivation of domestic baking wheat. Taking all these trends together there seems to be a shift from bulk to quality production and an increasing number of experts believe that the production of good baking wheat is possible in the Netherlands (Kelfkens 1994).

Table 5 Calculation of the Amount of Wheat and the Accompanying Acreage Required under the Assumption that only Dutch Wheat is Used in the Preparation of Dutch Bread

	Conventional approach	Zeeuwse Vlegel approach
Bread consumption per capita per year[1]	60 kg	60 kg
Number of consumers in the Netherlands	15 million	15 million
Total annual bread consumption	900 million kg	900 million kg
Average milling efficiency	75%	75%
Total amount of wheat required	1200 million kg	1200 million kg
Wheat acreage in the Netherlands[2]	120000 ha	120000 ha
Yield per ha	9000 kg	6000 kg
Total wheat production	1080 million kg	720 million kg
Shortage (in kg)	120 million kg	480 million kg
Shortage (in ha)	13333 ha	80000 ha

[1] Source: Meulenberg and Van Trijp (1992).
[2] Source: CBS (1992).

At the moment, approximately 75 percent of the wheat used for the preparation of Dutch bread is cultivated in other countries, mainly in Germany and France (Kauderer 1993). This means that enormous quantities of wheat have to be transported over long distances. From the point of view of sustainability this is an undesirable situation. Keeping in mind that production of good baking wheat is possible in the Netherlands, I

have calculated what the consequences would be in terms of the wheat production and the wheat acreage needed if all the wheat required for making Dutch bread were cultivated in the Netherlands. The results of this calculation are given in Table 5. It shows that despite the approach more wheat has to be produced to meet the needs of the consumers. Perhaps it is unrealistic to believe that all wheat will be produced according to the Zeeuwse Vlegel approach. However, a 10 percent niche market for organic wheat and a 15 percent niche market for Zeeuwse Vlegel type wheat does not seem to be too far-fetched. In addition, wheat is also needed for the production of seeds, biscuits, beer, starch and fodder. This implies that there may well be a potential shortage of wheat acreage in the future. For the last decade, agricultural research in the Netherlands has focused its attention on finding the so-called fourth crop, that is the crop that can compensate for the decreasing wheat acreage.[5] Perhaps it would be more fruitful to dedicate more attention to improving the baking quality of wheat as wheat is one of the few crops with a potential shortage in acreage.

Table 6 Calculation of the Potential Economic Impact at Farm-Level of the Production of Baking Wheat

	Conventional approach	Zeeuwse Vlegel approach
Yield per ha	9000 kg	6000 kg
Price per kg	40 cents	70 cents
Gross income	NLG 3600	NLG 4200
Gross income fodder wheat (10 tons x 30 cents)	NLG 3000	NLG 3000
Additional net income per ha	NLG 600	NLG 1200
Average size arable farm	80 ha	80 ha
Percentage wheat	25%	25%
Additional net income per farm	NLG 12000	NLG 24000

The production of high-quality baking wheat could also benefit the income of arable farmers. As mentioned before the gross income per hectare wheat is NLG 3000 (10 tons x 30 cents). At the moment farmers receive a slightly higher price – approximately 33 cents – for baking wheat. This price does not compensate for the lower yield – approximately 8500 kilo – of baking wheat varieties. However, I have come across arable farmers who produce high-quality baking wheat for the milling industry. They receive a price of 40 cents per kilo. Let us assume that a price of 40 cents for conventionally cultivated high-quality baking wheat is possible. In Table 6 I have presented the results of a hypothetical situation in which baking wheat is produced on an arable farm of 80 hectares with 25 percent wheat in the

crop rotation. As the cultivation costs of high-quality baking wheat does not differ from the cultivation costs of fodder wheat, the increase in gross income can be seen as additional net income. The results in Table 6 show that cultivation of high-quality baking wheat can lead to a substantial increase in net income per farm.

Concluding Remarks

A substantial increase of the portion of domestic wheat in Dutch bread as suggested in Tables 5 and 6 seems rather unrealistic if one looks at the wheat varieties that have recently been placed on the List of Varieties. However, several signs point to a turn in the tide. Steps are being taken to stimulate the breeding and cultivation of baking wheat varieties. This year the 'Agro-milieukeur' – a hallmark for sustainable agricultural production – was introduced for wheat. This hallmark was initiated by several ecology groups and is supported by the Consumers' Union and the agricultural board. Farmers who want their wheat to be eligible for this hallmark will have to fulfil strict conditions concerning the amount and kinds of pesticides and fertilizer used. They are obliged to keep a pesticide and fertilizer account. Farmers will be rewarded with a higher price for wheat eligible for the hallmark. It seems likely that the hallmark will only be applicable to baking wheat. If the hallmark becomes well-known and if the consumers are prepared to pay the extra price for products with this hallmark, then the criteria concerning pesticides and fertilizer will probably become part of the classification system of the milling industries (see Table 2). A positive aspect of the introduction of the hallmark will be a substantial increase in the amount of bread made with 100 percent domestic wheat, provided that consumers do indeed buy bread with the hallmark.

The hallmark will be integrated in the IKB approach currently being developed by the milling industry and the cooperatives. IKB stands for 'Integrale Keten Beheersing' (Integral Chain Control) or 'Integrale Kwaliteits Beheersing' (Integral Quality Control). A chain in this approach is the sequence of all links from producer to consumer. In the case of wheat, the chain covers all links from wheat breeder to bread consumer. IKB should lead to optimization of the complete production process through mutual agreements between connecting links in the chain. Furthermore, IKB should advance the transparency of the production process as a whole. In other words, it will improve the traceability. By integrating the hallmark in the IKB approach wheat cultivation should become more sustainable as criteria will be set for each link. The underlying idea is that the demands of the consumers will be translated back to the wheat breeders. Let us assume that the consumers demand bread made from Dutch wheat that is cultivated in an environmentally sound way. The

bakers will then ask the milling industry to supply them with meal coming from this type of domestic wheat. The milling industry will turn to the wheat stores and demand that specific wheat.

This means that wheat stores will have to store different batches – with different characteristics as far as variety, quality and use of pesticides and fertilizer are concerned – separately in order to fulfil the specific demands of the milling industry. The wheat stores will request the farmers to reduce the use of certain inputs and they might be prepared to pay a premium for wheat with a high protein content, for example. The farmers will then ask their seed supplier to supply them with baking wheat varieties that are resistant to pests and diseases. Finally, the seed suppliers will request the wheat breeders to focus on baking quality and resistance to pest and diseases in their breeding programmes and that should trigger wheat breeders to select varieties on those characteristics. This is how the IKB approach should work. Despite the fact that I have strong doubts about the IKB approach (see Wiskerke 1995), it could stimulate the cultivation of baking wheat in the Netherlands, especially when combined with a hallmark for environmentally sound production.

However, the hallmark seems to have become a problem for the Zeeuwse Vlegel. The herbicide they allow in their method of cultivating wheat is on the 'black list' of the ecology groups that have initiated the hallmark.[6] They do allow, however, the use of another herbicide but to be equally effective this herbicide has to be applied three times during the growing season after the wheat crop has sprouted above ground. This implies that the Zeeuwse Vlegel's very effective and extremely cheap system of social inspection would no longer be tenable. Instead all batches would have to be analyzed for residues of herbicides, fungicides and insecticides meaning that the costs to the farmers participating in the Zeeuwse Vlegel would necessarily increase. Furthermore, it is rather difficult to convince consumers that spraying the crop three times is more sustainable than spraying it once. The Board of the Zeeuwse Vlegel could simply ignore the hallmark and continue in the way they have always done. However, if the hallmark becomes well-known, it will be very hard to explain to consumers why a product like Zeeuwse Vlegel bread, which emphasises its environmentally sound way of production, is not eligible for the hallmark.

Notes

1 This paragraph is based on a paper that was written by myself and the chairman of the board of the corporation (De Koeijer and Wiskerke 1994). Additional information was obtained through informal talks with the chairman of the board and the product manager of the corporation and by interviewing arable farmers who participate in the Zeeuwse Vlegel project.

2 The name 'Zeeuwse Vlegel' has been carefully chosen. Zeeuwse refers to the regional identity of the product: the province of Zeeland. A 'Vlegel' is a flail, a traditional tool that was used in harvesting grain. However, 'vlegel' also means brat and this refers to the obstinate character of the participants in the project.

3 In this discussion the participants not only took the problem of weeds in baking wheat for the Zeeuwse Vlegel into consideration, but also the wider and long-term effects of insufficient weed control in baking wheat production. In the day to day practice of arable agriculture, the farmers prefer to control the weeds in cereals, as it is fairly easy in these crops. Control of weeds in crops like potatoes and sugar beets is more difficult and there is a need for more herbicides. One can choose not to use any herbicides in wheat cultivation, but if that implies that the overall effect is that more herbicides will be used on the farm as a whole, then nothing is gained.

4 The differences in classification of baking wheat between the milling industry and the Zeeuwse Vlegel is a case-study in itself. It would be extremely interesting to elaborate this issue especially from a theoretical point of view. However, I do not elaborate on it here.

5 For those readers that are not familiar with contemporary Dutch arable agriculture the three main crops are wheat, potatoes and sugar beet. The potato acreage has remained fairly constant over the last years. The sugar beet acreage has decreased over the last decade as a result of the quota system.

6 The Board of the Zeeuwse Vlegel used four criteria in its choice of the herbicide: the herbicide should have no negative impact on soil, water, atmosphere and soil organisms. The ecology groups use five criteria: the four used by the Zeeuwse Vlegel and in addition, the herbicide should not be persistent. The board of the Zeeuwse Vlegel questions whether '*persistency is a problem when the herbicide has no damaging effect at all on soil, water, atmosphere and soil organisms*'.

12 Local Cooperatives as Carriers of Endogenous Development

René de Bruin

Introduction

This chapter describes the consequences and potential of new developments in Dutch agriculture. In the last few years, a considerable number of new, local cooperatives and farmers' associations[1] have been founded and this has greatly affected thinking and practices in Dutch agriculture. These farmer initiatives have a common goal: the search for region-specific solutions and designs for adequate forms of sustainable development. In doing so they offer new alternatives to the ruling paradigms of agrarian development and can be see as a countervailing force challenging modernist dreams of sustainability.

Examples of these initiatives will be discussed in this chapter. I have chosen two farmers' associations in Friesland both of which are concerned with environmental management in their region. In my analysis I will stress the significance their integrated approach to rural development has had on making use of the endogenous potential in the region. This impact, however, is not only restricted to the economy of the region alone, it also supports other aspects of socio-economic development.

On a theoretical level, the farmer initiatives represent expressions of a new approach to the agrarian question in general. Van der Ploeg (1993) has offered a description of 'local self regulation' which stands in sharp contrast to traditional approaches of market liberalization, political regulation and technological optimization, for example. This important alternative response to the general crisis in agriculture is supported theoretically by the farming style approach in which heterogeneity and agency are central. Because of its consequences for policy design and implementation, de Bruin and Roex (1994) characterized this as the 'reinforcing heterogeneity' approach. Its starting point is the specific social dynamics and heterogeneity of agricultural practices and the specificity of their ecological settings. In this approach, agricultural development is not merely a derivative of 'markets' (liberalization and regulation approaches) or 'technology' (technological optimization approach). It is understood as being shaped by an interaction between farmers' strategies, the specificity of ecological settings and political and institutional 'modes of ordering' (see

Law 1994, also Roep and de Bruin 1994). This approach is mainly concerned with providing and using the 'best social means' available which includes the farmers labour, knowledge, craftsmanship, entrepreneurship and adequate institutional relationships.

Building upon heterogeneity may well provide new perspectives and solutions for sustainable development, rooted in the empirical reality of Dutch agriculture. Heterogeneity appears as a major challenge and opportunity for yet more diversified, decentralized and flexible strategies for sustainable rural development. Farmers and other local actors play a central rôle in the design and development of adequate forms of sustainable development.[2] This, in turn, has far-reaching consequences for agrarian policies and the relation between state agencies and farmers.

Background

In recent decades, great efforts have been made to modernize European agriculture. The route to be taken by modern agricultural development was supposed to be unilinear. Combining scale enlargement with the use of modern (science-based) technologies in the agrarian production process was seen as the only way to success. Farmers able to achieve this combination were classified as having 'vanguard farms', the rest were categorized as marginalizing farmers and their farming practices were delegitimized (van der Ploeg 1985). Agrarian policies, market prices, science, technologies and social engineering were considered to be the driving forces behind agrarian development.

This normative model of farm development reflects a productivist perspective of agricultural development, i.e. maximization of productivity under optimal production conditions (Roep 1993), and has been supported by EC price policies and national policy. At the national level this involved subsidies, research and development, extension and education, the improvement of infrastructures and the physical planning of rural areas and landscapes. To secure agricultural modernization, considerable efforts were made to transform production conditions in order to make optimal farming possible. Land consolidation projects aimed at optimizing conditions of production and at the redistribution of land so there was more of it available for the anticipated 'vanguard' farms. In this way a strict division between agricultural production and the management of nature and landscape values was advocated (and implemented). In the process characteristic rural landscapes disappeared.

As pointed out in more detail in other contributions to this volume (see for instance the chapter by van der Ploeg), Dutch agriculture is presently facing social, economic and ecological problems. To solve these problems new and adequate approaches and solutions have to be developed. Because of the accumulation of problems raised by agricultural develop-

ment in recent decades, traditional models of agricultural development have to be revised. Explicit attention has to be paid to issues other than agricultural productivity alone: the liveability of the rural areas is one such factor. In addition the whole relationship between agriculture and the natural environment needs to be reconsidered.

For this reason, sustainable development has to be operationalized with multiple objectives and not be limited to the socio-economic or ecological. Since the traditional model of agricultural development was so strongly interwoven with a specific model of policy making and implementation,[3] this too needs to be re-thought.

Endogenous Social Potentials: Styles of Farming

Despite the political project of agricultural development and its supposed unifying tendencies, farming is characterized by an enormous heterogeneity. Detailed empirical research shows that there is no one pattern of farm development. On the contrary, there have been and still are, diverging development patterns and strategies. Instead of the homogenization that modernization was expected to bring, heterogeneity has grown considerably during the last decades (de Bruin 1993b).

Heterogeneity is largely due to the various strategies actively managed by the actors involved. The strategies and corresponding farm practices are well-known in the countryside. Analytically they can be regarded as distinct styles of farming – specific combinations of farming practices involving the strategic and meaningful use of farm labour. A style of farming is linked to a specific idea and model of farm management and includes a strategic project for future farm development.

Each style of farming has its own production goals and these vary from style to style. It is, therefore, important to realize that styles of farming are relational concepts. Each style of farming combines a unique normative perspective on farm development involving specific farming practices and a particular use of natural and social resources.

Styles of Farming in the Wouden

Research has recently been carried out in the Noordelijk Friese Wouden (Northern Friesian Woodlands, hereafter Wouden) into styles of farming (de Bruin and van der Ploeg 1991). In this area, a typical landscape of wooded earth banks and lines of trees which function as fences have been preserved thanks to the farmers' natural resource management. It is a small-scale landscape and on higher sandy soils the average plot size is less than two hectares. This alternates with relatively open areas of lower lying peat-clay soils. Both the small-scale 'closed' landscape and the open areas contain important natural and landscape values.

Agriculture in the Wouden is dominated by dairy farming (85%) and is extensive and small-scale. Farmers resisted land consolidation projects initiated by state agencies because of their negative socio-economic effects (the gradual disappearance of large numbers of small farmers) and their tendency to increase costs. Therefore, production conditions are inadequate for industrial farming methods. The Wouden is recognized by the EU as a less-favoured (5B) area.

In the context of its specific ecological conditions, agriculture in the Wouden is still relatively well-balanced. This does not imply, however, that agricultural practices are homogeneous. Different patterns of farm development and different forms of farm management exist within the region. After extensive interviews with dairy farmers in the region, it became possible to distinguish four different styles of farming. These styles are known as *calm farmers, breeders, business-like farmers* and *stayers*. The metaphors used to characterize different styles of farming have been drawn from local discourse.[4] Farmers, in their search to secure the continuity of their farm enterprise, have looked for specific solutions and opportunities. Scale enlargement, which is important for the business-like farmers, and intensification which is part of the strategy of the breeders, are strategic options in the quest for continuity. These, however, are always adapted to the specificity of the small-scale landscape and the characteristics of its ecological setting.

Other farmers have tried to provide a future for their farms by strictly controlling costs (calm farmers) or by combining dairy farming with other, income-generating activities both on and off the farm (stayers). These different strategies towards the future are well-known in the region.

Differential Prospects for Sustainable Development

Styles of farming research shows that the different styles of farming offer differential prospects for sustainable development. This relates both to the economic viability of farming, as van der Ploeg *et al.* (1992, 1993) has shown and to the ecological aspects of sustainability (see: Roep and Roex 1992). There is no standard solution or optimal form of sustainable development (de Bruin 1993a). Each of the different styles of farming have strong and weak points as far as sustainability is concerned. In addition, the socio-economic and ecological aspects of sustainability cannot be regarded as separate entities. Which style will prove to be the most successful in the future will depend on political choices, institutional support, and on the capacity of farmers to adapt their farming practices to changing circumstances.

This can be illustrated with research data from the Wouden. In this region, in particular, the socio-economic and ecological aspects of sustainability are closely interwoven and the reproduction of natural and landscape values depend on the extent to which farmers are able to guarantee continuity on their farms. However, farm management and development

cannot be separated from the small-scale landscape and the claims and priorities that society gives to the preservation of nature and landscape in the region. Farmers also have to anticipate legislation relating to environmental issues and at the same time are confronted by the fact that the liveability of the rural area itself is at risk because of the decline in the number of farms and economic activities.

I will now try to show how the different styles of farming are able to anticipate changes in the political and economic environment in order to provide sustainability. First, it should be noted that there are significant differences in the ways styles of farming relate to the natural environment. These differences emerge in the intensity of land use, for example, and involve such factors as stocking rate and the use of chemical fertilizers and concentrates which result in differences in mineral losses of up to 35 percent between farming styles (de Bruin *et al.* 1991).

Business-like farmers, for instance, practise high input/high output farming. High production intensity is achieved through the application of large amounts of mineral fertilizers, concentrates and through drainage and levelling. Due to scale enlargement, their farm practices are relatively standardized. If economic conditions change and market prices decrease, business-like farmers will feel the need to transform both landscape and ecological conditions to meet their production goals. In addition, they see the best way of reducing mineral losses to be an on-going rationalization of farming methods along the lines of technological optimization. Calm farmers, on the other hand, practise low input/low output farming, the application of mineral fertilizers is low and they refrain from pasture renewal. Their farms have been developed in balance with the natural environment and cultural history of the region. The future of this style is very much dependent on their ability to continue a strategy of step-by-step development and low-input agriculture. Imposed environmental investments[5] and/or drastic changes of market prices will endanger the continuity of these farm.

Breeders and stayers also have their own specific prospects for future development. If flexible use of the natural environment is guaranteed, both styles will be able to adapt their farm management to changing market relations and environmental regulation within the small-scale landscape. Breeders will seek for specific solutions at farm level and carefully adjust their farming practices, while stayers will build upon their capacity to achieve extra income through an ongoing broadening of economic activities.

Research data from the Wouden shows, therefore, that each style has its own capacity to anticipate changes in its political and economic environment. These opportunities are very much related to the utilization of the specific ecological setting.

Prospects and Barriers for Using Endogenous Potentials

Nature and landscape are the main endogenous resources for rural development in the Wouden. Because there is a lack of alternative employment and very little opportunity for further modernization of farming practices, rural development has to be attuned to and build upon the specificity of the region. As has been stressed in policy documents,[6] nature and landscape in the Wouden are the basic resources for developing small-scale (agro)tourism and the commercialization of regional products. The relatively sound environment, 'silence and space' and a unique combination of lakes and small-scale landscapes gives it a specific touristic value.

Although a tension can be observed between some farm development patterns and these small-scale landscapes, it was found that nine farmers out of ten (N=110) are prepared to dedicate time and labour to the reproduction of the natural environment. Moreover, 91 percent of the farmers regard integration as possible, even if it were only in certain aspects. How integration takes place depends upon the characteristics of the different styles of farming. In each style important but specific opportunities exist for integrating the management of nature and landscape into farm practices. We can therefore conclude that the willingness of farmers and the opportunities they have for managing nature and landscape correspond well with the high priorities attached to its preservation and to the idea of building upon the specificity of the region. Nevertheless, despite these positive factors, nature and the small-scale landscape in the Wouden are in decline. There are important limitations to exploiting the endogenous potentials of the region.

At the present time farmers can make agreements with state agencies concerning payments for activities to ensure the reproduction and management of valuable landscape elements and natural values. However, as far as nature conservation is concerned, the participation of farmers in state programmes remains below expectation. Although remuneration is reasonable, farmers criticize the way in which agreements have been formulated. Management methods are prescribed by state agencies and these are rigid and unsuited to different ecological settings and year-to-year climate variations. The methods prescribed are not in tune with the large variety of farming practices embedded in different styles of farming. Furthermore, the present range of agreements reflect a particularly normative view of nature development which is not shared by farmers in the region. Although the majority of farmers favour integration and environmental management, many of them do not accept agreements because they fear difficulties when it comes to integrating these agreements into their farming practices.

In landscape management, the gap between possibilities and practices is even larger because of the high cost of landscape management involved. State programmes to support landscape management only operate in

selected parts of the Wouden. In the larger part of the region, in particular the most vulnerable areas where land parcels are smallest and landscape management costs are the highest, farmers have no chance to make agreements with state agencies about payments for landscape management (see VEL 1995; VANLA 1995). Although policy measures are taken to protect the landscape, there is inadequate finance to make policy effective. It is in these most vulnerable areas that the quality of the landscape is in rapid decline. For many farmers this situation is unacceptable, particularly because national government is investing large amounts of money in nature preservation and nature development in nature reserves. Within the framework of the Policy Plan for Nature Preservation (NBP), areas that have been taken away from agriculture are handed over to private organizations. As Slangen (1994a) points out putting the NBP into effect is very expensive when compared to the alternative – the agricultural management of nature and the landscape. In rural areas this policy has initiated a downward spiral in economic activity and social dynamics because land has been taken out of agricultural use (see de Bruin 1993). This has lead to an outflow of means of production from the region, to a decline in the number of active farmers and ultimately to a negative effect on those who remain behind. It has also put the potential for farmers to reproduce natural and landscape values at risk.

Another barrier to exploiting endogenous potential – in this cases the prospects of an active rôle for farmers – is the fact that responsibility for and the execution of policies and management agreements are divided amongst several state and semi-private agencies. Farmers who are willing to integrate various aspects of natural resource management into their farming practices often find themselves lost in an '*institutional labyrith*'. Transactional costs are considerable when farmers want to go beyond standard agreements and integrate natural resource management with agriculture production in more flexible ways.[7]

In environmental policy, farmers have to deal with a growing number of generic prescriptions, legislation and controls. The experience of the farmers in the Wouden is that agricultural and environmental policies are largely divorced from the empirical reality of their areas. For instance, the generic prescription to inject liquid manure into pastures in order to reduce ammonia emission gives rise to problems in the small-scale landscape of the Wouden. Fields are often too small and, because of shade, too moist in springtime for the large and heavy machinery required to inject manure. The alternative techniques allowed by law do not solve the specific problems of the Wouden. This kind of generic policy has counterproductive effects. Farmers are now concentrating their use of liquid manures on those parcels of land that are most suited for the use of heavy machinery. This leads to a higher use of chemical fertilizers on the rest of the farm. As a result of this problem, there is a growing tension between farming and the preservation of the small-scale landscape. Finally,

the generic prescription to inject manure into pasture land conflicts with the preservation of meadow birds whose breeding season falls in the period when most of the manure has to be applied. Farmers and contractors find it impossible to protect meadow birds when using large and heavy machinery.

Another striking example of the disjunction between policies and empirical reality occurred a few years ago. Within the framework of policies to limit the negative impact of ammonia emission on natural values, legislation was presented that would limit the development of all farms located less than 50 metres from valuable landscape elements. In the Wouden, this meant that almost all farm development became impossible because there was not a cowshed that was more than 50 metres from a landscape element and thus farmers efforts to preserve small-scale landscape elements became a burden on farm development itself. These policies were changed after strong protests from farmers themselves. However, this incident characterizes the relationship between policy making and the empirical reality of the rural areas. Farmers nowadays feel that their efforts to reproduce typical rural landscapes and natural values have gone unrecognized. They are often labelled 'environmental criminals' by public opinion and farming in general seems to be surrounded by a 'bad smell'. This has also affected the position of farmers in the rural community in general. The (supposedly) poor prospects facing farming in the future and the vulnerability of the quality of rural life has lead to feelings of social deprivation among farmers and one of the results of this has been a low succession rate.[8]

As de Bruin and van der Ploeg (1991) point out, the downward spiral described above can be countered if the crucial rôle farmers play in maintaining and managing natural resources is recognized. Farmers could, for example, be employed to maintain and manage natural resources. In the Wouden, a majority of the farmers indicated that they would be willing to play such an active rôle, especially if the management of natural resources was to become an economic activity. For some of them, such as the business-like farmers, a remuneration for loss of production because of shade effects and payment for basic management activities would be enough because for them dairying has the highest priority. For others, like stayers and calm farmers, the conscious production of natural values with corresponding rewards may offer possibilities for broadening their economic activities and providing alternative sources of income.

When the management of natural resources becomes an economic activity, the economic and ecological aspects of sustainable development can be balanced in new and flexible ways by using the specific dynamics of different styles of farming. Therefore the present system of agreements between state agencies and farmers needs to be reconsidered. New relations between farmers and state agencies have to be developed in order to establish specific solutions for less-favoured areas. Re-localization of

agricultural policies and self-regulation on behalf of the farmers concerned are crucial aspects in the development of adequate prospects for an integrated approach to sustainable rural development. In the Wouden, these alternatives are currently in an experimental phase.

Local Cooperatives to Bridge Barriers

In 1992, two farmers' associations in the Wouden, the Vereniging Eastermars Lânsdouwe (VEL) and Vereniging Agrarisch Natuur en Landschapsbeheer Achtkarspelen VANLA) were established to explore new solutions to sustainable rural development.[9] Farmers had realised that agricultural and environmental policies were confusing, contradictory and not particularly stimulating and they began searching for alternative, integrated solutions. Their goal was to balance economically sustainable agricultural development with ecological conditions. The concept of the separation of agriculture and the management of natural resources prominent in the NPB, was therefore rejected. In the farmers view, the reproduction and management of natural resources should create additional employment in the region, either directly through paid management activities or indirectly through the stimulation of small-scale tourism, and the marketing of local products. This should add to the quality of life in the region as a whole. In this view, the specificity of the landscape and the ecological setting is not seen as a limitation to rural development but as part of the potential for endogenous development.

The associations gained strong support from the local communities and a large majority of the farmers in the area joined them. Farmers became increasingly aware that it was better to take the initiative to balance agricultural production and the management of natural resources, than to wait for state regulation. However, the fact that groups of farmers have taken the initiative to develop proposals for sustainable agricultural development is relatively new in Dutch agriculture and therefore attracted much publicity. In general, the first reactions were very positive and the associations received support from local, regional and national state agencies in working out their ideas and programmes. Below I have described how the farmers' associations realize their ideas. These farmers' associations, as I mentioned earlier, are no longer exceptional aspects of Dutch agriculture but examples of the large number of local cooperatives in the Netherlands that are striving for sustainable development at the moment.

The Integrated Approach

Both the VEL and VANLA follow the same 'integrated approach', although their plans of action differ. Crucial to their approach is the notion that agricultural development, the liveability or quality of life in the rural

area, the reproduction of natural resources and a sound environment cannot be separated. They have set up many activities, including study groups to reduce on-farm mineral losses, experiments for the paid management of natural resources and activities to encourage rural tourism (see VEL 1994).

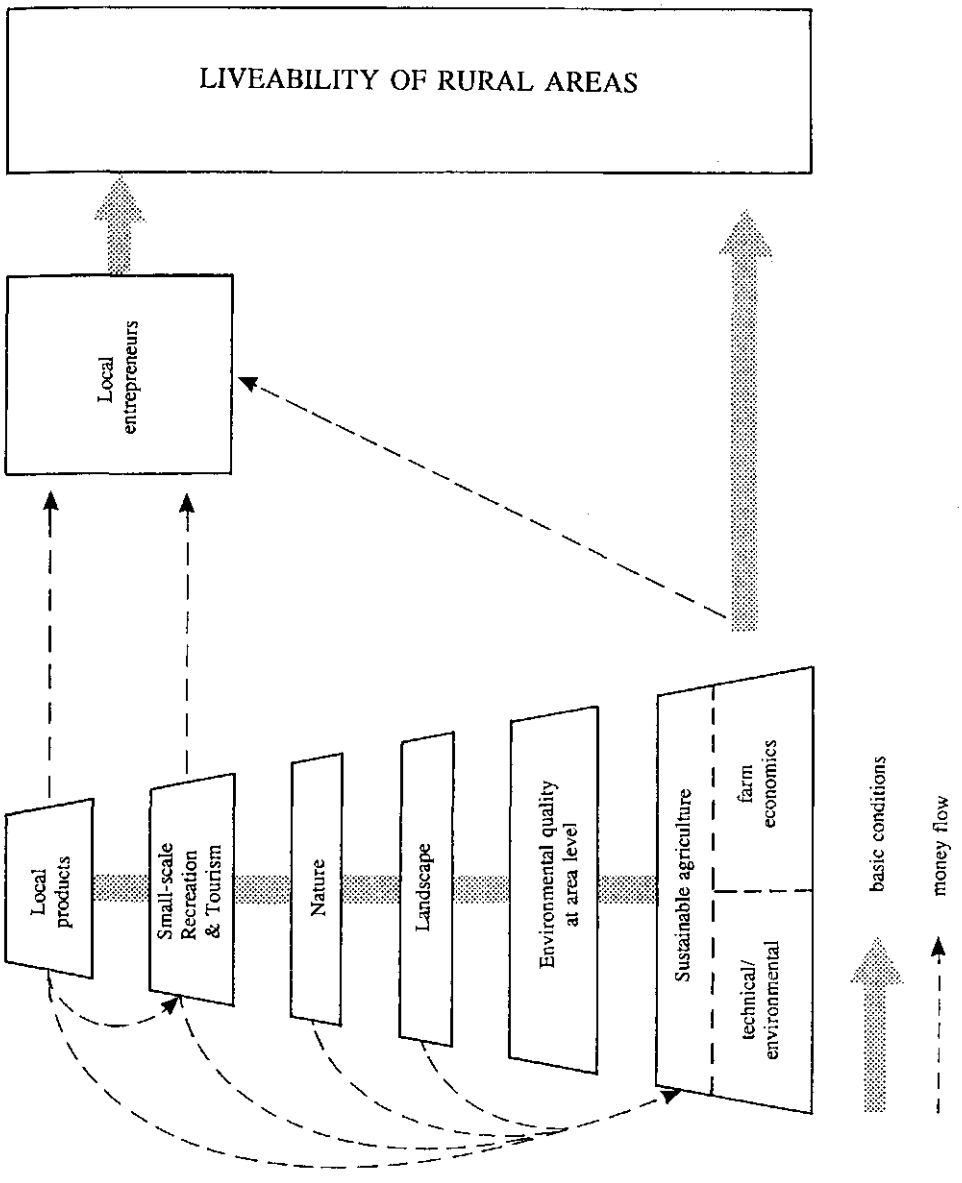
New possibilities for the paid management of nature and landscape and local tourism will be created in cooperation with local state agencies. In fact, new markets for alternative income-generating activities will emerge. The individual farmer may anticipate these new markets in the way that best fits into his own style of farming. For each farm business, an environmental management plan will be formulated, following the management possibilities of the farm in question. Each farmer contributes to the common goals in his or her own way. The available 'social means', craftsmanship and the entrepreneurial skills of farmers, are utilized for the benefit of the local community as a whole.

In Figure 1, the ideas and practices of the integrated approach are illustrated. We see that different aspects of rural development are mutually interrelated. The development of an economical and environmentally sustainable agriculture is the first step in this approach. Sustainable agriculture is the basis for further developments. This will result in an improvement of the environmental quality of the region in general and water quality in particular. A sound environment, in turn, is both a condition for sustainable development at farm level and for the development of landscape and natural values. Management of natural resources can then benefit economic sustainability at farm level through paid management activities or through the development of small-scale tourism. As stressed before, the specificity of nature and landscape in the Wouden is an endogenous potential for rural development. The production and marketing of local products such as specific types of berries that grow on the wooded, earthy banks, may complete this approach. Every step of the integrated approach is interrelated and is both the source and outcome of other steps. All activities will, directly or indirectly, benefit the creation of employment and income in other sections, and therefore contribute positively to improving the liveability of the rural areas.[10]

This scheme is no blueprint for rural development neither is it the only possible approach for the Wouden. It is more a 'heuristic device' for possible developments. Both associations direct their energy mainly to those activities that have the most support and are best accepted by the farmers in the region. In practice these are activities concerning environmental management and natural resources. In doing so, it is hoped to create conditions for a broader set of developments in the direction of integrated rural development. Whether and to what extend small-scale tourism and the marketing of local products will be part of this development, depends on the support of the farmer members and the impact of other activities. Thus, the route to follow can be adjusted and changed as

necessary during the process. There is no such thing as a final goal or a final definition of sustainability. Sustainable development has to be an ongoing process.

Figure 1 The Integrated Approach for Sustainable Rural Development



The associations have an important task in acting as intermediaries between the farms and local state agencies. Together with these agencies, new and adequate programmes for integrated nature management will be designed and new possibilities and measures to reach environmental goals will be developed. Hence, one of the strengths of the integrated approach is that it does not prescribe a particular way of farm development. Association members are only obliged to reach a certain commonly defined basic level in their management of natural resources and the environment and in this way different opportunities will be designed to fit different styles of farming.

Bridging Differences

In the past the interests of different groups of farmers often conflicted and were frequently manipulated by state agencies. The farmers in the Wouden, however, became aware that their common interests were much stronger than their conflicts. The only way to deal with differences in interests and goals was to create room for manoeuvre for different styles of farming and different development patterns. Those who initiated the two associations realized the importance of developing and maintaining good relations with other rural interest groups, such as the environmental movement and state agencies. Where there had been huge differences of opinions and approaches, the farmers now tried to bridge these differences and actively demonstrate their common interests. To reach their goals, it was important to search for support from other actors and interest groups concerned with the future of rural areas.

Step by step they constructed a large network of such parties as state agencies, local interest groups for tourism and recreation, bird protection societies and independent scientists. These actors participate in the debate on the design and development of adequate forms of sustainability. Moreover, for many of these actors the initiative of the VEL and VANLA offered a valuable alternative solution to the crisis in agriculture and policy. However, the capacity of the VEL and VANLA to mobilize the endogenous potentials in the Wouden, to build upon the existing heterogeneity and to design alternative routes for sustainable development remains the driving force for local self-regulation.

Potential Impact of Local Cooperatives and Self-Regulation

The potential impact of the activities of farmers' associations and local cooperatives goes beyond the purely economic aspects of farming. These initiatives provide possibilities for endogenous sustainable development in the broadest sense. Besides economic aspects, ecological, political and social factors are also involved.

The farmers' initiatives had a direct and concrete result and they have been taken serious in the debates about sustainability. The offensive strategy and the active rôle of farmers regarding sustainable development has gained considerable support. Farmers now find that their specific rôle in the management of natural resources is recognized. They are no longer seen as 'environmental criminals' and as a result their position in the rural community has been reinforced. Farmers have discovered that their future and the future of the rural areas in general is, to a large extend, again in their own hands. This has made them more self-confident: the downward spiral and tendencies towards social deprivation that threatened them seems to have been countered. This may have important and positive effects for the future development of family farms and on such issues as succession rate and the innovativeness of farmers. As I have said earlier, different styles of farming have the potential to provide economic sustainability. Farmers need, amongst other things, the self-confidence to put their strategies into practice.

Besides their social impact, these farmers' initiatives can have a very strong and positive impact on the environment and the management and preservation of nature and landscape. As I have shown, different styles of farming can be seen as an endogenous potential for the management of natural resources. Local self-regulation can provide opportunities for integrating different functions in new and flexible ways that complement heterogeneity at the local level. This may result in a considerable improvement of the endogenous potential of nature and landscape, which can benefit the development of small-scale rural tourism and, in the longer term, the marketing of local products typical of the region. Besides having considerable economic impact, this may also help to counter the growing individualization of the rural areas.[11]

The impact of local cooperatives and self regulation can also be analyzed in quite different terms. As intermediaries between farmers and state agencies, local cooperatives can lower the farmers' transaction costs for new economic activities. Local cooperatives can negotiate the remuneration and content of management agreements with state agencies and institutes. In addition cooperative groups can raise collective funds for the management of natural resources, something which would be impossible for individual farmers. They can even negotiate communal agreements for the whole region. An example of this is a collective agreement with SBB, a nature conservation organization, about taking over the management activities of nature reserves. Unlike the SBB, farmers are able to flexibly integrate these management activities into their farming and to sell the hay they harvest within the region.

In such ways local cooperatives can create space for using the best endogenous potential in the region and can raise collective funds while lowering the transactional costs to the individual farmers. They can even open up new markets when products and services are offered collectively.

Potentially this has a strong, positive effects on farm development and the liveability of the rural areas. It can also improve the efficiency of agricultural and environmental policies, make it more likely that policy goals are achieved and increase the acceptance of policies among farmers. The fact that a local cooperative can negotiate on behalf of its members makes it possible for state agencies to reach farmers in a more effective way. Thus, collective agreements for the management of natural resources can also drastically reduce the transactional costs incurred by state agencies as well. In addition, the agricultural management of natural resources is a cheap alternative to 'professionalised' nature management by private nature conservation organizations.

All the possible impacts mentioned above have a cumulative affect on the liveability of rural areas. In Table 1 I present a rough estimation of the possible impact on regional employment based on the current activities of the two Wouden associations. The regions in which they are active have been taken as one. The activities included in the calculation are: the stimulation of small-scale tourism on agricultural farms (camping site and 'bed and breakfast'), tourist arrangements in combination with other local entrepreneurs, production and marketing local products, marketing of certified milk from environmentally sound farms, collective fund-raising for landscape management (10 year programme), collective agreements for nature managements (on SBB reserves) and the enlargement of possibilities for regular nature and landscape management. It is also supposed that new environmental regulation will not have negative effects on agricultural employment because adequate and flexible solutions have been worked out at a regional level based on the endogenous potentials offered by different styles of farming.

Table 1 Existing Situation and Possible Impact of the Integrated Approach

Existing situation in Eastermar and Achtkarspelen
– employment
ca. 210 full-time farms x 1.4 Labour Units = 294 L.U. ca. 100 part-time farms x 0.3 Labour Units = 30 L.U. Total agricultural employment = 324 L.U.
– surface total regional surface ca. 9000 hectare nature reservates ca. 1500 hectare
– milk production total regional milk-quota (est.) 200 x 250,000 kg = 50,000,000 kg

Activity	Income per farm or hectare (NGL per year)	Contribution to regional income (NGL)	Equivalent number of L.U.
Small-scale tourism	15 camping sites x 10,000 10 bed & breakfast x 10,000	150,000 100,000	3 2
Tourist arrangements	15 farms x 10,000	150,000	3
Collective fund raising for landscape improvement (10 yrs)		1,500,000	30
Collective management agreement nature reserves	management 1000 ha x 400 sold hay 1000 ha x 200	600,000	12
Enlargement regular management of natural resources	nature 500 ha x 500 landscape 2000 ha x 300	250,000 600,000	5 12
Production and marketing local products	10 farms x 20,000	200,000	4
Certified milk (0.5 of regional milk quota)	25,000,000 kg x 0.02	500,000	10
Total contribution to rural economy		4,050,000	81

Based on the estimate presented in Table 1, it is possible to conclude that the activities of the farmers' associations in the Wouden may well have a considerable and positive impact on rural income and employment as well as on regional liveability as a whole. As has been shown by van der Ploeg (1993b), broadening economic activities can increase agricultural and rural income significantly – in this case by some NLG 4 million per year (some 81 labour units).[12] Although this extra income will not lead to an equivalent increase in employment because most of it will supplement existing farm incomes, the possible impact of the integrated approach is significant. Even if the extra income from all new activities were only sufficient to counter the downward spiral and stop the fall in regional agricultural employment, it would be worthwhile executing.

By Means of Conclusion: New Institutional Arrangements

We can conclude, therefore, that the integrated approach adopted by the Wouden farmers' associations and by other local cooperatives for the management of natural resources, contains a strong potential for endogenous sustainable development. This approach not only promises to have a considerable impact on rural incomes and employment, it benefits the rural area in a variety of ways. It creates new possibilities for the flexible

use of nature and landscape and offers new strategies for sound agricultural production. It also enforces the position of farmers in the rural community as a whole. An integrated approach to sustainable development, tailored to specific regional conditions, provides the best opportunities for creating dynamic and liveable rural areas.

Although some of the collective activities mentioned above could also be executed by individual farmers, I stress here that the cumulative impact of collective farmers' activities goes far beyond the possible impact of an individual approach. Collective activities and a strong regional coherence will lower transaction costs, open up new markets and have a stronger positive impact on sustainable rural development in general.[13] The potential of 'local design', using specific, endogenous, local resources, and the capacity to link this approach to an extended network that includes state agencies, is crucial for success. Local cooperatives can make strategic coalitions with other actors in their networks to solve the existing crisis in agriculture and policy. On the other hand, it can fairly be said that the success and impact of the collective activities depend on the degree to which local groups are able to gain political support in order to put their integrated approach into practice. Hence, one of the key aspects here is the re-localization of policies and the transfer of responsibilities to the farmers themselves, i.e. self-regulation and therefore, new relations between farmers and governing agencies have to be established. In the conventional approach, state agencies are given the central rôle and they formulate generic goals and policies which are often limited to only one aspect of the relationship between agriculture and the environment. Generic policies require detailed prescriptions and sanctioning to ensure the necessary measure of control and the responsibility of the individual is reduced to obeying prescriptions.

The farmers' initiatives in the Wouden demanded different relations between state agencies, at local, regional and national level and the farmers involved. The farmers themselves will take responsibility for the management of their natural environment. Working together with state agencies, agreements can be reached on acceptable levels of mineral losses, programmes to strengthen natural and landscape values, and necessary compensation for management tasks. In this way farmers' associations act as intermediaries between the individual farms and regional policy makers. State agencies need to reconsider their functions. To support these local initiatives, the main rôle of state agencies is in enlarging the room for manoeuvre available to the individual farmers and in providing the means necessary for solving problems at farm level using, of course, the approach that is most appropriate to the particular style of farming concerned.

The primary function of state agencies is to facilitate different perspectives for sustainable development. If these conditions are fulfilled, local groups of farmers and local or regional state agencies can be partners rather than competitors. Farmers' initiatives then play a crucial rôle in the

process of designing and developing perspectives for sustainable rural development. The integrated approach of the farmers in the Wouden offers a framework for endogenous development patterns based on the social means and specific characteristics of the region. As we have seen above, whilst this approach may have a considerable and positive socio-economic impact it also guarantees the sustainable management of natural resources and environmental sound production.

Notes

1 In a recent publication, Hees *et al.* (1993) inventorized 25 such farmers' groups. Since then the number has increased to approximately 50. See also Hees *et al.* (1994).

2 With van der Weijden *et al.* (1984) I therefore characterize the 'heterogeneity' approach as 'sociocratic', while the other approaches are pre-eminently 'technocratic'. Technocratic approaches are characterized by centralized decision-making and are strongly means-oriented, instead of goal-oriented.

3 Worthwhile reading is the study by Frouws (1993), in which the ideas, rules and practices of policy making and implementation in the neo-corporatistic model are described in detail.

4 For an extensive review on methodology of styles of farming research, see van der Ploeg 1994; Roep and de Bruin 1994; de Bruin 1993a.

5 Generic environmental policies now require high investments in cowsheds, manure storage and manure application.

6 Streekplan Friesland 1994; Toeristisch-Recreatief Beleidsplan Bergumermar 1993; Visie op Recreatie en Toerisme Achtkarspelen 1992.

7 Slangen (1994b) points out that the transaction costs at burden of state agencies in the Netherlands is about 33 percent of the remuneration farmers get for their activities. Considerable transaction costs are to be 'paid' by farmers as well.

8 The low succession rate and the fact that a large number of farms are closing their gates are not primarily due to bad economic results on the farms, but to a lack of confidence in the future of farming (see de Bruin 1991; Agrarisch Dagblad 14-3-95).

9 For a more detailed description of both farmers' associations VEL and VANLA see Hiemstra *et al.* 1993, VEL 1994, VEL 1995, VANLA 1995, Renting *et al.* 1994.

10 This approaches is worked out in detail by Renting *et al.* 1994.

11 Individualization is one of the most important negative aspects of agricultural modernization. To counter this tendency, farm women often initiate activities in rural tourism in order to broaden their horizon and to increase social relations.

12 Only the possible impact on agrarian incomes and agrarian employment is estimated. The impact on the rural economy as a whole may be substantially higher.

13 A good illustration of the surplus value of collective action is given by Renting and Pohlmann (1994). Collective agreements on landscape management and nature conservation in Hindelang (south Germany) provided farmers with enough additional incomes to continue farming.

References

Introduction

AVILA CANO, J.C. (1993), Comparison of Results Between Ecological and Conventional Agriculture. New Proposals for Evaluation of Agricultural Systems and Their Application to the Case of the Cooperative 'La Verde' (Andalusia, Southern Spain), In: Van der Ploeg *et al. On the Impact of Endogenous Development in Rural Areas*, Vol. II, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

DRIES, A. VAN DEN (1995), Intervention strategies in traditional farmer-managed irrigation systems in Northern Portugal, In: *Design Methods for Endogenous Rural Development*; Final Report (forthcoming). Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

DUBGAARD, A., P. OLSEN and S.N. SORENSEN (1990), Okonomien i okologisk jordbrug (Economics of Organic Farming). Report 54. Statens Jordbrugs-okonomiske Institut, Kopenhagen, Danmark

MARQUES, C. and J. PORTELA (1993), *Relatore preliminar de medicoes de caudais*, UA/DES/UTAD, Vila Real, Portugal

PLOEG, J.D. VAN DER (1993), Rural Sociology and the New Agrarian Question; a perspective from the Netherlands, In: *Sociologia Ruralis*, Vol. XXXIII (2) 1993

RALEY, M. (1995), The implications of organic farming for employment in the rural economy; paper given at International PhD Summer School Esbjerg, Danmark

ROEST, C. DE (1990), Een voorbeeld van kwaliteit: de produktie van Parmezaanse kaas, in: J.D. van der Ploeg and M. Ettema (eds) *Tussen Bulk en Kwaliteit*, Van Gorcum, Assen, the Netherlands

VENTURA, F. and H. VAN DER MEULEN (1994), *La costruzione della qualità; produzione, commercializzazione e consumo della carne bovina in Umbria*. CESAR, Assisi, Italy

VEREIJKEN, P. (1986), From conventional to integrated agriculture. *Netherlands Journal of Agricultural Science* 34, 387-393

WIJNANDS, F.D. (1990), Farming systems research in the Netherlands: perspectives for integrated arable and organic mixed systems, In: R. Unwin (ed) *Crop Protection in Organic and Low Input Agriculture* BCPC Monograph No. 45. Proceedings of a symposium organized by the British Crop Protection Council, Churchill College, Cambridge, United Kingdom

Chapter 1

BARDHAN, P. (1989), *The Economic Theory of Agrarian Institution*, Clarendon Press, Oxford

BENEDICTIS, M. DE (1993), Neoistituzionalismo e Economia Agraria, *La Questione Agraria*, n. 49

BENVENUTI, B. (1974), General System Theory and Entrepreneurial Autonomy in Farming: Toward a New Feudalism or toward Democratic Planning?, *Sociologia Ruralis*, 1-2

BENVENUTI, B. (1982), Cosa è l'Ambiente Tecnologico-Amministrativo che Fissa i Compiti (TATE) e a Cosa Serve, in: *I problemi dell'Imprenditorialità Agricola nella Integrazione Cooperativa*, AIPA, Bologna

BUTLER, R. (1982), A Transactional Approach to Organizing Efficiency: Perspective from Markets, Hierarchies and Collectives, *Administration and Society*, 10

COASE, R.H. (1960), The Nature of the Firm, Economica, 4, 197 – The Problem of Social Cost, *Journal of Law and Economics*, vol.3, 1

COASE, R.H. (1988), *The Firm, the Market and the Law;* Chicago UP, Chicago

COASE, R.H. (1992), The Institutional Structure of Production, *The American Economic Review*, September

CONNOR, J.R. (1934), *Institutional Economics*, University of Wisconsin Press

DARRIDA, (1994), *Lo Spettro di Marx*, Datanews, Roma, Italy

DEMSETZ, H. (1982), *Economic, Legal and Political Dimension of Competition*, Amsterdam, North Holland

DEMSETZ, H. (1988), *Ownership Control and the Firm*, Blackwell, Oxford

PLOEG, J.D. VAN DER (1990), *Labor, Market and Agricultural Production*, Westview Press Inc.

PLOEG, J.D. VAN DER (1986), *La ristrutturazione del lavoro agricolo*, La Reda, Roma

HANNAN, M.T. and J.H. FREEMAN (1982), The Population Ecology of Organization, *American Journal of Sociology*, March

HAYEK, F. VON (1948), *Individualism and Economic Orders*, University of Chicago Press, Chicago

JACQUEMIN, A. (1987), *The New Industrial Organization: Market Forces and Strategic Behaviour*, MIT Press, Cambridge, Mass.

JENSEN, M.C. and W.H. MECKLING (1979), *Right and Production Function: an Application to Labor Managed Firm and Codermination*, Journal of Business, 4

MARTINO, G. (1994), Efficienza del mercato e sequenza di formazione del prezzo: una analisi dinamica dei mercati del frumento tenero e del mais in Italia. *Studi di Economia e Diritto* N. 1

OUCHI, W.G. (1980), *Markets, Burocracies and Clan*, Administrative Science Quarterly, 25, March

PALASKAS, T.B. (1992), *New Methodologies for Testing Price Efficiency in Domestic Commodity Market*. Paper presented at the Assisi meeting on Agricultural Economics and Policy, 24-25 June 1992

PALASKAS, T.B. and B. HARRIS (1991), *Testing the Market Integration: New Approaches with Case Material*, Oxford applied economics discussion papers. Paper series 126

SACCOMANDI, V. (1992), *Istituzioni di Economia del Mercato dei Prodotti Agricoli*, La Reda, Roma, Italy

SCHMALANSEE, R. (1982), The New Industrial Organization and the Economic Analysis of Modern Markets, in: W. Hildenbrand (ed), *Advances in Economic Theory*, Cambridge University Press

SCHULZ, T.W. (1964), *Transforming Traditional Agriculture*, Yale University Press, New Haven

SCOTT, J. (1976), *The Moral Economy of the Peasant: Rebellion and Subsistence in Southern Asia*, Yale, New Haven

SIMON, H.A. (1991), Organization and Markets, *The Journal of Economic Perpectives*, 2

STIGLER, G.J. (1989), Two Notes on the Coase Theorem, *Yale Law Journal*, 99, December

THOMPSON, J.A. (1967), *Organization in Action*, McGraw Hill, New York

WILLIAMSON, O.E. (1975), *Market and Hierarchies: Analysis and Implication*, The Free Press, New York

WILLIAMSON, O.E. (1981), The economics of organization: The transaction cost approach, *American Journal of Sociology*, 3

WILLIAMSON, O.E. and Winter S.G. (1991), *The Nature of the Firm, Origins, Evolution and Development*, Oxford University Press

ZAMAGNI, S. (1990), Le Teorie Economiche della Giustizia. Un Contributo di Economia 'Ingenua', in: *Saggi di Politica Economica in Onore di Federico Caffè*, Franco Angeli

ZAMAGNI, S. (1991), Introduction to *Imprese e Mercati*, UTET, Torino

Chapter 2

ACOSTA NARANJO, R. (1991), The Dehesa. Arguments for a case study, In: *Endogenous Regional Development In Europe, Theory, Method and Practice, Proceedings of the seminar held in Vila Real*, November 1991

ALTIERI, M. (1987), *Agroecology; the scientific bases of alternative agriculture*, Westview Press, Boulder

ALTIERI, M. (1991), Porque estudiar la agricultura tradicional, In: *Agroecología y Desarrollo*, 1, 1, pp. 16-24

AVILA CANO, J.C. (1991), Ecological Horticulture in a 'Latifundist' Context. The co-operative experience of landless peasants in Andalusia (Southern Spain), In: *Endogenous Regional Development In Europe, Theory, Method and Practice, Proceedings of the seminar held in Vila Real*, November 1991

BENEDICTUS, M. DE (1993), *Neoistituzionalismo ed economia agraria*, In: Questioni Agraria, 49, 1993, pp. 27-70

BENVENUTI, B. (1992), On the Relationship between Central Regulation and the Potential for Local Initiatives: Some Reflections on the Growing Scope for More and Better Scientific Research, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

BENVENUTI, B. *et al.* (1988), Produttore agricolo e potere, CNR, IPRA, Roma

BRAY, F. (1986), *The Rice Economies: Technology and Development in Asian Societies*, Blackwell, Oxford

BRUIN, R. de *et al.* (1991), *Maat houden, bedrijfsstijlen en het beheer van de groene ruimte*, Bedrijfsstijlenstudie nr. 4, Wageningen Agricultural University, the Netherlands

CRISTÓVÃO, A., H. OOSTINDIE and F. PEREIRA (1992), Differentiated Development Patterns in Barroso: Searching for Specific Intervention Methods, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

DOSI, G. (1988), The nature of the innovative process, In: G. Dosi, C. Freeman et al (eds) *Technical Change and Economic Theory*

GEORGESCU-ROEGEN, N. (1969), The Institutional Aspects of Peasant Communities: An Analytical View, In: Clifton R. Wharton jr (ed) *Subsistence Agriculture and Economic Development*, Aldine Publishing Company Chicago

GOEWIE, E. (1993), Naar een duurzame landbouw. Inaugural address, Wageningen Agricultural University, the Netherlands

GRILICHES, Z. (1957), Hybrid Corn: an Exploration in the Economics of Technological Change, In: *Econometrica* 25, October 1957:501-522

GROEN, *et al.* (1993), *Stijlvol fokken* Bedrijfsstijlenstudie 9, Wageningen Agricultural University, the Netherlands

HUILLET, C. (1992), The Rural Development Challenge, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

IACOPONI, L. (1990), Distretto industriale marshalliano e forme di organizzazione delle imprese in agricoltura, In: *Rivista di Economia Agraria*, 1990, 4.

LEEUWIS, C. (1991), Kennisomgeving en management-ondersteuning, In: D. Roep *et al., Zicht op duurzaamheid en kontinuïteit, bedrijfsstijlen in de Achterhoek.* Bedrijfsstijlenstudie nr. 2, Wageningen Agricultural University, the Netherlands

LOWE, P., J. MURDOCH and N. WARD (1992), Rural Sustainable Development: A Socio-political Perspective on the Role of Agriculture, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

MIELE, M. (1993), Alternative agriculture: the ideological struggle about the concept of sustainability, Paper presented to the XV European Congress on Rural Sociology, Wageningen, 1993

OASA, E.K. (1981), *The IRRI and the Green Revolution*, University of Hawaii, Hawaii

OSTI, G. (1991), *Gli innovatori della periferia, la figura sociale dell'innovatore nell'agricoltura di montagna*, Reverdito Edizioni, Trento

PICCHI, A. (1992), The Relations between Central and Local Powers as Context for Endogenous Development, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

PLOEG, J.D. VAN DER (1991), Styles of Farming: An Introductory Note on Concepts and Methodology, In: *Endogenous Regional Development In Europe, Theory, Method and Practice*, Proceedings of the seminar held in Vila Real, November 1991

PLOEG, J.D. VAN DER (1992b), The Reconstitution of Locality: Technology and Labour in Modern Agriculture, In: T. Marsden, P. Lowe and S. Whatmore, *Labour and Locality, Uneven Development and the Rural Labour Process*, David Fulton Publishers, London, pp. 19-43

PLOEG, J.D. VAN DER, *et al.* (forthcoming) *Meerdere vergelijkingen en veel onbekenden; de samenhang van I/O relaties en bedrijfsstijlen*, NRLO, Den Haag

PLOEG, J.D. VAN DER (1993a), Socio-economic heterogeneity and dairy cattle selection, In: Proceedings of the International Conference on Sustainable Animal Production, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER, V. SACCOMANDI and D. ROEP, (1990), Differentiële groeipatronen in de landbouw: het verband tussen zingeving en structurering, in: *TSL*, 1990, jaargang 5, nr. 2, pp. 108-132

PLOEG, J.D. VAN DER (1990d), *Labor, markets and agricultural production*, Westview Special Studies in Agriculture, Science and Policy, Westview Press, Boulder, San Francisco and Oxford, 1990, xi-313 pp.

PLOEG, J.D. VAN DER (1990f), Lo sviluppo tecnologico in agricoltura: il caso della zootecnia, INEA, studi e ricerche, Il Mulino, Bologna, pp 360

PLOEG, J.D. VAN DER (1992a), Dynamics and Mechanisms of Endogenous Development: An Introduction to the Theme of the Seminar, *In: Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

PLOEG, J.D. VAN DER *et al.* (1992), *Boer bliuwe... blinder! Bedrijfsstijlen en ondernemersstrategieën op de Friese klei.* Bedrijfsstijlenstudie nr. 5, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER (1993), *Mesures pour l'environment dans une agriculture diversifiée*, Associations Descartes, INRA, Paris

PORTELA, J. (1991), Research and Reductionism; Have we Pretty Good Conceptual Tools? In: *Endogenous Regional Development In Europe, Theory, Method and Practice, Proceedings of the seminar held in Vila Real*, November 1991

PORTELA, E. (1992), Manuring in Barroso: A Crucial Farming Practice, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

PORTELA, J. and A. VAN DEN DRIES (1992), Revitalization of Farmer-Managed Irrigation Systems in Trás-os-Montes, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

PROVINCIE FRIESLAND (forthcoming) It kearpunt foarby. Leeuwarden

REMMERS, G. (1991), Ecological Wine-making in a Depressed Mountainous Region in Southern Spain: A Preliminary View on Problems and Prospects, In: *Endogenous Regional Development In Europe, Theory, Method and Practice, Proceedings of the seminar held in Vila Real*, November 1991

ROEP, D. and R. DE BRUIN (1991), Regional Marginalization, Styles of Farming and Technology Development, In: *Endogenous Regional Development In Europe, Theory, Method and Practice, Proceedings of the seminar held in Vila Real*, November 1991

ROEP, D. and J. ROEX (1992), *Wikken en Wegen. Bedrijfsstijlen en verschillen in stikstofoverschot.* Bedrijfsstijlenstudie 7, Wageningen Agricultural University, the Netherlands

ROEST, C. DE and S. ANTONELLO (1992), Linking Technological Research and Development to Differentiated Problem Definitions, Perspectives and Interests in the Countryside, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

SACCOMANDI, V. (1990), Presentazione, In: J.D. van der Ploeg, *Lo sviluppo tecnologico in agricolture: il caso della zootecnia*, Il Mulino, Bologna

SACCOMANDI, V. (1991), Istituzioni di Economia del Mercato dei Prodotti Agricoli, REDA, Roma.

SALTER, W.E.G. (1966), *Productivity and Technical Change*, New York

SEVILLA GUZMÁN, E. and M. RAMOS VADILLO (1991), Designing Methods for Endogenous Local Development in Andalusia, In: *Endogenous Regional Development in Europe, Theory, Method and Practice, Proceedings of the seminar held in Vila Real*, November 1991

SLEE, B. (1992), Theoretical Aspects of the Study of Endogenous Development, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

SPIERTZ, H. and P. VEREIJKEN (1993), *Technologie adaptée et innovation au service d'une agriculture durable*, Associations Descartes, INRA

THOMSON, K. (1992), Input-Output Linkages in Rural Development, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

TOLEDO, V.M. (1993), La racionalidad ecológica de la producción campesina, In: *Ecología, Campesinado e Historia*, E. Sevilla Guzmán and Manuel González de Molina, Ediciones La Piqueta, Madrid

VENTURA, F. and H. VAN DER MEULEN (1991), Social Definitions of Meat Quality in Central Italy, In: *Proceedings of the Seminar held in Vila Real* (Portugal), November 4-5, 1991

VENTURA, F. and H. VAN DER MEULEN (1992), Constructing new Linkages to the Markets in Order to Create the Required Valorization of Local High Quality Products: Lessons from Umbria, Italy, In: *Proceedings of the Seminar held in Chania* (Crete, Greece), October 20-22, 1992

VENTURA, F. and H. VAN DER MEULEN (1994), Transformation and Consumption of High-Quality Meat: The Case of Chianina Meat in Umbria, In: J.D. van der Ploeg and A. Long (ed) *Born from Within*, Van Gorcum, Assen, the Netherlands

VEREIJKEN, P. (1990), Gangbare, geïntegreerde of ecologische landbouw: wat is kwalitatief het beste? In: J.D. van der Ploeg and M. Ettema (eds) *Tussen bulk en kwaliteit*, Van Gorcum, Assen pp. 132-138

WHATMORE, S. (1993), Theoretical Achievements and Challenges in European Rural Gender Studies, In: L. van der Plas and M. Fonte (eds) *Rural Gender Studies in Europe*, Van Gorcum, Assen, the Netherlands

WILLIAMSON, O.E. (1975), *Markets and Hierarchies: Analysis and Antitrust Implication*, Free Press, New York

Chapter 3

ALCHIAN, A.A. (1950), Uncertainty, Evolution and Economic Theory, *Journal of Political Economy*, 58

ALESSI, L. de (1981), Property Rights, Transaction Costs And X-Efficiency, In: *American Economic Review* 73

BECATTINI, G. (1987), Il distretto industriale marshalliano: cronaca di un ritrovamento, In: *Mercato e forze locali*, Il Mulino

BENVENUTI, B. (1991), *Towards the formalization of professional knowledge in farming: growing problems for agricultural extension?* Mimeo

BENVENUTI, B. a.o. (1992), *Produttore agricolo e potere* – CNR, Progetto Finalizzato CNR/IPRA U.O. AIPA

BERTOLINI, P. (1988), Produzioni DOC e difesa delle economie locali: il caso del Parmigiano Reggiano, In: *La Questione Agraria*, 30

CLOKE, P. (1987), Rurality and change: some cautionary notes, In: *Journal of Rural Studies*, Vol. 3:1 p. 71-76

COASE, R.H. (1937), The nature of the firm, In: *Economica* 4

COZZI, T. and S. ZAMAGNI (1989), Economia Politica, Il Mulino

DESMETZ, H. (1988), The Theory of the Firm Revisited, UCLA, mimeo

FAVIA, F. (1992), L'agricoltura dei sistemi agricoli territoriali, In: *La Questione Agraria* 46, Roma

GIOVANNETTI, E. (1987), *Crisi e mercato del lavoro in un distretto industriale: il bacino delle ceramiche*, Dipartimento di Economia Politica dell'Università di Modena

HARVEY, D. (1985), The geopolitics of capitalism, In: Gregory-Urry, *Social Relations and Spatial Structures*

HARVEY, D. (1989), *The Conditions of Postmodernity*. Oxford: Basil Blackwell

IACOPONI, L. (1990), Distretto industriale marshalliano e forme di organizzazione delle imprese in agricoltura, In: *Rivista di Economia Agraria*, 4

LEFEBVRE, G. (1974) *La costruction de l'espace*. Paris: Anthropos

MARSDEN T., P. LOWE and S. WHATMORE (1992), *Labour and locality. Uneven development and the rural labour process*. London. Fulton

NELSON, R.R. and S.G. WINTER (1982), *An Evolutionary Theory of Economic Change*. Harvard University Press, Cambridge, Massachusetts

POLANY, K. (1944), *The Great Transformation*. New York: Rinehart

PYKE F., G. BECATTINI and W. SEGENBERGER (a cura di) (1990), *Distretti industriali ecooperazione fra imprese in Italia* Ed. Banca Toscana, Firenze

SACCOMANDI, V. and J.D. van der Ploeg (1993), *On the Impact of Endogenous Development in Agriculture*, CAMAR Seminar held in Assisi October 25-27

SALTARI, E. (1990), Introduzione in: *Informazione e teoria economica* Ed. Il Mulino, Bologna

SIMON, H.A. (1972), Theories of bounded rationality, *Decision and Organization*, American Elsevier

SIMON, H.A. (1961), *Administrative Behaviour*, MacMillan

SLEE, B. (1992), *Endogenous Development: a Concept in Search of a Theory*, CAMAR Seminar held in Chania October 20-22, European Commission DG VI

THRIFT, N. (1987), Manufacturing rural shift?, In: *Journal of Rural Studies*, Vol.3 1 p. 77-81

PLOEG, J.D. VAN DER (1992), *Dynamics and Mechanism of Endogenous Development*: an Introduction to the Theme of the Seminar, CAMAR Seminar held in Chania October 20-22, European Commission DG VI

PLOEG, J.D. VAN DER (1992), The Reconstruction of Locality: Technology and Labour in Modern Agriculture, In: *Marsden et al.* cit.

WILLIAMSON, O.E. (1985), *The Economic Institutions for Capitalism*, The Free Press

Chapter 5

AMIN, A. (1993), 'The regional development potential of inward investment in the less favoured regions of the European Community'. *Paper* presented at the Conference on Cohesion and Conflict in the Single Market, Newcastle upon Tyne

AMIN, A. (1994), The difficult transition from informal economy to Marshallian industrial district, *Area* 26, 13-24

AMIN, A. and K. ROBBINS (1989), The re-emergence of regional economies? The mythical geography of flexible specialization *Environment and Planning D: Society and Space* 8, 7-34

AMIN, A. and N. THRIFT (1992), 'The local in the global'. *Paper* presented to the Fourth Annual Conference of the European Association for Evolutionary Political Economy, Paris, November, 1992

AMIN, A. and N. THRIFT (1994), Institutional issues for the European regions: From markets and plans to powers of association, *Paper* presented at the Fourth General Conference of the European Science Foundation's RURE Programme, National research Council, Rome, March, 1994

BECATTINI, G. (1987), Il distretto industriale marshelliano: Cronaca di un ritrovamento, In: *Mercato e forze locali, Il Mulino*

BECATTINI, G. (1990), The Marshallian industrial district as a socio-economic notion, In: Pyke, F. and Becattini, G. (eds.) *Industrial Districts and Inter-Firm Co-Operation in Italy*, Geneva: ILO

BELLANDI, M. (1989), The industrial district in Marshall, In: Goodman, E., Bamford, J and Saynor, P. (eds.) *Small Firms and Industrial Districts in Italy*, London: Routeledge

BERTOLINI, P. (1988), Produzioni DOC e difesa delle economie locali: Il caso del Parmigiano Reggiano, In: *La Questione Agraria* 30

CALLON, M. (1991), 'Techno-economic networks and irreversibility', In: Law, J (ed) *A Sociology of Monsters: Essays on power, technology and domination.* London, Routledge pp. 132-161

COLLETIS, G. *et al.* (1990), *Les systemes industriels localises en Europe*, Report, IREPE, Université de Grenoble

COOKE, P. and K. MORGAN (1993), 'The network paradigm: new departures in corporate and regional development' *Environment and Planning D: Society and Space* 11 pp.543-564

DICKEN, P. and N. THRIFT (1992), 'The organization of production and the production of organization: why business enterprises matter in the study of geographical industrialization' *Trans. Institute of British Geographers* 17 pp. 279-291

FANFANI, R. (1994), Agro-food districts: A new dimension for policy-making and the role of institutions, pp. 81-89 in Centre for Rural Research (ed.) *Restructuring the Agro-Food System: Global Processes and National Responses - Conference Proceedings*, University of Trondheim, Norway: Centre for Rural Research.

FUA, G. (1988), Small-scale industry in rural areas: the Italian experience, In: Arrow, K.J. (ed.) *The balance between industry and agriculture in economic development*, Macmillan, London

GERTLER, M. (1992), 'Flexibility revisited: districts, nation-states and the forces of production' *Transactions of the Institute of British Geographers* 17, 259-278

GILLESPIE, A., M. COOMBES, S. RAYBOULD, D. BRADLEY (1991), "Telecommunications and the Development of Rural Scotland." A Study for Scottish Enterprise

GIOVANNETTI, E. (1987), *Crisi e mercato del lavoro in un distretto industriale: Il bacino delle ceramiche*, Dipartimento di Economia Politica dell'Università di Modena

HODGSON, G. (1988), *Economics and Institutions* Cambridge, Polity

IACOPONI, L., G. BRUNORI and M. ROVAI (1994), Endogenous development and the agri-industrial district, In: J.D. van der Ploeg *et al.* (eds.) *On the Impact of Endogenous Development in Rural Areas* seminar procedings, Brussels: European Commission (forthcoming)

LATOUR, B. (1986), 'The powers of association' In: Law, J (ed) *Power, Action and Belief: A new sociology of knowledge?* London, Routledge pp. 264-280

LATOUR, B. (1987), *Science in Action* Milton Keynes, Open University Press

MARSHALL, A. (1890), *Principles of Economics*,London, Macmillan

MARSHALL, A. (1927), *Industry and Trade*, 3rd edition, London, Macmillan

MILLER, P. and T. O'LEARY (1993), Accounting expertise and the politics of the product: economic citizenship and modes of corporate governance, *Accounting, Organization and Society* 18,(2/3) 187-206

MURDOCH, J. (1995), Actor networks and the evolution of economic forms: Combining description and explanation in theories of regulation, flexible specialization and networks, *Environment and Planning A* (forthcoming)

OECD (1988), *New Trends in Rural Policy-making*, OECD, Paris

PICCHI, A. (1994), The relations between central and local powers as context for endogenous development, In: van der Ploeg and A. Long (eds.) *Born From Within: Practice and Perspectives of Endogenous Rural Development* pp.195-203, Assen, the Netherlands, Van Gorcum

PLOEG, J.D. VAN DER and A. LONG (1994), Endogenous development: Practices and perspectives, In: J.D. van der Ploeg and A. Long (eds.) *Born From Within: Practice and Perspectives of Endogenous Rural Development* pp. 1-6, Van Gorcum, Assen, the Netherlands

PLOEG, J.D. VAN DER and V. SACCOMANDI (1994), On the impact of endogenous development in agriculture, In: J.D. van der Ploeg, V. Saccomandi, F. Ventura and A. van der Lande (eds.) *On the Impact of Endogenous Development in Rural Areas, Proceedings of a Circle for European Studies Seminar* pp. 9-24, Department of Rural Sociology, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

POWELL, W. (1990), 'Neither market nor hierarchy: network forms of organization' *Research and Organizational Behaviour* 12, pp. 74-96

SACCOMANDI, V. (1994), Neo-institutionalism and the agrarian economy, In: J.D. van der Ploeg, V. Saccomandi, F. Ventura and A. van der Lande (eds.) *On the Impact of Endogenous Development in Rural Areas, Proceedings of a Circle for European Studies Seminar* pp.1-7, Department of Rural Sociology, Wageningen Agricultural University, the Netherlands

SAXENIAN, A. (1991), 'Regional networks: industrial adaptation in Silicon Valley and Route 128' paper presented at the Association of European Planning Schools Conference, Oxford

SLEE, B. (1994), Theoretical apects of the study of endogenous development, In: J.D. van der Ploeg and A. Long (eds.) *Born From Within: Practice and Perspectives of Endogenous Rural Development* pp. 184-194, Van Gorcum, Assen, the Netherlands

VÀSQUEZ-BARQUERO, A. (1988), Small-scale industry in rural areas: the Spanish experience since the beginning of this century, In: K.J. Arrow (ed.) *The balance between industry and agriculture in economic development: basic issues* pp. 232-258, Macmillan, London

VÀSQUEZ-BARQUERO, A. and F. LÒPEZ-GROG (1988), 'Los cambios del terciario en el territorio: el caso Español', paper presented at the *III Incontro di Economisti Italo-Spagnoli*, Bari

WHATMORE, S. (1994), Farm household strategies and styles of farming: Assessing the utility of farm typologies, In: J.D. van der Ploeg and A. Long (eds.) *Born From Within: Practice and Perspectives of Endogenous Rural Development* pp. 31-37, Van Gorcum, Assen, the Netherlands

WILLIAMSON, O. (1981), The economic of organization: The transaction costs approach, *American Journal of Sociology* 3

Chapter 6

ANTUMA, S.J.F., P.B.M. BERENTSEN and G.W.J. GIESSEN (1993), *Friese melkveehouderij, waarheen? Een verkenning van de Friese melkveehoudrij in 2005: modelberekeningen voor diverse bedrijfsstijlen onder uiteenlopende scenario's*; LUW, bedrijfsstijlenstudie 10.1, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

ANTUMA, S.J.F. and T. VAN SCHEPPINGEN (1995), *Veenweidekaas; bedrijfseconomische modelstudie van een streekeigen produkt*, PR, Lelystad

BAGNASCO, A. (1988), *La costruzione sociale del mercato, studi sullo sviluppo di piccola impresa in Italia*, Il Mulino, Bologna

BARBERIS, C. (1992), Les micromarchés alimentaire: produits typiques de qualité dans les régions méditerranéennes, Commission des Communautés Européennes, Agrimed, Luxembourg

BAUWENS, A.L.G.M (1979), *De middenbedrijven als structureel en maatschappelijk vraagstuk*, LEI, Den Haag

BEAUDEAU, F. (1994), *Cows' health and farmers' attitude towards the culling decision in dairy herds*; PhD thesis, Wageningen Agricultural University, the Netherlands

BENNETT, J. (1981), *Of time and the enterprise, North American family farm management in a context of resource marginality*. University of Minnesota Press, Minneapolis

BENVENUTI, B. *et al.* (1989), *Produttore Agricolo e Potere; modernizzazione delle relazioni sociali ed economiche e fattori determinanti dell' imprenditorialita agricola* (ricerca CNR/IPRA), Coldiretti, Roma

BERGHS, M.E.G. and A. VAN DEN HAM (1994), *Verkenning veehouderij en milieu; beelden bij eisen*, IKC (publicatie 43), Ede

BOERDERIJ; (onafhankelijk weekblad voor de landbouw) (1994), Crisisgevoel zit diep: Massa boeren wil andere koers, nr. 25 22 maart pp. 20-25

BOLHUIS, E.E. and J.D. VAN DER PLOEG (1985), *Boerenarbeid en stijlen van landbouwbeoefening; een socio-economisch onderzoek naar de effecten van incorporatie en institutionalisering op agrarische ontwikkelingspatronen in Italië en Peru*. PhD thesis Leiden Development Studies, Leiden, the Netherlands

BOURDIEU, P.(1986), *Distinction, a social critique of the judgement of taste*, Routledge and Kegan Paul, London

BREEMER, J.P.M. VAN DEN (1984), *Onze aarde houdt niet van rijst, een cultureel antropologische studie van innovatie in de landbouw bij de Aouan van Ivoorkust*, Leiden, the Netherlands

BRINK, A. VAN DEN (1990), *Structuur in beweging: het landbouwstructuurbeleid in Nederland 1945-1985*. Wageningen Agricultural University, Pudoc, Wageningen

BROEKHUIZEN, R. VAN and H. RENTING (1993), *Pioniers op het Platteland; nieuwe overlevingsstrategieën van boeren en tuinders*, 3CLO pers, Den Haag

BRUIN, R. DE (1993), *Bont of Blauw, bedrijfsstijlen en koersbepaling landelijke gebieden*, (Bedrijfsstijlenstudie 8). Wageningen Agricultural University, the Netherlands

BRUIN, R. DE (1994), Diverging farm development patterns and changing cost relations, In: J.D. van der Ploeg *et al.* (eds): *On the Impact of Endogenous*

Development in Rural Areas; Proceedings of a seminar held in Assisi (Umbria, Italy), October 25-27 1993

BRUIN, R. DE and J.D. VAN DER PLOEG (1992), *Maat Houden; bedrijfsstijlen en het beheer van natuur en landschap in de Noordelijke Friese Wouden en het Zuidelijk Wester Kwartier*, (Bedrijfsstijlenstudie 4), Wageningen Agricultural University, the Netherlands

BRUIN, R. DE (forthcoming), *The social struggle for sustainability: Differentiated processes and practices*. Wageningen Agricultural University, the Netherlands

BURAWOY, M. (1985), *The politics of production*, Verso for New Left Books, London

CHAYANOV, A.V. (1986), *The Theory of Peasant Economy, with a New Introduction by Theodor Shanin*, Manchester University Press, Manchester

CHRISTIS, J.(1985), Technologiekritiek: een confrontatie tussen Ullrich en Habermas, in: *Krisis* (20) Sept., pp 30-51

COCHRANE, W.W. (1979), *The development of American agriculture: a historical analysis*, University of Minnesota Press, Minneapolis

CPB (Centraal Planbureau) (1992a), *Scanning the future – a long-term scenario study of the world economy 1990-2015*, Den Haag

CPB (Centraal Planbureau) (1992b), *Nederland in drievoud – een scenario-studie van de Nederlandse economie, 1990-2015*, Den Haag

CRISTÓVÃO, A., H. OOSTINDIE and F. PEREIRA (1992), *Differentiated agricultural development patterns in Barroso: searching for alternative intervention strategies*. Strengthening endogenous development patterns in European Agriculture CERES-CAMAR seminar, Chania, Crete. 20-22 October 1992

DARRÉ, J.P. (1985), *La parole et la technique, l'univers de pensée des éleveurs du Ternois*, Editions L'Harmattan, Paris

DONKERS, H. 1995), Landbouw en natuur: huwelijk of scheiding? In: K. Waagmeester (ed) *Ontstolen welvaart; Kroniek van duurzaam Nederland*; Platform voor Duurzame Ontwikkeling, Uitgeverij Jan Mets, Utrecht, the Netherlands

DOSI, G. (1988), The nature of the innovative process, pp. 221-238, in: Dosi, G., C. Freeman *et al.* (eds), *Technical Change and Economic Theory*, Pinter Publishers, London

DRIEL, J.A. VAN (1982), De middengroep in de landbouw, LEI (no 2.159), Den Haag, 1982

DRIEL, J.A. VAN (1984), *Toekomst voor middenbedrijven? Resultaten van een onderzoek in de melkveehouderij*, LEI, (no 2.169), Den Haag

DIJK, G. VAN (1994), *De toegevoegde waardestrategie voor landbouw en agribusiness in de 21e eeuw*, NCR, Den Haag

DIJKSTRA, H. and J.F. VAN RIEMSDIJK (1952), *Uitkomsten van weidebedrijven, over 1947/48 t/m 1950/51, ontwikkeling van de kosten en opbrengsten over de laatste jaren*. LEI, Den Haag

EIZNER, N. (1983), *Les paradoxes de l'agriculture francaise: essai d'analyse a partir des Etats Generaux de Developpement Agricole*, Harmattan, Paris

ELERIE, H. (1994), De identiteit van het platteland, In: J.N.H. Elerie and C.A.M. Fleischer-van Rooijen (eds), *Omstreden ruimte, een discussie over de toekomst van het landelijk gebied*, REGIO-PRojekt, Groningen, the Netherlands

ETTEMA, M., A.T.J. NOOY *et al.*(1994), *De Vernieuwing, een verslag van de tweede Boerderij-enquête*, LUW, vakgroep Sociologie, Wageningen Agricultural University, the Netherlands

FROUWS, J. (1993), *Mest en Macht. Een politiek-sociologische studie naar belangenbehartiging en beleidsvorming inzake de mestproblematiek in Nederland vanaf 1970.* Studies van Landbouw en Platteland 11, Wageningen Agricultural University, the Netherlands

FROUWS, J. and J.D. VAN DER PLOEG (1973), *Over de landbouwvoorlichting: materiaal voor een kritiek op de agrarische sociologie en de voorlichtingskunde,* Wageningen, Boerengroep/SG

GEERTZ, C. (1963), *Agricultural Involution: the process of ecological change in Indonesia,* Berkeley, USA

GOEWIE, E. (1993), *Ecologische landbouw: een duurzaam perspectief?* (inaugural address) Wageningen Agricultural University, the Netherlands

GROOT, N.S.P. DE, C.P.C.M. VAN DER HAMSVOORT and H. RUTTEN (1994), *Voorbij het verleden – Drie toekomstbeelden voor de Nederlandse agribusiness, 1990-2015,* LEI-DLO (Onderzoeksverslag 127), Den Haag

HAAN, T. DE (1994), *Moed en Ondernemersbloed,* Uitgeverij Roodbont, Breda

HEES, E., H. RENTING and S.J.G. DE ROOIJ (1994), *Naar Lokale Zelfregulering, samenwerkingsverbanden voor integratie van landbouw, milieu, natuur en landschap,* (studies van Landbouw en Platteland 14), Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

HOFSTEE, E.W. (1946), *Over de oorzaken van de verscheidenheid in de Nederlandse landbouwgebieden,* (inaugural address), Wageningen Agricultural University, the Netherlands

HOFSTEE, E.W. (1985), *Groningen van grasland naar bouwland, 1750-1930, een agrarisch-economische ontwikkeling als probleem van sociale verandering,* PUDOC, Wageningen, the Netherlands

HOOGH, J. DE (1991), *Beschouwingen over landbouweconomie en landbouwpolitiek,* Werkgroep Landbouwpolitiek, Wageningen Agricultural University, the Netherlands

KOLKMAN, G. *et al.* (1994), *Veehouderij na 2005: uitwaaieren in opties – een scenariostudie over de Nederlandse veehouderij rond het jaar 2005,* IKC-Veehouderij, Ede, publicatie 41

KOSIK, K. (1976), *Dialectics of the concrete: a study on problems of man and world,* Reidel Publishing, Dordrecht, the Netherlands

LANDBOUWSCHAP (1994), stuknr N044329a.W20, dd 04-10-1994, Den Haag, the Netherlands

LAW, J. (1994), *Organizing Modernity.* Blackwell Publishers, Oxford, UK and Cambridge, USA

LONG, N. (1984), Creating space for change, a perspective on the sociology of development, in: *Sociologia Ruralis* Vol. XXIV, 3/4, pp. 168-184

LONG, N., *et al.* (1986), *The commoditization debate: labour process, strategy and social network.* Papers of the Department of Sociology, 17, Wageningen Agricultural University, the Netherlands

LONG, A. and J.D. VAN DER PLOEG (1994), Endogenous Development: Practices and Perspectives in: J.D. van der Ploeg and A. Long (eds), *Born from within* Van Gorcum, Assen, the Netherlands

LONG, N. and J.D. VAN DER PLOEG (1994), Heterogeneity, actor and structure: towards a reconstitution of the concept of structure, In: D. Booth (ed), *Rethinking Social Development,* Longman, London, 1994

MASO, B. (1986), *Rood en Zwart. Bedrijfsstrategieën en kennismodellen in de Nederlandse melkveehouderij*. Mededelingen van de vakgroepen voor sociologie 18, Wageningen Agricultural University, the Netherlands

MEESTER, G. (1993), Brusselse randvoorwaarden voor de Nederlandse land- en tuinbouw in: Beleid en universiteit 5, Werkgroep Landbouwpolitiek, Wageningen Agricultural University, the Netherlands

MEULEN, H. VAN DER and F. VENTURA (1994), *La costruzione della qualitá; Produzione, commercializzazione e consumo della carne bovina in Umbria*, Centro per lo Sviluppo Agricolo e Rurale, Assisi, Italia

NRLO (Nationale Raad voor Landbouwkundig Onderzoek) (1994), *Meerdere vergelijkingen en vele onbekenden* publ. 94/1, Den Haag, the Netherlands

OOSTINDIE, H, and K. PETERS, *Perspectief voor Afbouwers, Aanbiedsters of Verbreders?* Wageningen Agricultural University (Mededelingen van de werkgroep recreatie en toerisme, 21), the Netherlands

OSKAM, A.J. (1991), *Agrarische Sectoreconomie: oefeningen* (D 150-202), Dept. of Agricultural Economics, Wageningen Agricultural University, the Netherlands

OSTI, G. (1991), Gli *innovatori della periferia, la figura sociale dell'innovatore nell'agricoltura di montagna*, Reverdito Edizioni, Trento, Italy

PLAS, L. VAN DER and M. FONTE (1994), *Rural Gender Studies in Europe*, Van Gorcum, Assen, the Netherlands

PLOEG, J.D, VAN DER (1985), Patterns of Farming Logic: The Structuration of Labour and the Impact of Externalization, in: *Sociologia Ruralis* Vol. XXV, No. 1, pp. 5-25

PLOEG, J.D. VAN DER (1985), Het classificatieschema van en in de Nederlandse landbouw, in: *Spil* 41-42 pp. 25-32

PLOEG, J.D. VAN DER (1987), *De verwetenschappelijking van de landbouwbeoefening*, Mededelingen van de vakgroepen voor sociologie 21, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER (1990a), *Labour, markets and agricultural production*, Westview Special Studies in Agricultural Science and Policy, Westview Press, Boulder, San Francisco, USA and Oxford, UK

PLOEG, J.D. VAN DER *et al.* (1992), *Boer bliuwe blinder, bedrijfsstijlen op de Friese klei*, Wageningen Agricultural University and CCLB, Wageningen and Leeuwarden, the Netherlands

PLOEG, J.D. VAN DER (1992), The reconstitution of locality: technology and labour in modern agriculture, In: T. Marsden *et al.*: *Labour and Locality, uneven development and the rural labour process*, David Fulton Publishers Ltd, London

PLOEG, J.D. VAN DER *et al.* (1993), *It kearpunt foarby; bouwstenen voor het agrarisch ontwikkelingsplan Friesland*, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER (1993), Rural Sociology and the New Agrarian Question: a perspective from the Netherlands, In: *Sociologia Ruralis*, Vol. XXXIII (2)

PLOEG, J.D. VAN DER (1994), Agricultural production and employment: differential practices and perspectives, In: Verhaar, C.H.A and P.M. de Klaver (eds), *The functioning of economy and labour market in a peripheral region – the case of Friesland*, Fryske Akademy, Leeuwarden, the Netherlands

PLOEG, J.D. VAN DER, M. ETTEMA and J. ROEX (1994), De crisis. Een bespreking van de eerste Boerderij-enquête voor het nationaal landbouwdebat. Misset, Doetinchem, the Netherlands

PLOEG, J.D. VAN DER, J. ROEX and B. KOOLEN (1995), *Bedrijfsstijlen en kengetallen*, LEI, Den Haag

RENTING, H., R. DE BRUIN and ELKE POHLMANN (1994), Bruggen bouwen. Een integrale aanpak van landbouw, milieu, natuur, en landschap in Eastermar-'s Lândouwe. Studies van Landbouw en Platteland 16, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

ROEP, D. (1993), Landbouw op een keerpunt: verscheidenheid als springplank voor diversificatie, in: *Tijdschrift voor Sociaalwetenschappelijk onderzoek van de Landbouw* (TSL), jaargang 8 (1993), nr 3 pp 279-308

ROEP, D.(forthcoming), Dynamics and innovation in agriculture: the case of peatland cheese, PhD, Wageningen Agricultural University, the Netherlands

ROEST, C. DE (1990), Een voorbeeld van kwaliteit: de produktie van parmezaanse kaas, In: J.D. Van der Ploeg and M. Ettema (eds), *Tussen bulk en kwaliteit, landbouw, voedselproduktieketens en gezondheid* pp 77-87, Van Gorcum, Assen/Maastricht, the Netherlands

SACCOMANDI, S. (1993), *Istituzioni di Economia del Mercato dei Prodotti Agricoli*, REDA, Roma, 1991

SACCOMANDI, S. and J.D. VAN DER PLOEG (1993), On the impact of endogenous development in agriculture, In: *Proceedings of a seminar on the Impact of Endogenous Development in Rural Areas*, Vol. 1, CESAR, Assisi, Italy

SLANGEN, L.H.G. (1994), De financiële en economische aspecten van het natuurbeleidsplan, Wageningen Agricultural University, the Netherlands

STAUDENMAIER, J.M. (1985), *Technology's storytellers*, MIT, Massachusetts, USA

STRIJKER, D. and J. VAN DIJK (1994), Peak Labour in Agriculture, paper presented at the CURE conference, Ameland, the Netherlands

TSL (1993), Themanummer: Het gebruik van classificaties in het landbouw-economisch en -sociologisch onderzoek, jaargang 8 nr. 1

VARENKAMP, M. (1986), Landbouwschap voor iedereen, In: *Landbode* (41), 5, no 47

VEL, VANLA *et al.* (1995), Plannen van aanpak voor praktijkexperimenten voor lokale zelfregulering. Wageningen, the Netherlands

VENTURA, F. and H. VAN DER MEULEN (1994), Social Definitions of Meat Quality in Central Italy; endogenous practices and perspectives in Umbrian beef production, in: H. de Haan and J.D. van der Ploeg (eds), *Endogenous regional development in Europe, Theory, Method and Practice*, European Commision, DG VI, AGRIMED series, Luxembourg

VONDELING, A. (1948), *De bedrijfsvergelijking in de landbouw, een economisch-statistische studie*, Veenman and Zonen, Wageningen, the Netherlands

VRIES, W. DE (1993), Farming with other gainful activities in the Netherlands, in: *Sociologia Ruralis* Vol XXXIII (2)

WISKERKE, H. (1995), Arable farmers in pursuit of a new interpretation of sustainable baking wheat cultivation, In: Van Dijk *et al.* (eds), *Beyond modernization, the impact of endogenous rural development*, Van Gorcum, Assen, the Netherlands, (forthcoming)

WISKERKE, H. (1992), *Voortrekkers op Kwaeie Grond. een agrarisch sociologische analyse van de ontwikkeling van een Zeeuws akkerbouwbedrijf (1920-1990)*, Wageningen Agricultural University, the Netherlands

WISKERKE, H. (1995), De vraag naar arbeid in de Flevolandse akkerbouw, In: J.D. van der Ploeg and R. van Broekhuizen: *Criteria voor de beoordeling en selectie van*

aanvragen voor ondersteuning in het kader van het 'doelstelling 1' programma pp. 19-33, Wageningen Agricultural University, the Netherlands

WRIGHT MILLS, C. (1959), The power elite. Oxford University Press, London

WRR (Wetenschappelijke Raad voor het Regeringsbeleid) (1992), *Grond voor keuzen – vier perspectieven voor de landelijke gebieden in de Europese Gemeenschap*, SDU (Rapporten aan de Regering 42), Den Haag, the Netherlands

ZWAVING, H. (1994), Het samenspel van natuur en landbouw in het waardevolle cultuurlandschap Noord-Drenthe, In: J.N.H. Elerie and C.A.M. Fleischer-van Rooijen (eds), *Omstreden ruimte, een discussie over de toekomst van het landelijk gebied*, REGIO-PRojekt, Groningen, the Netherlands

Chapter 7

BECATTINI, G. (1979), 'Dal 'settore' industriale al 'distretto' industriale', in: *Economia e Politica Industriale*, nr. 1

BENEDICTIS, M. DE (1993), 'Neoistituttionalismo ed economia agraria', in: *La Questione Agraria*, nr. 49, 1993

BROEKHUIZEN, R. and J.D. VAN DER PLOEG *et al.* (1994), 'Design methods for endogenous rural development; a contribution from the Netherlands', In: *proceedings CERES-CAMAR Seminar, 10-15 December 1994*, ISEC Córdoba, Spain

CAMANGI, R. (1993), *Lo spazio e il tempo nel milieu innovateur*, paper presented at the 14th Conferenza Italiana di Scienze Regionali, Bologna 6-8 October 1993

CARBONE, A. (1992), Integrazione produttiva sul territorio e distretto agro-industriale, in: *La Questione Agraria* n.46, pp 137-163, Franco Angeli, Milan

CIANI, A. and P. BURINI, 1989, *Analisi tecnico-economico di allevamenti bovini da carne in Umbria; costi dell'alimentazione*, Ente di Sviluppo, Regione Umbria, Perugia

CRETI, A. (1994), La metodologia di ricerca per lo sviluppo regionale:un'analisi critica, in: PASQUINI *et al.* (eds). *Modelli di analisi e di intervento per un nuovo regionalismo*, pp. 235-255, Franco Angeli, Milan

DEI OTTATI, G. (1986), Distretto industriale, problemi delle transazioni e mercato communitaris in: *Economia e Politica Industriale* nr. 51

FAVIA, F. (1992), *L'agricoltura nei sistemi produttivi territoriali.* in: *La Questione Agraria* n.46, pp. 109-135, Franco Angeli, Milan

GAROFOLI, G. (1991), *Modelli locali di sviluppo*, Franco Angeli, Milan

HOFSTEE, E.W. (1985), *Groningen van grasland naar bouwland, 1750-1938; een agrarisch-economische ontwikkleing als probleem van sociale verandering*, Wageningen Agricultural University, the Netherlands

IACOPONI, L. (1990), *Distretto industriale marshalliano e forme di organizzazione delle imprese in agricoltura*, in: *Rivista di economia Agraria* n.4, Il Mulino, Bologna

IACOPONI, L., G.BRUNORI and M.ROVAI (1993), *Endogenous Development and the Agroindustrial District*, Paper presented at the Seminar 'On the impact of endogenous Rural Development' Assisi, Umbria, Italy October 24-27 1993

MAGNATI, P. (1991), Alla ricerca di un 'metodo' di valutazione, in: NOMISMA *Strategie e Valutazione nella Politica Industriale*, Franco Angeli, Milan

MARCHINI, A. and F.M. SANTUCCI (1991), *Economia dell'allevamento da carne in Umbria; c'è un futuro per le razze Chainina e Marchigiana?*, INEA osservatorio per l'Umbria e Le Marche, Perugia

MARSHALL, A. (1920), Principles of Economics, Macmillan, London

MEULEN, H.S. VAN DER and F. VENTURA (1994), *Transformation and Consumption of High Quality Meat: The Case of Chianina Meat in Umbria*, In: J.D. van der Ploeg 1994, Born From Within, Van Gorcum, Assen, the Netherlands

MEULEN, H.S. VAN DER and F. VENTURA (1993), *The contribution of high-quality food production to endogenous rural development in Umbria, Central-Italy*, In: J.D. van der Ploeg (ed.), Strengthening Endogenous Development Patterns in European Agriculture, proceedings of the CERES-CAMAR seminar in Chania (Greece), October 20-22 1992

MEULEN, H.S. VAN DER (1993), *The role of Transaction Costs, Managment Costs and Transformation Costs in the Orvieto Wine Sector,Umbria*, in: Van der Ploeg *et al.* (eds.), On the Impact of Endogenous Development in Rural Areas, proceedings CERES-CAMAR seminar, October 25-27 1993, Assisi

MEULEN, H.S. VAN DER (1993), *High-quality food production as an organized defense against technological acquisitions*, paper presented at XVth European Congress of the ESRS, 2-6 august 1993, IAC Wageningen

PLOEG, J.D. VAN DER (1992), The Reconstitution of Locality: Technology and Labour in Modern Agriculture, In: T. Marsden, P. Lowe and S. Whatmore, *Labour and Locality, Uneven Development and the Rural Labour Process*, David Fulton Publishers, London, pp. 19-43

SACCOMANDI, V. (1991), *Istitutzioni di Economia del Mercato dei Prodotti Agricoli*, REDA, Rome

SARACENO, E. (1992), 'Il distretto delle barbatelle', In: *La Questione Agraria* nr 46, Franco Angelli, Milano

VELLANTE, S. (1985), Disattivazione aziendale ed omologazione sistematica e territoriale del processo produttivo agricolo, In: G. DI SANDRO (ed.) *L'Innovazione in Agricoltura e i Suoi Effetti*, IPRA Quaderno nr. 8, pp 207-223, Roma

VENTURA, F. and F. MUSOTTI (1993), *Agricultural models of endogenous development; an empirical key to understand two settings in Umbria*, In: van der Ploeg *et al.* (eds.), On the Impact of Endogenous Development in Rural Areas, proceedings CERES-CAMAR seminar, October 25-27 1993, Assisi, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

Chapter 9

BLACK, R. (1992), *Crisis and Change in Rural Europe;* Agricultural development in the Portuguese mountains. University of London.

CRISTÓVÃO, A., OOSTINDIE, H. and PEREIRA, F. (1994), Practices of Endogenous Development in Barroso, Northern Portugal. In: J.D. van der Ploeg and A. Long (eds) *Born from Within*, Van Gorcum, The Netherlands

DRATM, (1992). PEDAP, Relatorio Annual 1991, Mirandela

DRIES, A. VAN DEN, P. HOOGENDAM and J. PORTELA (1993), *Diversity versus homogeneity; similar processes, varying outcomes. Analysis of the effects of public intervention in farmer managed irrigation systems in north-east Portugal.* (forthcoming)

DRIES, A. VAN DEN and J. PORTELA (1994), Revitalization of Farmer-Managed Irrigation Systems in Trás-os-Montes. In 'Born from Within' (Eds. J.D. van der Ploeg and A.Long), van Gorcum, the Netherlands

DRIES, A. VAN DEN (1995), *Intervention strategies in traditional Farmer-managed irrigation systems in Northern Portugal*, Final report (forthcoming). Circle for Rural European Studies, Wageningen Agricultural University, The Netherlands.

GONÇALVES, D.A. (1985), A rega de lima no interior de Trás-os-Montes; alguns aspectos de sua energética, UTAD, Vila Real, Portugal

JACINTO, P.M. (1993), Sezelhe; Agricultura, regadio e declinio socio-demografico. Relatorio final de estagio, UTAD, Vila Real, Portugal

LIMA E SANTOS, J. (1990), *Recursos naturais e sistemas agrarios no alto Barroso.* Primeiros jornadas sobre o Mundo rural, Instituto Superior Politecnico de Braganca, Bragança, Portugal

LIMA E SANTOS, J. (1992), *Mercado, economias e ecosistemas no Alto Barroso.* Edição da Camara Municipal de Montalegre

M. MALTA, P. M. Jacinto, N. GUSMAO, J. CARVALHO, J. VERSTRAATE, and E. PRINS (1993), The Second phase of an Inventory study of FMIS in Trás-os-Montes. Unpublished draft report. UTAD, Vila Real, Portugal

MARQUES, C.P. and PORTELA, J. (1994), Praticas culturais e caudais de rega em regadios tradicionais – Verao de 1993, UA/DES/UTAD, Vila Real, Portugal

O'NEILL, B. (1978). Proprietarios, Lavradores e Jornaleiros. Publicações Dom Quixote, Lisboa

OOSTINDIE, H. and A. CRISTÓVÃO (1993), Institutional Support and Endogenous development in Trás-os-Montes. In; the Proceedings of a CAMAR seminar held in Assisi, Italy, October 1993

OOSTINDIE, H. and A. VAN DEN DRIES (1994), The Portugues CAMAR research programme and design methods for endogenous development. Draft paper to a CAMAR seminar held in Córdoba, Spain, December 1994

PINTO, C.P. (1991), Aproveitamentos Hidroagrícolas de Curalha e de Gostei-Trás-os-Montes, In: *Recursos Hídricos*, vol.12, Lisboa

PORTELA, J. and A. BAPTISTA (1985), PDRITM-Melhoria dos Regadios Tradicionais-Efeitos Imediatos. Unidade de Avaliação (UA), UTAD/DES

PORTELA, J., A. MELO and A. BAPTISTA (1987), PDRITM-Melhoria dos Regadios Tradicionais-Efeitos Intermedios. UA, UTAD/DES

PORTELA, J. (1988), Rural household strategies of income generation; A study of north-eastern Portugal, 1900-1987. PhD thesis, University of Wales

PORTELA, J. 1990. Relatorio Final de Avaliação: PDRITM, Melhoria dos Regadios Tradicionais. Unidade de Avaliacao, UTAD/DES

PORTELA, E. (1994), Manuring in Barroso: a crucial farming practice, In: J.D. van der Ploeg and A. Long (eds) *Born from Within*, Van Gorcum, Assen, the Netherlands

RIBEIRO, M. (1992), Estrategias de reprodução socioeconomica das unidades familiares camponesas, em regiões de montanha (Barroso, 1940-1990). PhD thesis, UTAD, Vila Real, Portugal

RIBEIRO, O. (1987), *Portugal: o Mediterraneo e o Atlantico.* 5a Edicao, collecção 'nova Universidade', livraria Sa da Costa editora, Lisboa, Portugal

TABORDA, V. (1932), *Alto Trás-os-Montes, estudo geografico.* Colleccao Espaco e Sociedade, livros horizonte, lda., Lisboa, Portugal

WORLD BANK (1989), Trás-os-Montes Regional Development Project, Staff appraisal Report

Chapter 10

GAGAGLIA L., P. BIONDI, P. BOLLI and G. FARINA (1987), Produzione agricola e fabbisogni energetici, Genio Rurale n.9, 1987

IANNONE G. (1994), Gestione aziendale e tutela dell'ambiente: problemi di rilevazione, in Sudi e Informazioni n.2, Firenze

MEULEN H. VAN DER and F. VENTURA (1995), La costruzione della qualita': produzione, commercializzazione e consumo della carne bovina in Umbria, Cesar Assisi

PLOEG J.D. VAN DER (1994), La ricostruzione della localita': tecnologia e lavoro nell'agricoltura moderna., in: *Produzione trasferimento e impatto delle innovazioni nell'agricoltura italiana: primi risultati dell'indagine INEA*, Il Mulino, Bologna.

SACCOMANDI V. (1991), Istituzioni di economia del mercato dei prodotti agricoli, Reda, Bologna

TELLARINI V. and F. CAPORALI (1991), 'Proposta per un modello di contabilita-' energetica: il caso di due agroecosistemi a diverso input di fattori esterni, in Genio Rurale n.10. 1991, Edagricole, Bologna

Chapter 11

BEEK, J.B. TER and A.A.M. POELMAN (1994), *De Zeeuwse Vlegel en zijn consument*, Rapport 96, Wetenschapswinkel, Wageningen Agricultural University, the Netherlands

BEUKERING, P.H.M VAN (1992), Juridische bescherming van kweekprodukten, In: *Zeven, A.C., Zaaizaad en pootgoedproductie* pp. 1-13, Vakgroep Plantenveredeling, Wageningen Agricultural University, the Netherlands

BIJKER, W.E. (1990), *The social construction of technology*, WMW-publikatie, Faculteit der wijsbegeerte en maatschappijwetenschappen, University of Twente, Enschede, the Netherlands

BRUIN, R. DE (1993), *Bont of blauw: bedrijfsstijlen en koersbepaling landelijke gebieden*, Bedrijfsstijlenstudie 8, Province of Friesland and Department of Rural Sociology, Wageningen Agricultural University, the Netherlands

BRUIN, R. DE, J.D. VAN DER PLOEG (1992), *Maat houden: bedrijfsstijlen en het beheer van natuur en landschap in de Noordelijke Friese Wouden en het Zuidelijk Westerkwartier*, Bedrijfsstijlenstudie 4, Ministerie van LNV Friesland/Groningen Department of Rural Sociology, Wageningen Agricultural University, the Netherlands

CALLON, M. (1986), Some elements of the sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay, In: Law, J. (ed.), *Power, action and belief: A new sociology of knowledge?* Sociological review monograph 32, pp. 196-233, Routledge and Kegan Paul, London, Boston and Henley

HAAN, H. DE (1949), *Vijfentwintig jaren Rassenlijst*, Wageningen

HEES, E., H. RENTING and S. DE ROOIJ (1994), *Naar lokale zelfregulering. Samenwerkingsverbanden voor integratie van landbouw, milieu, natuur en landschap,*

Studies van Landbouw en Platteland 14, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

KAUDERER, I.J. (1993), Tarweklassificatie: de schakel tussen kweker, teler en verwerker, In: *Van kwantiteit naar kwaliteit; kwaliteitsdag granen 1993*, Stichting Nederlands Graan Centrum, Wageningen, pp. 62-74

KAUDERER, I.J. (1994), Kwaliteitstarwe, een goede zaak voor de hele keten, In: *Van kwantiteit naar kwaliteit; kwaliteitsdag granen 1994*, Stichting Nederlands Graan Centrum, Wageningen, pp. 47-61

KELFKENS, M. (1994), Inlandse tarwe: zit daar wat in?, In: *Van kwantiteit naar kwaliteit; kwaliteitsdag granen 1994*, Stichting Nederlands Graan Centrum, Wageningen, pp. 4-22

KOEIJER, J. DE, J.S.C. WISKERKE (1994), Allemaal een beetje trots op de Zeeuwse Vlegel; akkerbouwers regelen zelf teelt en afzetmilieuvriendelijke baktarwe, In: *Broekhuizen, R.E. van, Renting, H. (eds.), Pioniers op het platteland: Boeren en tuinders op zoek naar nieuwe overlevingsmogehlijkheden*, CLO Pers, 's-Gravenhage, pp. 27-36

LENTE, H. VAN (1993), *Promising technology: The dynamics of expectations in technological developments*, WMW-publicatie 17, Faculteit der wijsbegeerte en maatschappijwetenschappen, Universiteit Twente, Enschede

MEULENBERG, M.T.G., J.C.M. VAN TRIJP (1992), *Winkelkeuze van consumenten bij de aankoop van agrische versprodukten*, Vakgroep Marktkunde en Marktonderzoek, Landbouw-universiteit, Wageningen

PLOEG, J.D. VAN DER (1987), *De verwetenschappelijking van de landbouwbeoefening*, Mededelingen van de vakgroepen voor sociologie 21, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER (1994), Styles of farming: an introductory note on concepts and methodology, In: Ploeg, J.D. van der, Long, A. (eds.), *Born from within: practice and perspectives of endogenous rural development*, Van Gorcum, Assen, the Netherlands, pp. 7-30

PLOEG, J.D. VAN DER and A. LONG (1994). *Born from within: practice and perspectives of endogenous rural development*, Van Gorcum, Assen, the Netherlands

PLOEG, J.D. VAN DER, S. MIEDEMA, D. ROEP, R.E. VAN BROEKHUIZEN, R. DE BRUIN (1992), *Boer bliuwe, blinder ....! Bedrijfsstijlen, ondernemerschap en toekomstperspectieven*, AVM/CCLB and Department Agrarische Ontwikkelingssociologie, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER and D. ROEP (1990), *Bedrijfsstijlen in de Zuidhollandse Veenweidegebieden; nieuwe perspectieven voor beleid en belangbehartiging*, Katholieke Land- en Tuinbouwbond and Wageningen Agricultural University, the Netherlands

RENTING, H., R. DE BRUIN and E. POHLMANN (1994), *Bruggen bouwen; een integrale aanpak van landbouw, milieu, natuur en landschap in Eastermar's Lânsdouwe*, Studies van Landbouw en Platteland 16, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

ROEP, D. (1993), Landbouw op een keerpunt: verscheidenheid als springplank voor diversificatie, *Tijdschrift voor sociaal wetenschappelijk onderzoek in de landbouw (TSL) 8*:

SCHAAP, S. (1983), *Bedreigd bestaan: het landbouwbeleid en de positie van de boer*, Stichting wetenschappelijk bureau D'66, Den Haag

SCHOT, J.W. (1991), *Maatschappelijke sturing van technisch ontwikkeling: Constructief Technology Assessment als hedendaags Luddisme*, WMW-publicatie 9, Faculteit der wijsbegeerte en maatschappijwetenschappen, Universiteit Twente, Enschede

SNEEP, J. (1976), *Geschiedenis, wetten en organisaties*, Vakgroep Plantenveredeling, Wageningen Agricultural University, the Netherlands

STICHTING ZEEUWSE VLEGEL (1993), *Jaarverslag 1993*, Stichting Zeeuwse Vlegel, Goes

STICHTING ZEEUWSE VLEGEL (1994), *Overzicht resultaten bakproeven oogst 1994, uitgevoerd op 7 september 1994 bij Zeelandia te Zierikzee*, Stichting Zeeuwse Vlegel, Goes

WISKERKE, J.S.C. (1994), *Bedrijfsstijlen in de Zeeuwse akkerbouw*, Vakgroep Algemene en Regionale Landbouwkunde, Wageningen Agricultural University, the Netherlands

WISKERKE, J.S.C. (1995), *Dutch bread de- and reconstructed: a case-study on quality definitions and quality control* (provisional title), submitted for publication in Arce, A. and Marsden, T. (eds.) (forthcoming)

WISKERKE, J.S.C., G.A.A. WOSSINK, J.H. VAN NIEJENHUIS, H.C.M. HAVERKAMP and R.E. VAN BROEKHUIZEN (1994), *Van eenheid naar verscheidenheid. Bedrijfsstijlen in de Flevolandse akkerbouw*, Studies van Landbouw en Platteland 13, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

YOUNG, N.A. (1984), *The arrangements for potato breeding and the future prospects for the UK seed potato industry*, Report no. 17, Centre for European Agricultural Studies

Chapter 12

BRUIN, R. DE (1991), *Kiezen voor Perspektieven: Agrarische jongeren verkennen hun toekomst*. NAJK/Wetenschapswinkel/Vakgroep Agrarische Ontwikkelingssociologie, Wageningen

BRUIN, R. DE (1993), *Bont of Blauw. Bedrijfsstijlen en koersbepaling landelijke gebieden*. Bedrijfsstijlenstudie 8. Province of Friesland and Wageningen Agricultural University, the Netherlands

BRUIN, R. DE (1993a), *Styles of farming in the Netherlands: differential patterns towards sustainable agriculture* Paper presented at the Scientific Conference on New Strategies for Sustainable Rural Development, Gödöllö (Hungary), March 1993

BRUIN, R. DE (1993b), *Supporting endogenous potentials for sustainable agricultural development. New institutional arrangements to create space for adequate solutions* Paper presented at the CAMAR/CERES seminar on The impact of endogenous development, Assisi (Italy), 25-27 October 1993

BRUIN, R. DE and J.D. VAN DER PLOEG (1991), *Maat Houden. Bedrijfsstijlen en het beheer van natuur & landschap in de Noordelijke Friese Wouden en het Zuidelijk Westerkwartier*. Bedrijfsstijlenstudie 4. Bos- en Landschapsbouw Groningen and Department of Rural Sociology Wageningen Agricultural University, the Netherlands

BRUIN, R. DE and J. ROEX (1994), Farmer Initiatives as Countervailing Power: A new approach to sustainable agricultural development, In: Symes, D. and A.J.

Jansen (eds) *Agricultural Restructuring and Rural Change in Europe*, pp 195-208. Agricultural University, the Netherlands

FROUWS, J. (1993), *Mest en Macht*, Bedrijfsstijlenstudie 10. Department of Rural Sociology, Wageningen Agricultural University, the Netherlands

GEMEENTE ACHTKARSPELEN (1992), *Visie op recreatie en toerisme.*

GEMEENTE TYTSJERKSTERADIEL (1993), *Toeristisch-Recreatief Beleidsplan Bergumermeer e.o.* Heerenveen, the Netherlands

HEES, E., H. RENTING and S. DE ROOIJ (1993), *Inventarisatie van samenwerkingsverbanden van agrariërs op het vlak van milieu-, natuur- & landschapsbeheer. Tussenrapportage.* Circle for Rural European Studies, Wageningen Agricultural University Wageningen

HEES, E., H. RENTING and S. DE ROOIJ (1994), *Naar lokale zelfregulering. Samenwerkingsverbanden voor integratie van landbouw, natuur en landschap.* Studies van Landbouw en Platteland 14 Ministry of LNV and Circle for Rural European Studies Wageningen Agricultural University, the Netherlands

HIEMSTRA, W., F. BENEDICTUS, R. DE BRUIN and P. DE JONG (1993), Farmers search for new ways of cooperating: networking in the Friesian woodlands of the Netherlands, In: C. Alders *et al.* (eds.) (1993), *Linking with farmers. Networking for low-external-input and sustainable agriculture.* Intermediate Technology Publications. London

LAW, J (1994), *Organizing Modernity*. Blackwell. Oxford, UK and Cambridge, USA

PLOEG, J.D. VAN DER (1993), *Over de betekenis van verscheidenheid* Inaugural lecture, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER (1994), Styles of farming: an introductory note on concepts and methodology, In: J.D. van der Ploeg and A. Long, eds., *Born from within. Practice and perspectives of endogenous rural development* Van Gorcum, Assen, the Netherlands

PLOEG, J.D. VAN DER *et al.* (1993b), *It Kearpunt Foarby: Bouwstenen voor het Agrarisch Ontwikkelingsplan Friesland*, Bedrijfsstijlenstudie 10, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

PLOEG, J.D. VAN DER, S. MIEDEMA, D. ROEP, R. VAN BROEKHUIZEN and R. DE BRUIN (1992), *Boer bliuwe, blinder ...!, Bedrijfsstijlen, ondernemerschap en toekomstperspectieven* (Wageningen: AVM/CCLB and Department of Rural Development Sociology, Agricultural University Wageningen)

PROVINCIE FRIESLAND (1994), *Streekplan Friesland 1994*. Leeuwarden

RENTING, H., R. DE BRUIN and E. POHLMANN (1994), *Bruggen Bouwen: Een integrale aanpak van landbouw, milieu, natuur en landschap in Eastermar's Lânsdouwe.* Studies van Landbouw en Platteland 16, Circle for Rural European Studies, Wageningen Agricultural University, the Netherlands

RENTING, H. and E. POHLMANN (1994), *Boeren tussen de toeristen: Beierse alpenboer overleeft dankzij onderhoud natuur en landschap*, In: Broekhuizen, R. Van and H. Renting (1994) *Pioniers op het Platteland* pp. 51-64, Den Haag

ROEP, D. and R. DE BRUIN (1994), *Regional Marginalization. Styles of Farming and Technology Development*, in: J.D. van der Ploeg and A. Long (eds) *Born from Within. Practice and Perspectives of endogenous rural development.* Assen, Van Gorcum

ROEP, D. and J. ROEX (1992), *Wikken en Wegen. Bedrijfsstijlen en verschillen in stikstofoverschot.* Vakgroep Rurale Sociologie, Wageningen Agricultural University Wageningen. Bedrijfsstijlenstudie 7

VANLA (1995), *Plan van Aanpak voor Achtkarspelen.* Drogeham/Den Haag
VEL (1994), *It Lânjuwiel. Voorbeeldplan van de Vereniging Eastermar's Lânsdouwe.* Eastermar
VEL (1995), *Plan van Aanpak voor Eastermar.* Eastermâr/Den Haag
WEIJDEN, W.J. VAN DER *et al.* (1984), *Bouwstenen voor een geïntegreerde landbouw.* Vakgroep Milieubiologie Rijksuniversiteit Leiden en Wetenschappelijke Raad voor het Regeringsbeleid. Staatsuitgeverij 's Gravenhage

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