

CHANGING RURAL AREAS; EXPLORING FUTURE AGRICULTURE

in the Netherlands and EU

O. Oenema (Ed)



Referaat

O. Oenema (Ed) CHANGING RURAL AREAS; EXPLORING FUTURE AGRICULTURE in the Netherlands and EU

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Most studies presented here used the triple P concept (People, Planet, Profit) and a 'Roadmap' with five basic questions (Why? What? How? Where? How much?) as common framework for the analyses.

Key words: sustainable agriculture, people, planet, profit, rural areas, agriculture, innovations, designs, policy

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Abstract.

This booklet provides a brief overview of the results of 9 studies exploring the challenges, barriers and dilemmas of agriculture and rural areas in the next three decades. The purpose of these studies was to assist policy makers in (re)shaping policies for agriculture, environment and spatial planning. Each chapter quickly summarizes the major findings of a study and the lessons to be learned from that study. All studies have been carried out by researchers from Wageningen-UR and approaches, views and conclusions expressed may be biased to some extent by experiences from The Netherlands, where the 'transition towards sustainable agriculture' receives considerable attention from policy makers.

Most studies presented here used the triple P concept (People, Planet, Profit) and a 'Roadmap' with five basic questions (Why? What? How? Where? How much?) as common framework for the analyses. Emphasis though differed in the various studies. One study focused in particular on the 'How' - question, and showed that all three approaches commonly used in the transition towards sustainable agriculture, i.e, food chain, sector and regional approaches, have their strengths and weaknesses. The challenge is then to combine the strengths of the various approaches. The next study explored the possible spatial changes in agricultural sectors in the EU-25 following changes in driving forces, i.e., urban pressures and land prices, transport and logistics, market conditions and environment.

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Participatory stakeholder involvement is of key importance in establishing social support and cohesion for the transition towards sustainable agriculture. Sketches and designs of innovative systems and landscape views can greatly facilitate and focus the discussion. They also facilitate thinking about the future. Inventories of practical initiatives learn that innovations are common practice, and that these pioneers face many institutional barriers and dilemmas. There is a clear quest for fewer rules and more freedom and responsibility.

The last two chapters focus on the international and policy contexts of the transition towards sustainable agriculture. Reviews of initiatives in France and United Kingdom show interesting differences. In France, sustainable agriculture is largely initiated by public authorities; it aims to strengthen the economic viability of agriculture. In doing so, the social dimension of sustainability is interlinked with economic viability. In the UK, stakeholder engagement (private industry co-operating with public authorities, extension service, NGOs and experts) is considered vital to the success of implementing sustainable practices. In the policy arena, major items are reform of the EU Common Agricultural Policy, liberalisation of world trade and the increasing role of the agrifoodchain that operates on the international market. Such changes go beyond single regions and countries and could largely shape practices and changes in the years to come. They put constraints to farmers, and possibly affect competitive positions.

1. General Introduction

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Background

Rural areas in Europe are in a continuous transformation. Large part of the rural areas is used for agriculture, and agricultural production systems are under pressure to reform to meet the increasing demands from market and society. The economic and political importance of agriculture has greatly diminished during the last century, and some rural areas in Europe have become abandoned, depopulated and impoverished. Some areas witness a diversification of activities and part-time employment to raise sufficient income. Other areas though have witnessed the development of relatively large specialized and industrialized agricultural production systems. There are also increasing urban and ecological claims to the rural area; living, forestry, nature conservation, recreation, water management, and landscape conservation gain in importance.

Globalisation, population growth and migration, technological developments, and changes in consumer behaviour and political situations will contribute to global changes during the next decades. The projected increase in global population of 2 to 3 billion people during the next 3 to 5 decades will require global agricultural productivity to increase by a factor of about 2, especially in the places where the population increase takes place. To be able to diminish the further degradation of natural ecosystems as a result of externalisation of environmental effects, resource use efficiency in agriculture has to increase by at least a factor 4. Meeting these goals will require radical changes in global agriculture.

Agriculture in The Netherlands

Agriculture of The Netherlands ranks among the highest in the world in terms of production level and resource use per unit surface area. Though the country is small (34,000 km²) and densely populated (470 inhabitants per km²), it ranks among the first in the world as net exporter of agricultural products. About 60% of the total surface area

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is covered by agricultural land, leaving 10% for forests and natural areas, 15% for surface waters and 15% for living, industrial and infra-structural area. Governmental policies have strongly contributed to the intensification and specialization of agricultural production during the second half of the 20th century. Early signals in the 1960's and 1970's about the environmental and social-cultural side-effects of this intensification of especially animal production were largely ignored initially by stakeholders and policy makers. However, from 1985 onwards, drastic changes in agricultural and environmental policies and measures have been implemented. These policies and measures have improved the environmental performance of agriculture, but some problems appear stubborn and wicked, and the outbreaks of foot and mouth disease, BSE, pig pest, and Salmonella infections, at the end of the 1990's, have put agriculture further under pressure to reform. Recent changes in the common agricultural policy of the EU and in trade policy and markets have altered the economic competitiveness of various sectors within Netherlands' agriculture and necessitate for further changes as well. Urban sprawl, nature conservation and water storage increasingly claim areas at the expense of agricultural land.

Transition towards sustainable agricultural

Recent governmental initiatives plead for a 'transition towards sustainable agriculture', by restructuring Netherlands' agriculture and by having solved all stubborn problems by the year 2030. Though there is broad consensus about the need to move towards 'economically viable, socially acceptable and environmentally sound agriculture' there is less consensus about the outlook of such agriculture and about how to reach that agriculture. There are no generally accepted 'blueprints' for sustainable agriculture, and no validated transition management theory for sustainable development, which would facilitate managing the transition towards sustainable agriculture. Current believe is to develop innovative and sustainable agroecosystems jointly with relevant stakeholders, considering all economic, ecological, social and cultural trade-offs of such systems in a balanced manner. It is also believed that a sequence of well-focused activities are needed to achieve the transition towards sustainable agriculture. These activities are carried out in so-called arenas with all relevant stake-holders.

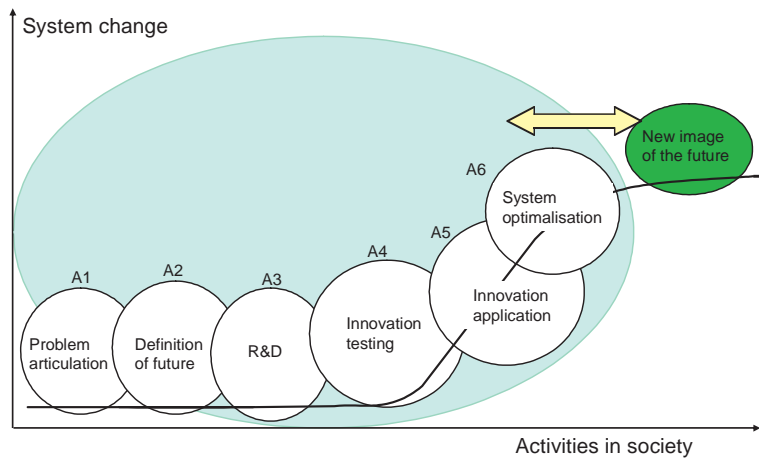


Figure 1. Hypothetical picture of the transition process towards sustainable agriculture. A sequence of activities with all relevant actors is needed to achieve the structural changes in systems. Innovations and system optimization are suggested to play a key role. (after Ros et al., 20003)

Over the last two years, researchers from Wageningen University and Research Center have made a number of preliminary studies exploring the challenges, barriers and dilemmas of future agriculture and rural areas in the Netherlands. The purpose of these studies was to assist policy makers in (re)shaping agricultural, environmental and spatial policies. The studies were financed by the Ministry of Agriculture, Nature and Food Quality, through program 385 Environmental Assessments. The studies were carried out in close interaction with policy makers from the Ministry of Agriculture, Nature and Food Quality (LNV), the Ministry of Housing, Spatial Planning and the Environment (VROM), and the Environmental Assessment Agency (RIVM).

This booklet provides a quick overview of the results of some of the studies. Each chapter summarizes the major findings of a study and the lessons to be learned from that study.

Chapter 2 provides a common framework (Road map) for analyzing (the need for) agricultural change. Chapter 3 discusses the pros and cons of three approaches (food chain, sectoral and regional) for managing changes in rural areas in desired directions. Chapter 4 sketches maps of future developments of various agricultural sectors

in EU-25, and the Netherlands, based on an analysis of major driving forces for change. Chapter 5 presents designs of future farming systems. Chapter 6 reports on an inventory of initiatives in practice in the Netherlands to move towards sustainable farming systems. Chapter 7 reports on another inventory of initiatives in practice in the Netherlands to move towards sustainable farming systems. Chapter 8 compares a selection of approaches and initiatives towards sustainable agriculture in France and United Kingdom with those in The Netherlands. Finally, the benefits and constraints of the transition toward sustainable agriculture are discussed in chapter 9.

Each of the chapters is based on an underlying report, written in Dutch language. These reports can be obtained from the authors upon request.

References

Ros, J.P.M. et al., 2003. Method for Assessment of a Transition. The case transition towards sustainable agriculture and food chain. RIVM report 550011001/2003, Bilthoven.

2 A roadmap to sustainable agriculture

*C. Hermans**

To guide the development to a more sustainable agriculture a roadmap has been formulated along five questions concerning profit, planet and people aspects: why, what, where, how much and how. The challenge is the combination of all questions and aspects instead of the deepening of one of them to obtain a more sustainable agriculture.

Introduction:

Sustainability or the lack of sustainability is often described in economical aspects (profit), ecological aspects (planet) and socio-cultural aspects (people). Sometimes (the lack of) sustainability is addressed at a high scale level and formulated as a problem: insufficient food to feed the world population, sometimes it is addressed at a low scale level and formulated as a goal: continuity of farms. Often, it is not clear what is meant by agriculture. Is it agricultural production for the world market or is it enlarged agriculture for the local market? Shortly, there often is a perfect Babel confusion of tongues.

Therefore a roadmap has been formulated along five questions, to guide the analysis and the development to sustainable agriculture.

The Roadmap

Basically, the roadmap addresses five basic questions:

- Why: what is the problem with current agriculture, why is it a problem and for whom?
- What: what do we understand by sustainable agriculture? What do we want?
- Where: where do we expect spatial impacts of sustainable agriculture?
- How much: what is the balance of costs and profits?

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- How: how can we achieve sustainable agriculture?

During testing of the roadmap, four additional issues were raised:

- Make clear what type of agriculture you focus on: in our studies we focused on primary production for the world market as well as on enlarged agriculture for the local market (frame 1);
- Make clear what scale level you focus on: in our studies we mainly focussed on the regional or local scale, even if they present lessons

Figure 2.1

Both pictures represent agriculture. On the left, a modern mono-functional farm producing for the world market, on the right a multi-functional farm concentrating on landscape. Both can be or become sustainable.

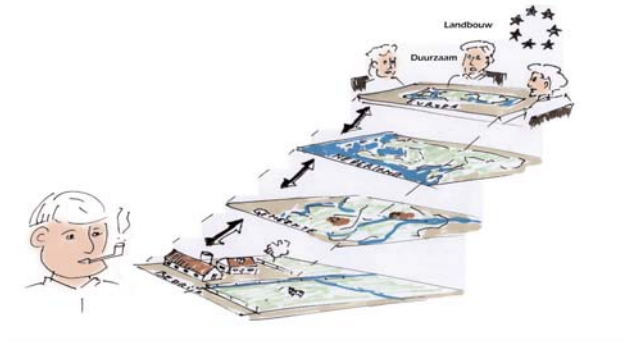


learned from elsewhere in Europe (frame 2);

- Identify the relevant aspects of profit, planet and people at the preferred scale level. We call an aspect relevant if a governing body

Figure 2.2

Not all aspects of sustainability are relevant at all scale levels. We distinguish continental, national, regional and local (farm) scales. Each scale has its own governing body, varying from the European parliament to the individual farmer.



has the ability to influence the aspect by policy. For example, the concern for the environment in the EU has led to the agreements on the implementation of the Nitrate Directive and Water Framework Directive. The way to achieve this goal is situated at a lower scale: at a national scale (translating EU policy into national regulations), regional scale or at the local or farm scale. It can be chosen to close nutrient circles at the regional level or at each individual farm.

- Indicators are needed to be able to monitor and evaluate the development towards sustainability. An elaborate list of indicators is available (Ten Pierik and Meeusen 2003). An indicator can be measured and a level can be agreed above which we call it sustainable. We went one step further and have allocated these aspects and indicators to the relevant scale.

Application of the Roadmap

Application of the Roadmap in practice requires the completion of a number of tables, together with the actors involved.

Addressing the 'Why' question is important as it underlines the urgency for change and actions. This question needs to be related to all three aspects People, Profit, Planet, and it is up to the stake holders involved to make any judgment about the relative importance of these three.

Table 2.1. Addressing the "Why?" question at various scales, to illustrate the case.

Scales	Profit	Planet	People
International/ European	<ul style="list-style-type: none"> • Limited competitiveness of European agricultural sector on world market 	<ul style="list-style-type: none"> • Exhaustion of natural resources • Decrease of biodiversity • Undesirable change of climate 	<ul style="list-style-type: none"> • Uncertainty about food availability
National	<ul style="list-style-type: none"> • Limited competitiveness of national agricultural sector on world market 	<ul style="list-style-type: none"> • Excessive use of land for production or - activities • Limited awareness of environmental quality aspect 	<ul style="list-style-type: none"> • Uncertainty about food safety
Regional	<ul style="list-style-type: none"> • Limited competitiveness of agrarian holdings on consuming market and land market 	<ul style="list-style-type: none"> • High levels of nutrients in soil and water 	<ul style="list-style-type: none"> • High population pressure and therefore limited space for living and recreation
Local/Farm	<ul style="list-style-type: none"> • Low continuity of individual farms 	<ul style="list-style-type: none"> • Large amounts of water used 	<ul style="list-style-type: none"> • High population pressure and therefore limited space for living and recreation • Bad smell for inhabitants from neighbouring farms • Low attention to animal welfare • Bad conditions for human labour (safety and health)

Addressing the 'What?' question builds on the answers of at the 'Why?' question. What type of land use and what types of agriculture contribute to solving the problems identified during the 'Why?' questioning. This question also needs to be related to all three aspects People, Profit, Planet, and it is up to the actors involved to make any judgment about the relative importance of these three. Of course it should be in line with the relative importance given at the why question.

Table 2.2. Addressing the "What ?" question at different scales (see also table 1).

Scale	Profit	Planet	People
European	<ul style="list-style-type: none"> • Competitive European agricultural sector on world market 	<ul style="list-style-type: none"> • Preservation of natural resources • Preservation of biodiversity • Control of climate change 	<ul style="list-style-type: none"> • Food availability secured
National	<ul style="list-style-type: none"> • Competitive national agricultural sector on world market 	<ul style="list-style-type: none"> • Reduced amount of land for production or - activities • Awareness of environmental quality aspects 	<ul style="list-style-type: none"> • Food safety secured
Regional	<ul style="list-style-type: none"> • Competitive agrarian holdings on consuming market and land market 	<ul style="list-style-type: none"> • Low levels of nutrients in soil and water 	<ul style="list-style-type: none"> • Sufficient space for living and recreation • High quality of landscape
Farm	<ul style="list-style-type: none"> • Continuity of farm 	<ul style="list-style-type: none"> • Limited amount of water used 	<ul style="list-style-type: none"> • No agricultural smell for inhabitants • Attention for animal welfare • Good labour conditions

Addressing the 'Where?' question relates to the spatial dimensions and spatial arrangements of land use systems. For this assessment various indicators have to be identified and quantified for each of the three dimensions: profit, planet and people. An example of addressing the 'Where?' question is given by Rienks and Van den Bosch in chapter 4.

Addressing the question 'How much?' should be based on a cost-benefit analysis. All possible consequences of changes are translated into monetary terms (euro's), although it turns out to be extremely difficult to correctly estimate for example the benefits of clean drinking water and surface waters, or beautiful nature and landscapes.

'How' to establish a more sustainable agriculture is a complicated question. Many actors are involved and the ultimate picture of sustainable agriculture is not uniform for all actors, and there is limited knowledge about the required responsibility of the different levels of government. Illustrations of this search are presented in the following chapters.

References

- Brouwer, F.M., W. van Eck, M.A.H.J. van Bavel, G.F. van den Bosch, H. Leneman & O. Oenema, 2003. Een routekaart naar duurzame landbouw; wegen en kruispunten. Alterra-rapport 824, Wageningen.
- Ten Pierick, E. en M.J.G. Meeusen, 2003. Meten van duurzaamheid II. Een instrument voor agroketens. LEI rapportage.

3 Switching between management approaches for the transition towards sustainable agriculture

A. Smit¹, I.G.A.M. Noij¹, J.W.H. van der Kolk¹, M.J.G. Meeusen²

Three management approaches for the transition towards sustainable agriculture are compared in this paper. Consumer demand is the main driving force in the "chain approach". The "sector approach" is based on cooperation between farmers belonging to the same primary production system and associated industry. The "regional approach" aims at social and environmental coherence through interactive spatial planning and is specific for a limited region. Although the approaches are quite complementary with respect to sustainability criteria, we do not recommend integration, but rather stress the importance of switching between approaches and associated networks during the successive stages of transition.

Introduction

There is as yet little consensus on the preferred transition management pathway towards sustainable agriculture. The goal of this study was to gain more insight in the strengths and weaknesses of three different approaches that are currently being applied in the search of a more sustainable agriculture, namely 'chain approach', 'sector approach' and 'regional approach'.

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Procedure

In order to assess the contribution of the approaches to sustainability, we chose the framework as outlined in chapter 2. This framework with the 3P concept is visualized in figure 1. We added the dimensions of time and space to take account of the interests of next generations (later) and other places (elsewhere).



Figure 3.1. Visualized 3P concept, i.e., People (blue pie), Planet (green pie) and Profit (red pie), used as Framework for the analysis (see also chapter 2)

In order to collect information we did interviews with experts representing each of the three approaches. In each interview we followed the same guidelines that were derived from the framework of analysis. In addition we organized a workshop with members of the reference group, consisting of policy makers from the Ministry of Agriculture, Nature and Food Quality (LNV) and the Ministry of Housing, Spatial Planning and the Environment (VROM), to apply each of the approaches to two problems regarding agriculture in the Netherlands.

Comparison of the approaches:

Essentially, the approaches are quite different (table 1). The 'chain approach' is driven by the shared economic interest of the consecutive links (supplying industry - farm - processing industry - trade - retail - consumer). The main sustainability issues at this moment are to reduce waste, transport and energy. The environmental issues very often only play a role as limiting condition and are regulated by the government. The 'regional approach' chooses the environment and social-cultural aspects in a region as a

starting point, including the ways it is experienced by the people that live and work there. Several interests have to be balanced, taking into account the specific features of the region, both in the physical and the social sense. Working on the transition to sustainability through the primary producers, joined per sector, is called the 'sector approach'. Traditionally, farmers are organized by production sectors to stand stronger as suppliers in the free market. The sector approach mostly focuses on technical innovations to increase yields, improve product quality and to reduce the emission and the use of resources.

Table 3.1: Context of the three approaches examined

Approach	Chain	Sector	Regional
Motto	Profit and quality	Together we stand	Society and environment
Concept of man	Consumer	Producer	Land user/inhabitant
Driving force	Consumer demand	Joint interest	Livability
Strengths	World market orientation Integration over production chain	Degree of organisation Knowledge transfer and technology	Social support Spatial design
Weaknesses	Drop-outs Few big players Sustainability is hard to sell	Little control: farms are chained and captured in the region Majority delays innovation	Process control Knowledge transfer Friction participation versus innovation
Network	Worldwide	National	Regional (platform)
Business	Chain players	Farmers organisations	Individual entrepreneurs
Government	National and EU	National and EU	Province Water board Municipality
NGO's	Consumers interest Nature & environment 3 ^d world development Labour organisations	Dependent on regional or chain initiatives	Nature & environment Regional landscape
Knowledge	Own R&D and Research institutes	Research institutes Extension services	Dependent on actors involved

Figure 2 summarizes the contribution to sustainability of the three approaches that we deduced from the gathered information in this study. The figure is meant to give a first impression of the difference in focus on People, Planet and Profit and is not meant to rate the approaches. In all approaches and at all scales, profit is a boundary condition for sustainability; without sustainable finance, the focus on People and Planet would not last. Obviously, on the local scale and in present time the approaches differ: the chain approach focuses on Profit, while in the regional approach People and Planet (landscape, liveability) get more attention. The sector approach takes an intermediate position and is mainly focused on Profit and Planet. The figure does not distinguish between specific sectors (arable, animal, horticulture, etc.), although they contribute differently. The chain approach pays most attention to international issues,

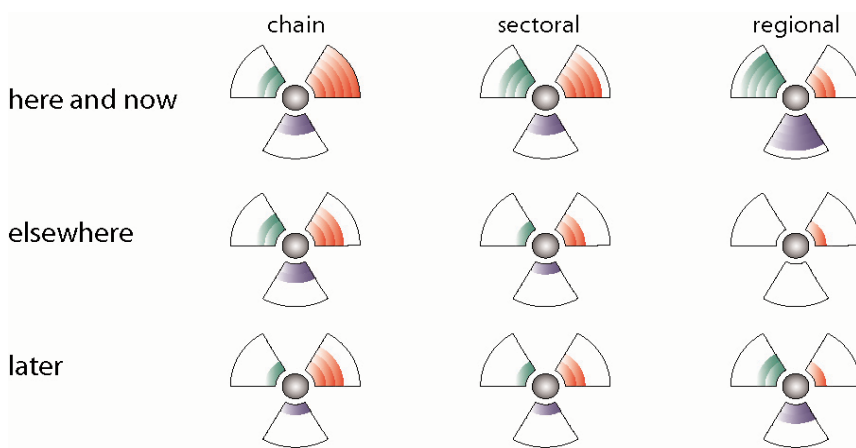


Figure 3.2: Comparison of the Chain, sectoral and regional approaches. The contribution to sustainability by each approach is indicated by the colouring of the different pies, i.e., green for Planet, red for Profit and blue for People.

while the regional approach mainly concentrates on the smaller (regional) scales. Here too, the sector approach takes an intermediate position as some sectors are strongly connected to international chains. All approaches have a heavy emphasis on the current situation and pay less attention to future issues.

Although the interests of next generations (later) and other places (elsewhere) are addressed insufficiently, the three approaches appear to be quite complementary as far as the three P's are concerned.

Relation with transition process and associated network

How can we make use of the complementarities of the approaches in the transition towards sustainable agriculture? To answer this question we need to go into the transition process. Ros et al. (2003) divided the transition process into 6 so-called arena's, focused activities (see also figure 1 of chapter 1).

Especially during the first two arena's (problem perception, imaging the future) it is important to involve actors from outside the traditional network to make sure that all sustainability aspects get proper attention during the transition process. Industries, for instance, tend to seek solutions in the production chain, whereas it might be necessary to take the effects of each link on the nearby environment into account. Inhabitants, on the other hand, tend to organize a local or regional interest group to fight the deterioration of environmental quality. However, it might be useful to seek solutions in the production chain or sector. In the first phases of the transition process it is important that problems are not transferred but shared, and that solutions are searched from different perspectives. The strengths of the different approaches can be utilized during the next arena's when plans have to be worked out. It is important to mutually report results and to see if separate plans have to be retuned. At those moments the process can or should switch between the three approaches.

In order to stimulate switching between the three approaches during the transition process, overlaps between the associated networks have to be organized, especially during the first two arena's (figure 4). Traditionally, there is an overlap between the chain and the sector networks, as primary production sectors are one of the links of the chain. The regional and sector networks may be linked by the individual farms from a sector in a certain region. However, links between the regional and chain networks are sporadic. Farms may indeed form part of chain, sector and regional network, but individually they exert insufficient steering power to reach an integrated approach. Actually, the problem of integration of all sustainability

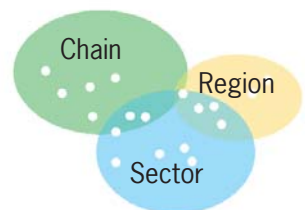


Figure 3.3: Networks associated with the three approaches

aspects in the primary production process is transferred to the farmer. To prevent this, there should be overlap between the three networks. Either the actors that are traditionally associated with each of the approaches or a governmental organization should take the initiative to broaden the network at the beginning of a transition. A stakeholder analysis will be useful at this stage.

References

- Ros, J.P.M. et al., 2003. Method for Assessment of a Transition. The case transition towards sustainable agriculture and food chain. RIVM report 550011001/2003, Bilthoven.
- Smit, A., J.W.H. van der Kolk, I.G.A.M. Noij & M.J.G. Meeusen. 2004 (in prep). Duurzame Landbouw via een schakelkast .

4 Driving forces for spatial change in agriculture

W.A. Rienks en G.F. van den Bosch**

Agriculture is an economic sector that covers most of the land surface in Europe. Due to political, economical, technical and social changes the allocation of agriculture has changed over time. This process will continue in the future. Because of the vast area of land used by agriculture changes will affect spatial planning policies in the various member states and regions of the EU25. At present, spatial consequences are hardly being taken into consideration in the debates on agricultural policy.

Introduction

The laws of economics dictate that agriculture can only survive in the long term in areas where it is profitable, that is, where yields exceed costs. In a situation where there is a large market with more or less uniform prices (e.g., the world market or the common EU market), profitability is largely determined by costs. Areas offering favourable production conditions allow more efficient production. Such areas are said to have comparative cost advantage and offer the perspective of a lasting and sustainable agricultural production.

Aspects that come to mind in relation to production conditions are often abiotic and climate factors. Traditionally, aspects like the availability of fertile soil, sufficient water of adequate quality, easy access and suitable parcelling are regarded as the decisive factors for land-based agriculture. Ever since the 1950s, land use planning schemes in the Netherlands and also elsewhere in Europe have therefore concentrated heavily on improving these production conditions. However, it are not only the physical conditions which

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determine farmland allocation; other factors include land price (insofar as it does not result from physical qualities but from the demand for space by other functions) and the proximity of infrastructure elements, suppliers and customers.

In this contribution we describe two examples of the influence of different aspects on the spatial configuration of several agricultural sectors (primary production). The European example illustrates an analysis of 'most suitable' regions on a European scale. The Dutch example illustrates an analysis of driving forces for change within the Netherlands.

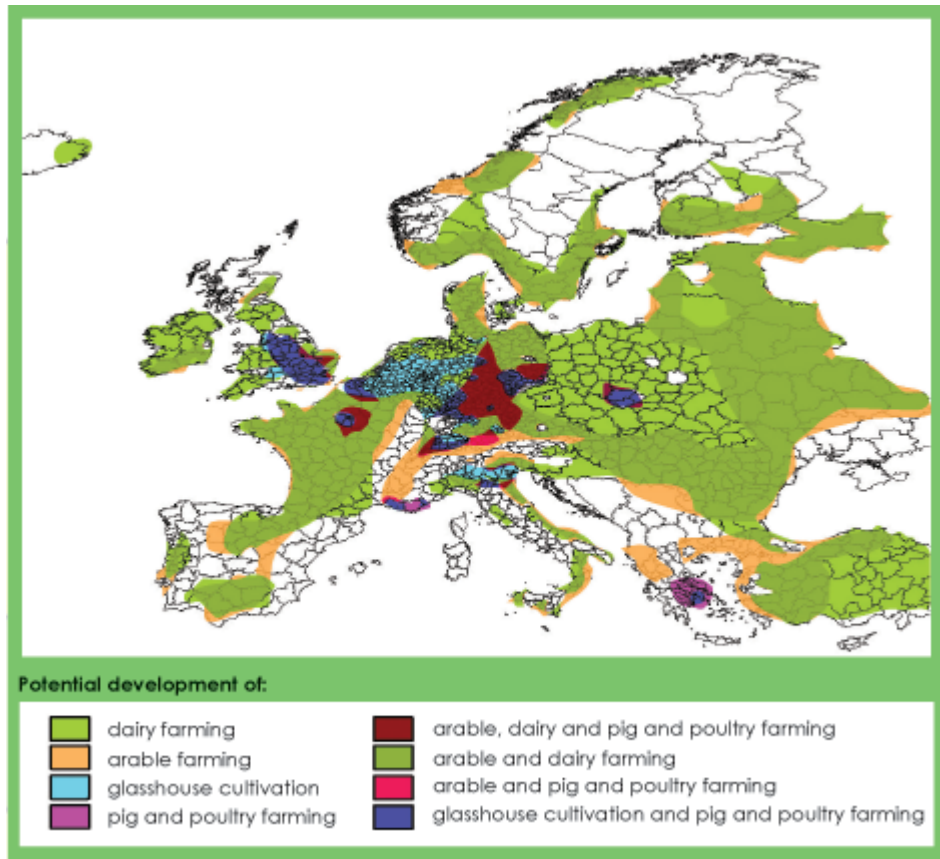


Figure 4.1: Optimal allocation of primary production sectors in the EU-25 (see text).

European scale: agricultural potential in Europe

At the European scale we considered four main factors that determine the allocation of agricultural activities i.e.

- physical conditions
- neighborhood of urban areas
- transport and logistics
- environment

It will be obvious that these four factors do not impact equally on all agricultural sectors. Briefly, the following factors are critical for agricultural sectors:

- Arable farming - physical conditions and the urban system (land price)
- Dairy farming - the urban system (land price) and physical conditions
- Pig and poultry farming - transport and logistics and the environment
- Glasshouse cultivation - transport and logistics and the urban system (land price)

To assess which parts of Europe offer the greatest potential for each of these sectors, maps for each critical factor were made and subsequently combined. The resulting maps offer a (simplified) overview of the areas where a specific sector has potential for growth. White areas on the maps are either unsuitable or are areas where the sector is present but is expected to stabilise or downsize.

Figure 4.1 was obtained by combining the individual maps for each sector. It shows the potential offered by various regions for the different types of agriculture. The map reveals two 'meta-cities': the Po valley conurbation and the North-West European delta metropolis (the polygon encompassing London, Paris, Cologne and Amsterdam). In the immediate vicinity of these two meta-cities there is a zone providing high-return products that are voluminous and hence involve high transport costs. These include especially vegetables, fruit and ornamental plants. At a certain distance from the meta-cities, the zones offering potential for various agricultural sectors seem to overlap. In these areas, land prices are not boosted by urban pressure, while at the same time the distances to the conurbations are not too large and physical conditions are favorable. These areas

include Central Europe and northern parts of France, as well as parts of Great Britain. At greater distances from the meta-cities, agriculture will be largely limited to arable farming and/or dairy farming.

Spatial changes in agriculture in the Netherlands

The objective of the Dutch example is to illustrate spatial differences within the Netherlands. The agrosector encounters different problems, which can be divided into profit, planet and people aspects.

Table 4.1: Context of the three approaches examined

	Profit	Planet	People
Problem	Limited competitiveness of agrarian holdings on consumer market and land market	High levels of nutrients in soil and water	High population pressure and therefore a high demand on land for housing and recreation
Objective	Competitive agrarian holdings on consumer market and land market	Low levels of nutrients in soil and water	Development of agriculture in areas with lower population pressure
Indicator	Average income per farm and per hectare	Area with potential environmental problems	Urbanized area in proportion to agricultural area

Profit

A sufficient income is the basis for farms to exist. Two indicators were identified to illustrate the economical viability of the Dutch agrosector. One indicator is used to illustrate the competitive position on the international market, the other to illustrate the competitive position on the local land market.

Planet

Due to intensive livestock farming, the Netherlands face eutrophication problems through nitrogen and phosphorus from animal manure. As an example of the impact of environmental aspects, soil properties were identified that limit the possibilities for agriculture because of accumulation of phosphate in the soil and leaching of nitrogen to groundwater and surface waters.

People

As a social-cultural pressure on agriculture we chose urbanization. We expect that the higher the population pressure, the higher the demand for land for housing, infrastructure and recreation will be. As a result less land will be available for agriculture.

For such an analysis the regional scale is the most suitable scale to use. However, the boundaries of agricultural regions for assessing the profit aspects are not the same as those for the physical-geographical regions for assessing the planet aspects. And demographic regions to assess people aspects know even other boundaries. To tackle this problem, we chose an administrative division at a sub regional level: municipalities. Because the municipalities differ considerably in size, the indicators were not used as absolute figures but as relative figures.

Three scenario's for possible changes

We do not know which factor will be the most decisive for the future of agriculture in the Netherlands. Therefore we explored three possible scenario's for spatial changes. We expect that the international market, local land prices and urbanization may be decisive factors for different agricultural sectors. Therefore in each of the scenarios one of these factors is leading. The chosen indicator for

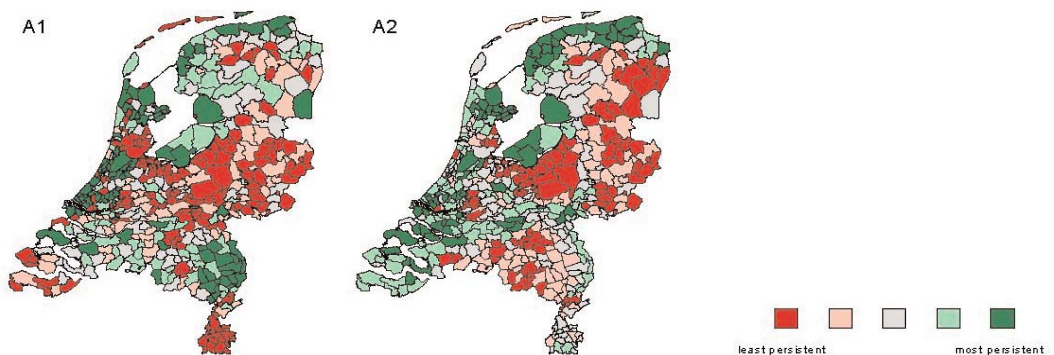


Figure 4.2: Scenario 'International market'; map A1 shows the persistence of agriculture when the international market is leading, A2 shows the results when also the environmental conditions are taken into account. The scale moves gradually from most persistent (green color) to least persistent (red color).

environmental aspects is restricted to livestock farming. Therefore for each scenario an extra map was made to illustrate the effect of the environmental limitations (Figures 4.2, 4.3 and 4.4).

The first map (A1) of Figure 4.2 shows the results of the scenario 'International market'. If the competitive position on the international market will be the most decisive small farms will have a hard time to survive. The areas where these farms are concentrated are found in the middle and east of the Netherlands, as well as in the south-east and south-west. Because of environmental limitations scaling up is not a feasible option. In these areas it will be an option to generate more income by means of providing other (green) services like water storage and nature conservation, but also by offering tourist and recreational services.

In the middle and east this process will be accelerated because of the environmental vulnerability of these areas (map A2). From an economical point of view scaling up farms could be an option to meet the immediate demand of more income. The environmental problems however will still be there and demand large investments, which will be difficult to be done. Even more important will probably be the social-cultural aspects. The areas under discussion are areas with highly valued landscapes, which also have a high potential for recreation and nature. Development to multifunctional agriculture, where the role of

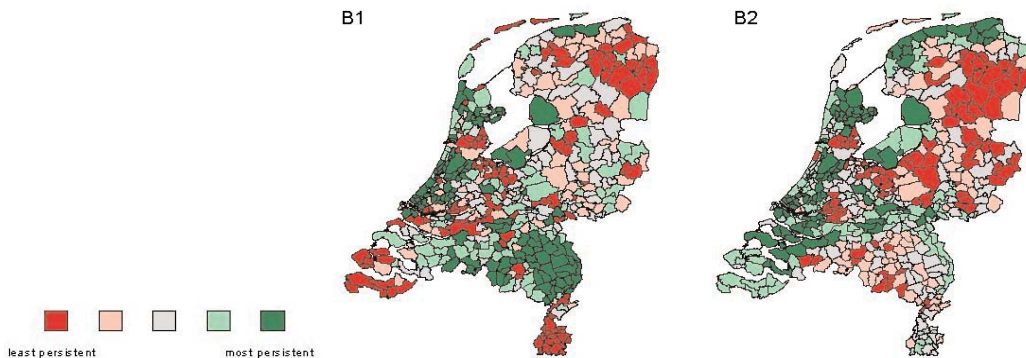


Figure 4.3: Scenario 'Local land market'; map B1 shows the persistence of agriculture when the local land market is leading, B2 shows the results when also the environmental conditions are taken into account. The scale moves gradually from most persistent (green color) to least persistent (red color).

agriculture as source of income will be relatively small and other services provided by the farms may also add to the income.

Map B1 of Figure 4.3 shows the results of the scenario 'Local land market'. If the competitive position on the local land market will be the most decisive factor arable farming in the northern part and in the south-west will have the most difficult position. Because the environmental conditions in these parts are relatively well, it's likely that livestock farming will take its place (map B2). The challenge will be to shape this process in a way to develop sustainable husbandry.

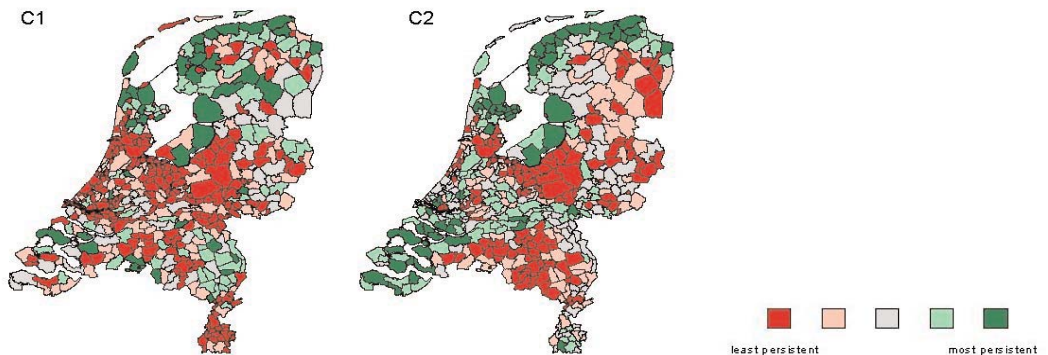


Figure 4.4: Scenario 'Urbanization'; map C1 shows the persistence of agriculture when the local land market is leading, C2 shows the results when also the environmental conditions are taken into account. The scale moves gradually from most persistent (green color) to least persistent (red color).

If the pressure from urbanization will be the most decisive factor, agriculture in the urbanized areas will have the hardest time. These areas are found in the west and middle. In this case, the economic relatively strong agricultural sectors like intensive dairy farming and intensive horticulture will have to compete with other economical activities. On the other hand, the urbanized areas provide also a good infrastructural network that is important for distribution of the products. In this light, the relatively large and economic strong glasshouse cultivation complexes in the west have a good chance to survive. The relatively small pig and poultry farms in the middle and south that also have to deal with the environmental conditions will have to find an answer to this pressure.

Lessons learned:

Our analyses show that the spatial distribution of the various agricultural sectors is subject to the interplay of a number of mechanisms. The combination of different forms of agriculture and different regional characteristics results in a patchwork of options. This patchwork is, however, not a blueprint of what is happening or supposed to happen. Rather, it indicates the relevant forces which determine the chances of success for certain developments.



Agriculture is complex. Our analyses show that location factors for agricultural sectors, at both the European and the national level, are determined by developments within agriculture (intensification, the impact of transport distances, sustainability, etc.) as well as beyond agriculture (urbanization, struggle for land). The resulting overall picture could be debated from a whole range of perspectives, which is precisely what the authors feel should happen: there ought to be a European debate on the forces that determine the spatial allocation of agricultural activities. It is important to examine the available information on the basis of adequate knowledge of specific circumstances, to allow a balanced view.



In any scenario, agriculture is the key structuring spatial factor in Europe, which means that agricultural policies largely coincide with spatial planning policies. When looking at the economical and physical factors, we expect considerable shifts in the allocation of agricultural activities over the next few decades, which will have great consequences for land use and spatial planning policies in the various member states and regions of the EU25. The impact on the landscape and the livability of rural areas will also be great. At present, spatial consequences are hardly being taken into consideration in the debates on agricultural policy. We therefore feel that an agenda should be drawn up for the combination of agriculture and spatial planning in Europe.

References:

Rienks, W.A., Hermans, C.M.L., Olde Loohuis, R.J.W. en Van Eck, W., 2004. Agriculture on the European map. Alterra Wageningen UR. 20 p.

5 Designing farming systems that differ in emphasis on profit, planet and people

J.W.H. van der Kolk¹, W. van Eck¹, and J.H.J. Spiertz²

The transition process towards a more sustainable agricultural system needs inspiring examples to facilitate discussion among stakeholders. Here, we present a number of possible future farming systems that differ in emphasis on profit, planet and people aspects, as a result of different economical, environmental and social-cultural conditions. These examples should be seen as possible developments and not as blueprints for future farming systems.

Introduction

This chapter addresses the "What?" question of the Roadmap (see chapter 2); what agricultural systems may be seen as inspiring examples of sustainable agricultural systems for the future (ca. 2030). The designs of future systems are meant to stimulate the discussion among stakeholders. By showing and discussing the pros and cons of contrasting designs, stakeholders become involved in thinking about the future. They should provide challenging and provocative images of the future systems. By no way they are meant as blueprints for future farming systems. Under current conditions, they may be unrealistic, but they may become realistic in the future, following institutional, social-cultural, technological and/or economical adjustments in society. Inspiring designs facilitate the discussion; they may help identifying attractive and less attractive future scenarios.

As a starting point, we used the triple P concept discussed in chapter 2. For both People, Planet and Profit, we formulated three common objectives.

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For People, these objectives were:

- Food security, safety and meta quality;
- Social cohesion and livability; and
- Experiencing nature and landscape.

For Profit, the objectives were:

- Income;
- Employment; and
- National trade balance.

Finally, for Planet, the objectives were:

- Environmental quality and ecological functions;
- Biodiversity of fauna and flora; and
- Conservation of natural resources.

Here, we discuss 5 different systems, which differ in the emphasis on Profit, People or Planet aspects. The 5 systems are:

- Land-based agro production (land-dependent);
- Foot-loose agro production (apart from the land);
- Farming for nature conservation (production of nature);
- Peri-urban agriculture (agriculture around cities); and
- Caring and experiencing agriculture (pluri-activity agriculture)

Food - loose agro production

Emphasis in land-based (land-dependent) agro production is on Profit, on income, though aspects of Planet and People can and have to be incorporated as well. Examples of the latter include objectives related to nature, biodiversity and landscape conservation, and multiple uses of parts of the rural area by having for example site activities such as managing a camp site. Evidently, biophysical conditions (e.g., climate, soil, topography and morphology) have to be good for this type of system. It is also important that there is a good infrastructure and processing and marketing facilities for the harvested products.

An example of land-based agro production is the design of a modern dairy farming cluster (Rienks et. al., 2003). This design was made for the central and northern parts of the Netherlands. The design is a low-cost, large-scale dairy farm, to be able to produce milk for world market prices (Figure 1). The farm has a size of 1200 dairy cows. All animal feed is grown on the farm or on farms in the neighborhood. The animal manure is digested anaerobically to generate bio fuel, and

the effluent is processed on-farm into a solid and a liquid fraction. The liquid fraction will be used as irrigation water on the farm, while part of the solid fraction is transferred to other farms. Nutrient cycles are 'tight' on the local scale (neighborhood farms).

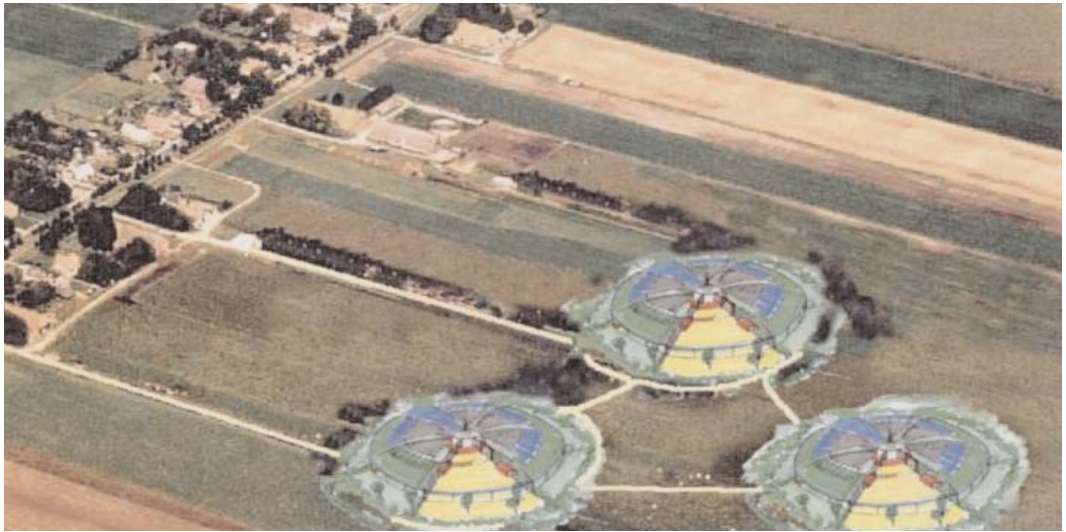


Figure 5.1: Example of clusters of dairy farms in land-based agro-production.

Production apart from the land

Emphasis in foot-loose agro production (apart from the land) is also on Profit, on income. Possible problems related to Planet aspects are solved via technological innovations. In these systems, the price of the land is not important, as very little land is needed. A good infrastructure and the presence of suppliers and processing industry is extremely important for the location of these companies. In general, these foot-loose systems are high-tech, industrialized agro production systems with a high input and output per unit of surface area. These systems include also multipurpose industrialized systems.

An example of a multipurpose industrialized system is the design of "Californie" (Smeets, 2004 in prep). This design combines greenhouses for vegetable and fruit production with and large-scale animal protein production via pigs, poultry and fish (Figure 2). There are 8 to 10 buildings, which agricultural entrepreneurs can rent.



Figure 5.2: Example of a foot-loose system: "Californie"

Together, they arrange their energy, water management, logistics and infrastructure. For the protein production (pigs, poultry, eggs, fish, ect.) there is a central slaughterhouse. Transport of manure will take place subterranean and will be processed on a central spot. In this way, waste of energy and nutrients will be minimized. By concentrating different parts of the chain on one spot, the negative people aspects (e.g., animal welfare, odor) will be concentrated. Because of this concentration of intensive livestock production on a few localities, the rural areas may be used for other activities.

Farming for nature conservation

Emphasis in farming for nature conservation is on Planet, on maintaining landscape and enhancing of biodiversity. In this system, production of food and fiber is not the central issue, but nature conservation and enhancing biodiversity. This type of systems should be situated close to already existing nature conservation areas. People and planet aspects of this type of farming have been rated as very high, but profit aspects are negative. Indeed, key problem of this type of farming is the low income, and this aspect must be solved to be able to make this type of farming sustainable.

An example of this system is a mega "dairy and nature farm" in the low-lying grasslands on peat soil in the western part of the

Netherlands (Figure 3). Nature conservation is the primary function of this farm, but there is extensive dairy farming as well. Land and buildings should be provided by the government or nature conservation organizations. The dairy farm is a low-input, large-scale dairy farm, which should provide enough income to the farmer.



Figure 5.3: Example of a nature conservation farming system

Peri-urban agriculture

Emphasis in peri-urban agriculture (agriculture around cities) is on both, People, Profit and Planet. Direct contact between consumers and primary producers (farmers) is seen as education to consumers and as a direct feed back mechanism to producers. Food quality and safety, landscape maintenance and social cohesion and livability are of prime concern. The food produced is marketed directed to the nearby citizen, and there is a huge variety in products produced on different farms.

An example is the concept 'Rural Park', with a broad range of farms that produce a broad range of products (Figure 4). Fresh products will be sold directly in the park shop. Emphasis here is on high quality products, specialties with added value, direct contact between producers and consumers, and low transportation costs.

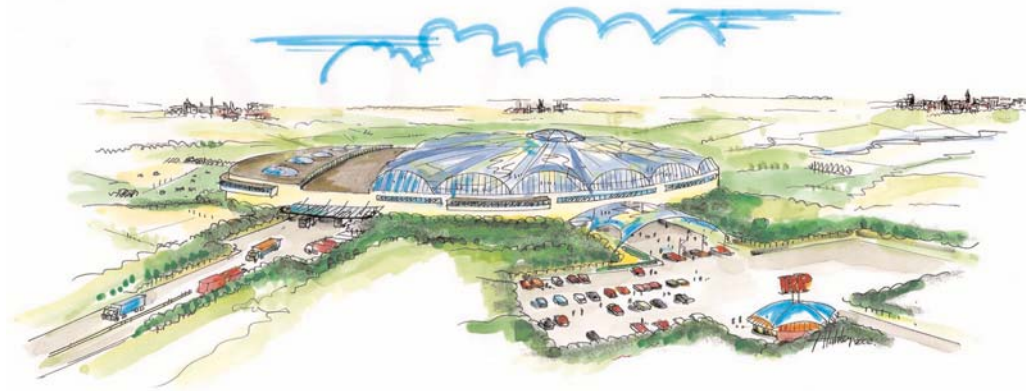


Figure 5.4: Example of a peri-urban agricultural system

Caring and experiencing farming

Emphasis in caring and experiencing farming is on People. Here, farming is more the setting for other activities. These other activities are aimed to help or to entertain people. The income of the farmers is largely based on fees visiting people have to pay. Possible activities include psychiatric care, day care for infants or for disabled persons, camping sites, facilitating conferences and meetings at the farm. These activities are in some way connected with the farming activities in a natural surrounding (Figure 5.5).

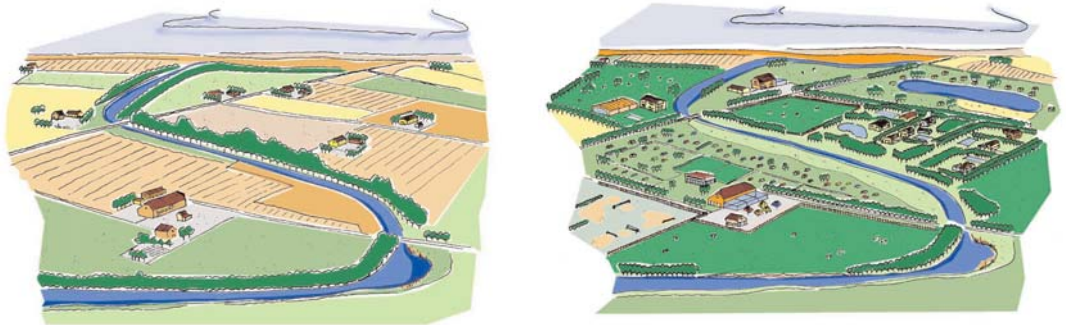


Figure 5.5: Examples for organization of the caring and experiencing agriculture: left current situation, right new setting.

Lessons to be learned

The farming systems described above have different functions and goals. They all have to meet a minimum set of criteria of People - Planet - Profit aspects, but the emphasis greatly differs between the various systems.

The triple P concept can be used to find the strengths and weaknesses of the systems. The images and assessments of the various systems also facilitate the discussion among stakeholders. They help to think about the future and about possible future developments. The Profit aspects are of key importance. Enlarging of Planet and People aspects is not effective, when no real solutions can be found for the payment of these activities. Designing future farming systems is just one step in the transition process towards a more sustainable rural area (see figure 1 of chapter 1). It is a step in a reiterating cycle; if goals are not met the cycle start again.

References

Van der Kolk, J.W.H., W. Van Eck and J.H.J. Spiertz. 2004. Duurzame landbouw in beeld. Alterra report 1024, Wageningen.

Smeets, P.J.A.M. (in prep.). Landbouw in de Noordwest-Europese Deltametropool (in prep.)

6 The practitioners' quest for sustainable agriculture

*B.J. Cino**

Practitioners have since long started their own quest for sustainable agriculture. The main message derived from the two cases that are reported here is: orientate us, facilitate us and give us responsibility, then we will use our own capacities and resources to go into the right direction. Policy makers and scholars are challenged to continue the quest together with practitioners.

Introduction

In the Roadmap of Brouwer et al (2003), a line of thought is elaborated which could guide the quest for sustainable agriculture (see also chapter 2). We have tried to test this line of thought for its practical use. Starting-point was the idea that practitioners had already started their own quest for sustainable agriculture and that their experiences would offer food for thought.

We studied two cases through interviews and documentation: the environmental co-operatives 'VEL & VANLA' and the innovation platform 'Duurzame Meierij' (IDM, platform for a sustainable Meierij). In the aforementioned roadmap five basic questions have been identified: why, what, where, how much and how (see chapter 2). Here, we focused on the "how-dimension": how do practitioners strive for sustainable agriculture. Both cases have the intention of working towards sustainability, but as we focused on the "how-dimension" we did not actually test the sustainability claims. A full report of this study can be found in Cino (2004).

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Brief description of cases

VEL & VANLA are two environmental co-operatives in the Friese Wouden (hereafter the Friesian Woodlands) in the Province of Friesland in the Netherlands. They were founded in 1992 and were amongst the first of their kind in the Netherlands. Environmental cooperatives are regional groups of agricultural entrepreneurs, including in some occasions citizens and other rural stakeholders (e.g. environmental organizations, local authorities, animal welfare groups). They aim to integrate environment, nature and landscape objectives into the farming practice from a regional perspective (Wiskerke et al., 2003). The Friesian Woodlands are a combination of small-scale and closed landscapes that are bordered by hedges and relatively open areas. Together VEL & VANLA have 209 members amongst whom 160 farmers and 46 landowners. These members are responsible for 3,550 ha. of land, mainly grassland used for dairy farming. VEL & VANLA strive for a more environmentally friendly dairy farming that actively integrates nature conservation and landscape management. Ecological and economical sustainability should go hand in hand and the relationship with the other stakeholders in the area is thought to be important.

Obstacles in the quest for sustainability, according to VEL & VANLA, are mainly found at the level of policy and its implementation, in the present knowledge system and in the remuneration for sustainable farm management.

The IDM is located in the Province of Brabant in the Netherlands in between the cities Eindhoven, s-Hertogenbosch and Tilburg. The platform strives for a sustainable Meierij (Duurzame Meierij), with a focus on the rural areas. Members represent a number of committees that deal with topics like agriculture, nature and environment and tourism and leisure. The platform checks projects using a model developed by Telos (Brabants Centre for Sustainability Issues) and in which three forms of capital are central: ecological, social-cultural and economical. The area is quite rich in different types of nature. This nature however is threatened by pollution and land use changes. Agriculture is under pressure. On the one hand (parts of) agriculture are seen as a main threat of nature and on the other hand agriculture is threatened by claims on land from surrounding cities.

Obstacles in the quest for sustainability, according to IDM, are mainly found at the level of policy and its implementation, in the price setting for sustainable products and in the perception and attitude regarding sustainability amongst citizens, consumers and the different stakeholders of the area.

Lessons for policy makers

Both cases are challenging policy makers to better define directions, to create better preconditions, but above all to give more responsibility to the local areas and the local actors. Farmers and other actors will then take their responsibility and exploit their own innovative capacities to develop themselves into the right direction. There is a need for criteria to assess sustainability, but from which perspective should these be formulated? Should it be from the perspective of sustainable economic sectors (e.g. agriculture), sustainable areas or sustainable consumption? Governmental rules and regulations should be there to facilitate the achievement of objectives and not in the first place to exercise control.

Giving more responsibility to local areas is supposed to generate more creativity and innovation than prescribing general measures. The different levels of government are challenged to formulate the outline of such responsibility. They seek answers to questions such as:

- How can the democratic legitimacy of responsibility be organised?
With whom should the government enter into a contract?
- How to combine such legitimacy with the suggestion that people who are actually implicated should play an important role as representatives of interest groups?

-Lessons for knowledge institutes

Knowledge institutes, and Wageningen UR is mentioned explicitly, are expected to focus their knowledge development more on sustainability and to work less in a disciplinary way and more in an interdisciplinary way. Many within Wageningen UR will react by saying that they already work in an interdisciplinary way, focused on sustainability. Apparently this is not obvious to outsiders and consequently reflection on this self image is needed.

Knowledge institutes are also urged to better explore indigenous knowledge and to focus on the facilitation of learning by farmers and other actors in rural areas. The present knowledge system pays little attention to tailor made services for local clients or client groups. This means a challenge, not only for the institutes, but for policy makers and funding mechanisms as well.

Income and marketing

How to recognize 'properly' produced products from products produced according to conventional practices? Both for niche markets and for local markets. Products can be labelled as sustainable, but consumers should not get confused by using too many different labels. There is a tendency for developing labels for many different qualities of products which are sometimes only slightly different. Consumers should be able to find the products they are interested in at easily accessible places. One-stop shopping is highly appreciated by many consumers and therefore sustainable products should be available in supermarkets or shopping centres.

Farmers should receive a fair remuneration for "green" or social services, but not as subsidy, but through products that can be accounted for. A regional fund might serve as an intermediary between producers and consumers of such services.

Human factor and relation with neighbourhood

Awareness-raising regarding the need for sustainability is important. Different actors should all become conscious of the need for ecological sustainability and the fact that a free ride is excluded. How to achieve such awareness is not exactly clear. People within an area can be reached by tangible projects, but how to involve people

that live at distance? It was suggested that alliances with consumers (organisations) and retailers are needed.

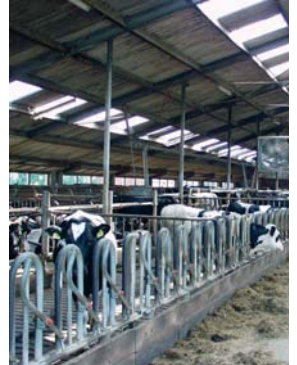
Practical use of the "Roadmap"

As for the "Roadmap" and its practical use, we concluded that the roadmap provided useful hints and practical questions. A number of tools for analysis have to be developed further.

In addition to the "how?" question, there is need for a "who?" question. Who should take the initiative and at which level?

References

- Brouwer, F.M., W. van Eck, M.A.H.J. van Bavel, G.F. van den Bosch, H. Leneman & O. Oenema, 2003. Een routekaart naar duurzame landbouw; wegen en kruispunten. Alterra-rapport 824, Wageningen.
- Cino, B.J. 2004. Duurzame landbouw: de praktijk onderweg. Wageningen, Alterra-rapport 1005.
- Wiskerke, J.S.C., B.B. Bock, M. Stuver & H. Renting, 2003, Environmental co-operatives as a new mode of rural governance. NJAS-Wageningen Journal of Life Sciences, Volume 51 no1-2, Wageningen





7 Striving for sustainability: lessons from pioneers in The Netherlands

J.W.A. Langeveld and P. Henstra**

This paper reports on experiences from 20 pioneers in search for a more sustainable agriculture in The Netherlands. The major focus is on analyzing the constraints that pioneers are experiencing in their daily routine. Using the Roadmap, four initiatives are described in more detail. Results are used to draw lessons for policy makers.

Introduction

In practice, various initiatives to improve the sustainability of farming can be found. It is believed that these initiatives, no matter how small, may play a role in the transition towards sustainability. Often, innovators go no easy way and in their day-to-day practice they encounter often many problems. A successful policy aiming at improved sustainability therefore should be based upon a thorough insight in the type and extend of constraints innovators are confronted with. This project aimed at making an inventory of the constraints pioneers meet in practice, and to learn from these initiatives. Emphasis has been on pioneers that successfully took the necessary steps in the transition process.

Case-studies

Twenty initiatives were studied, covering a wide range of activities, actors and scales. The initiatives include innovative plant propagation, methods requiring less energy and agro-chemicals, farms hosting mentally or physically handicapped, biological farmers selling through the internet, etc. Four types of initiatives have been distinguished: (1) initiatives with innovations relating to transportation or sales of farm products, (2) initiatives identifying new sources of income, (3) developing or adopting technical innovations, and (4) farmers

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developing new combinations of arable farming and animal production. Below, we briefly describe 4 initiatives a little further. Next we answer the questions of the Road map for the four cases.

'Adopt a chicken' started in 2003 when poultry farms were suffering from AI (chicken pest). This initiative offers the possibility to adopt a laying hen by individual costumers. An annual payment is rewarded with a 'rent' in the form of 12 annual lots of six eggs each, as well as an invitation for an annual visit to the farm. Hens are kept according to rules of organic farming, maintaining standards for e.g. animal welfare, feed and housing. Web cams were installed to allow those interested a live view from the stables. Right from the start, the initiative attracted a lot of publicity and sold more than 20 thousand 'adoptions'.

The initiative 'Family pig stable' was taken by two pig farmers, aiming at a regionally closed pig breeding and fattening system. Growth of animal feed, animal production and processing were organized regionally, with local slaughtering and selling products to local shops and restaurants. A new stable type was designed that provides ample opportunity to pigs to behave normally. It was developed by a consortium of research institutes and regional industry. Routine actions have been mechanized as much as possible, so that labor requirements remain limited.

The province North Holland hosts one of the most important flower bulb production areas. Here, a farmers' study group has been able to develop and test a new, innovative, idea for the production of plant propagation material of *Zantedeschia*. Originally designed by a single farmer, the group arranged further development at a research farm, using the money provided by a subsidy. The propagation now is done at the farm, where it originally was done in laboratories. As the growth period has been shortened, application of chemicals, water and fertilizers has been reduced.

The arable farm 'Drentsche schans' diversified its economic activities in order to generate more income. The farm developed its first visitor's room for beer tasting in 2002. Since then, the farm has invested in offering more room as well as more services to its visitors. Currently, the farm can host food tasting evenings as well as meetings, courses and parties. Hosting is done by the farmer and his wife. Local products, mostly farm produced, are offered for sale in a small shop.

Testing the Road map

Adopt a chicken

Why - Conventional poultry production has large problems with animal welfare, environmental aspects and profitability. Alternative organic production suffers from lack of demand and marketing, and hence has also low profitability.

What - Linking a new group of customers to organic farming is increasing the scope for organic farmers. Marketing of eggs from organic farms has been improved. Poultry has better living conditions. Farmers' income has increased and working conditions for farmers have improved.



Where - The initiative covers the entire country, linking farmers to a national network of ecological shops.

How much - Over twenty thousand of hens have been adopted, making this initiative successful. The fare for adoption is more than sufficient to cover the differences in production and handling costs for farmers and shops. The remainder is used for marketing and publicity.

How - The idea was conceptualized by a consortium of NGO's, banks, and a chain of organic shops. Necessary funds, marketing and publicity were planned from the start, thus overcoming problems many groups of producers normally have in starting a similar initiative. Public awareness of problems in poultry production, raised by huge publicity due to the chicken pest outbreak, was used effectively.



Family pig stable

Why - Traditional pig production has major problems with animal welfare, limited support from the general public, odor problems, profitability and environmental problems. Alternative housing systems were not very attractive, partly because they generally are labor intensive. Organic producers are confronted with limited demand

What - Developing a regional production system under control of the farmers. It addresses aspects of sustainability and animal welfare. The new system improves the negotiating power of the farmers, giving them more direct contacts with suppliers and clients. The new stable system combines animal welfare with restricted labor requirements.

Where - The farms are located in the east of the country in the center of intensive livestock production

How much - Currently, one stable has become operational. Further plans have been made to extend to a full blown ecological farm with 250 sows and 1800 fattening pig places, offering a normal farm income.

How -The input of NGO's, research institutions and other parties in the development of the stable has been crucial, in addition to the farmers that took the initiative.

Zantedeschia propagation

Why - Intensive bulb production is implicated for environmental problems related to the use of large amounts of fertilizers, agro-chemicals and water.

What - Shortening of the growth period of propagation material reduces the need for inputs. As *Zantedeschia* is not related to the dominant bulb species, introduction of this crop in the rotation relieves the pressure from pests and diseases, thus further reducing applications of agro-chemicals. Farmers further save on costs for producing the propagation material.

Where - The farms are located in the second largest intensive bulb growing area of the country.

How much - It is currently not clear how many farmers are applying this new propagation method. The resulting reduction in inputs (especially agro-chemicals) and costs have not been quantified yet.

How - Starting with an individual farmer, a farmers study group on *Zantedeschia* soon took the lead in organizing formal research for improving the method. EU subsidy helped to cover the costs. The farmers complained however about the time and energy needed to obtain the subsidy.



Drentsche schans

Why - Traditional pig production has major problems with animal welfare, limited support from the general public, odor problems, profitability and environmental problems.

What - Developing regional production systems that combine animal welfare with restricted labor requirements, minimal odor and ammonia emissions and a high profitability.

Where - The farm is located in a former peat reclamation area, currently mainly used for arable farming.

How much - The farm broadened its scope recently, making it too early to assess how much income this type of activities will generate.

How - The start of the diversification activities was given when a local brewery was asked to develop a beer of home produced cereals (rye, wheat, barley). It has taken a long time before the necessary licenses were obtained. When this was realised, a room was setup for beer tasting by small groups, and, subsequently, this developed into a range of activities.

Lessons learned

Many initiatives find themselves burdened with problems relating to legislation, protocols and regulations, mainly referring to updating or adapting licenses. A considerable number of internal problems is listed, referring to organization and management and conflicting interests of actors involved. Problems related to financial aspects were reported as well, while constraints on ecological or socio-cultural issues seem limited. These findings are in line with results from Den Hartog et al. (2004) and Van de Grijp et al. (2003), and show many similarities with the results of the pilot service desk.

The result indicates that most assistance is required to internal organisation and compliance to regulations and procedures. A successful service desk for this group should address such issues. Other initiatives may contribute as well. The minister of agriculture has expressed the wish to reduce administrative costs that have to be made in order to comply with legislation. The objective is to develop a more simple and straightforward type of legislation, requiring less data and forms to be filled in. This may also lead to simplified procedures, for example for adjusting licenses that are required. Consequently, it may get easier - and quicker - to make necessary adjustments in the farm's setup and structure, allowing more farmers to develop or adopt sustainable innovations.

References

- Den Hartog, L., Backus, G., Enting, I., Hermans, T. and De Vries, C., 2004, Room for entrepreneurs (In Dutch: Bewegingsruimte voor ondernemers. Tien belemmeringen in wet- en regelgeving voor de veehouderij). Wageningen UR. Wageningen.
- Van Calker, K.J., Berentsen, P.B.M., Giesen, G.W.J. and Huirne, R.B.M., 2004, Identifying and ranking attributes that determine sustainability in Dutch dairy farming. Submitted.
- Van den Grijp, N., Lasage, R., Goosen, H., Pleizier, I. and Hisschemöller, M., 2003. De praktijk van duurzame landbouw. Een overzicht van initiatieven en een analyse van lessen uit de praktijk. Amsterdam, Instituut voor Milieuvraagstukken.

8 Lessons to be learned from innovative farming systems elsewhere in Europe

*F.M. Brouwer**

Efforts to promote sustainable agriculture in France and the United Kingdom are reviewed. In France, sustainable agriculture is largely initiated by public authorities. Sustainable agriculture aims to strengthen the economic viability of agriculture. In doing so, the social dimension of sustainability is interlinked with economic viability. In the UK, stakeholder engagement (private industry co-operating with public authorities, extension service, NGOs and experts) is considered vital to the success of implementing sustainable practices. In conclusion, economic factors are critical in achieving sustainable agriculture. However, socio-cultural factors are vital in understanding consumer behaviour, cultural dimensions of agriculture, food and the farming community.

Introduction

Sustainable agriculture has a strong international dimension. Sustainable development is an explicit objective of the EU as mentioned in the Amsterdam Treaty, and the integration of environment into EU policy sectors is required to all policy sectors (including agriculture). Policy proposals made by the European Commission should be accompanied by an appraisal of their environmental impact. This principle recognises that environmental policy alone cannot achieve the environmental achievements required as part of sustainable development. Policies, including the Common Agricultural Policy (CAP) need to be made more consistent with the requirements for environmental protection, social development and economic viability.

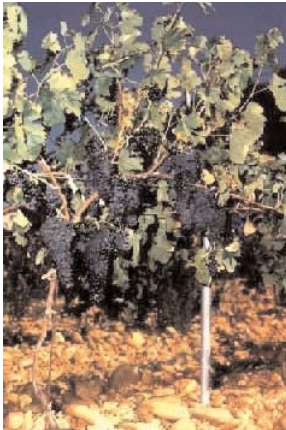
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This contribution aims to improve the understanding of the international context of sustainable agriculture. It provides an overview of the experience in France and the UK on efforts undertaken to promote sustainability in agriculture. The experience in these countries focuses on:

- What definition of sustainable agriculture is adopted?
- Who took the main initiative and who else is involved (policy, private organizations, NGOs and research organizations)?
- What judgements are made regarding the economic, ecological and social dimensions of sustainable agriculture? If so, how is it done and who are involved?
- What efforts are made by public authorities to promote sustainable agriculture?

The contribution draws from a review of initiatives in these countries, with a view to identify key messages on the international dimension of sustainable agriculture. The two countries selected for this paper reflect different political systems with divergent approaches of public-private co-operation.



France: sustainability is adopted only recently

Introduction

Intensification of production has been the mainstream model for agriculture for long. In this context agricultural policy measures, extension services and research were in support of this main trend in French farming. This model was adopted until recently and other types of farming (e.g. mountain farming and farming in remote areas like marshlands) were marginalised. Nowadays, this has changed with the efforts to promote organic farming and regional produce.

Sustainability is adopted only recently in the French policy debate. The national strategy on sustainable development has adopted some guidelines only on agriculture, including the development of agricultural practices that is favourable to the environment. Second, organic farming is promoted as well as 'Agriculture Raisonnée Respectueuse de l'Environnement'.

France has a strong tradition of state involvement in agriculture and the agricultural sector is strongly administered. This is reflected by the Agriculture Raisonnée, aimed to standardise good agricultural

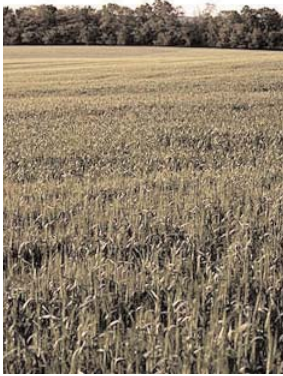
practices, and regional and national committees are established to adapt national rules to local conditions with a view to test and improve them. A basic idea of Agriculture Raisonnée was to protect farmers against the contracts established among farmers and the agrifood sector.

Agriculture Raisonnée is introduced to design a model to standardise good practices in agriculture. Almost 100 items are taken into account, and around 80 of them require farmers to respect the legal constraints, among others regarding environment, occupational health, and human and animal health issues. The approval system started during the first half of 2004 and by the middle of that year less than 100 farmers were formally approved by the Ministry of Agriculture. Rather ambitious objectives are formulated with 50,000 farms that should be approved in 2005. Eighty percent of the farmers should qualify to meeting the requirements of Agriculture Raisonnée by the year 2008.

Initiatives taken by the Ministry of Agriculture

The French government designed measures aiming at the multifunctional character of agriculture, the farming territorial contract (Contrat Territorial d'Exploitation or CTE). It builds on agri-environmental measures (with higher payments than those to agri-environmental programmes). It essentially includes a contract between farmers and state, aiming to shift agriculture to strengthen the multiple functions they sustain, and taking into account production, environmental constraints and social conditions (e.g. labour conditions and efforts to promote viable rural areas).

Social conditions were largely ignored and no ceiling was introduced in the system to the upper level of compensatory payments and farmers could be eligible for up to 50,000 euro. The policy objectives are to maintain an agricultural sector with many farmers, to place the farmers in the centre of an integrated rural policy and to transfer significant parts of CAP support from large specialised farms towards holdings that strengthen multifunctionality. CTE has been signed for a period of 5 years, and they remain to be the main tool to implement the Rural Development Regulation. Following an evaluation in 2002, the implementation of the CTE scheme was suspended. However, the CTE entered into the Contrat d'Agriculture Durable, CAD (Sustainable



Farm Contract). Under this new scheme, farmers have the option to formalise the contract on the environmental part only, or on a mixture of economic and environmental measures.

The basic idea on sustainable agriculture is to support practices that improve the economic viability of agriculture. Quality produce - with agriculture having a firm economic basis - is linked to the social dimension of sustainability. A main criterion is that a sufficient number of people, both farmers and other inhabitants, should be in the position to sustain viability of such a region. In doing so, the social dimension of sustainability is interlinked with economic viability.

Although the economic dimension seems to dominate, the environmental dimension is respected as well.

Except for CAD, the concept of sustainable agriculture is not available yet in France. Essentially, the meaning of sustainable agriculture is not clearly understood, and the main question is how to manage diversity in agriculture. In response, there is a tendency to privatise innovations with farmers seeking for niche markets.

United Kingdom: many actors involved in promoting sustainable agriculture

In the United Kingdom (UK) farmers are seen as guardians of the landscape and the providers of public services. In the context of sustainable agriculture, there is concern on small high-tech companies that increasingly move into the rural countryside. In fact, rural communities are dependent on farming in some areas, among others in mountain farming areas. Long-term viability of agriculture is critically affected by the age of farmers and the perspective for continuation of farming. There is serious concern by the farming community on the international competitive position and the overwhelming argument provided by farmers is to stop adding more rules on their practice. There is concern by the farming community on the implementation of the Water Framework Directive, and the possible high costs involved for meeting its requirements. Sustainable agriculture is not seen as the main trend for the future. The Sustainable Development Strategy is currently being reshaped, essentially aiming to develop a toolkit for sustainable development. Focus is also on sustainable land use, and critical to the achievement is how environmental targets are delivered in agriculture.

Public authorities are keen to make operational the degree of integration of the environment in agricultural practices. Rather than developing a set of indicators of sustainability, emphasis is given to indicators that can be operationalised. Measures on rarity of flora and fauna were designed, and gradually moved into the establishment of management agreements. The importance of this trend is also reflected since 'agricultural birds' is a key indicator by the Department for Environment, Food and Rural Affairs (DEFRA) in their attempt to operationalise sustainability. It was chosen because it is perceived as a good measure of sustainability in agriculture. Birds are sensitive indicators of the health of the environment and sustainability, being responsive to change, high in food chains, inexpensive to survey and widely known component of Europe's wildlife (RSPB, 2003). Populations of farmland birds have nearly halved since the late 1970s, and modern farm management practices have contributed to the decline. The index of farmland birds stabilised since the mid 1990s.

Efforts taken by food-processing industry

One of the main food-processing industries in the world - Unilever - began an initiative in 1998 to address the pressures facing agriculture. Together with external stakeholders the following definition of sustainable agriculture was adopted:

'Sustainable agriculture is productive, competitive and efficient while at the same time protecting and improving the natural environment and conditions of the local communities'.

The promotion of sustainable agriculture should ensure the continued availability of Unilever's key crops by defining and adopting sustainable agriculture practices in the supply chain. A factor critical on the success of the company is the societies in which the business operates continue to develop well. In doing so, five key crops were identified, including peas, spinach, oil palm, tea and tomatoes. Guidelines on Good Agricultural Practice are developed for the cultivation of each of these crops and stakeholders and opinion formers have participated in this effort, and published on www.growingforthefuture.com. Essentially, stakeholders are engaged at every phase. Indicators are developed to monitor progress on



achieving sustainable agriculture (See Box 1), and data are collected for all indicators and published on www.growingforthefuture.com. In 2002, the Sustainable Agriculture Initiative (SAI) Platform was launched by Unilever, Nestlé and Danone (www.saiplatform.org). The objective of this partnership is to promote implementation of standards for sustainable agriculture, contribute to the development of sustainable practices, support other research programmes in this area and communicate key stakeholders and consumers about this work.

Box 1 Sustainable agriculture indicators, developed by Unilever

1. Soil fertility and health
2. Soil loss
3. Nutrients
4. Pest management
5. Biodiversity
6. Product value
7. Energy
8. Water
9. Social/human capital
10. Local economy

Indicators are important tools to provide evidence on improvements achieved in production methods. Stakeholder engagement (private industry co-operating with public authorities, extension service, NGOs and experts) is considered vital to the success of implementing sustainable practices.

Concluding remarks

Economic factors are critical in achieving sustainable agriculture. However, socio-cultural factors are vital in understanding consumer behaviour, cultural dimensions of agriculture, food and the farming community.

CAP promotes the integration with environment

CAP encourages the agricultural sector to respond to changes in public demand. The second pillar of the CAP promotes the transformation of agriculture into sustainable practices. Measures

developed in the context of the Rural Development Programme (RDP), for example, embrace both farm and non-farm developments, as well as agri-environment measures. RDP aims to (1) support a viable and sustainable agriculture and forestry sector, (2) develop the territorial, economic and social conditions necessary for maintaining the rural population on the basis of a sustainable approach; and (3) maintain and improve the environment, the countryside and the natural heritage of rural areas.

Agrifood sector promotes uniform standards

Codes of Good Agricultural Practices are promoted by the agrifood sector (e.g. retailers and food processing industry through the market standards they introduce). Such Codes of Good Agricultural Practices that are beyond legal standards reduce the possibility for compensatory measures from the CAP. Such Codes include measures to control the physical environment. In addition, economic and social indicators are included as well.

The interpretation of sustainable agriculture is perceived differently, but long-term economic viability seems to be a common thread through the various examples examined. The social, cultural and institutional dimensions also seem to be of considerable importance since they reflect the diversity of agriculture and the different approaches of involving partners in efforts for sustainable farming practices. The terminology of transitions for sustainable agriculture does not seem to be adopted widely. However, the long-term perspective of agriculture, managing the integration of economic ambitions, environmental constraints and social demands is a major concern to agriculture across the globe.

References

RSPB, 2003 Birds as biodiversity indicators for sustainability: a pan-European strategy. Sandy, Bedfordshire, Royal Society for the Protection of Birds.

9 Benefits and constraints of the transitions towards sustainable agriculture

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Sustainable agriculture should be put in the context of international changes. Major items are reform of the the Common Agricultural Policy (CAP), liberalisation of world trade and the agrifoodchain that operates on the international market. Such changes go beyond single countries and could largely shape sustainable practices in the years to come. They put constraints to farmers, increasing cost prices and possibly affecting competitive position. However, such efforts could also be an important area to explore new markets.

Introduction

National efforts to stimulate sustainable farming practices need to be seen in the context of international trends. A transition towards sustainable agriculture should therefore be aware of changes in the Common Agricultural Policy (CAP), liberalisation of world trade and the agrifoodchain that operates on the international market. This contribution essentially aims to identify key trends beyond single countries that could largely shape sustainable practices in the years to come.

Main trends in European agricultural policy and markets

Two dominant trends in current farming practices are intensification, concentration and specialisation in some areas, and marginalisation and abandonment in others. They both involve a move away from traditional forms of low-input, labour-intensive crop and livestock production, which have characterised most of Europe for many

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centuries. Efforts that stimulate sustainable practices in agriculture need to be placed in that context:

- First, intensification and specialisation involves the development of capital-intensive and geographically specialised farming, which is mainly observed in regions where agriculture is most productive. Competitive advantages may arise in some regions because of better biophysical conditions, more rationalised farm structures, the integration of primary production with food processing industries and well developed farm extension services. Here, sustainable farming practices emerge to better respond to changes in consumer demand (in terms of quality and diversity of food) and meeting environmental constraints. Ambitions for sustainable agriculture are linked to the long-term economic viability of agriculture and strengthening the competitive position on export markets.
- Second, marginalisation and large-scale abandonment of agricultural land tends to occur in remote areas with unfavourable economic or social conditions, or on less fertile land where traditional extensive agriculture is threatened by its inability to compete effectively with intensive production in other regions. Abandonment, degradation and economic decline currently threaten the extreme north and south of Europe, where harsh natural conditions, poor soils and long distances to markets increase the costs of agricultural production and rural populations are falling. Ambitions for sustainable agriculture could be linked to strengthen multifunctionality in an effort to cope with marginalisation in agriculture.

Societal debate on nitrates and pesticides in water that started in the late 1980s has given incentives to better control the environmental effects of farming practices, especially in regions with intensive farming practices. Since then, the interest moved towards a more targeted and rationalised use of inputs. Mandatory measures are introduced to introduce farm management aspects that better respect the environment. In addition, environmental quality measures are linked with food safety aspects.

The farming community increasingly responds to the societal demands regarding production methods applied in European agriculture. Such societal demands might be reflected by rules on the

use of inputs, put either by food processing industry and food retailers, or by public policies. In some Member States in northern Europe, farmers currently respond to the rules put by retailers, including conditions that are in place regarding the use of plant protection products. Codes of Good Agricultural Practice are important in the attempt to clarify the responsibilities in managing environmental resources by farmers. This is important since European agriculture is an important producer of food in the world.

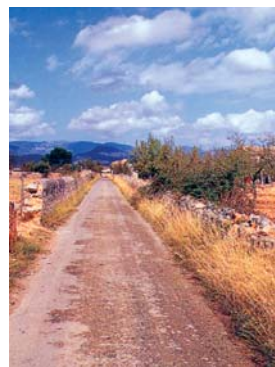
The CAP and sustainable agriculture

The ambition of European agricultural policy, as expressed with the reforms of the CAP over the past years, is to enhance the sustainable and viable nature of the agricultural sector. This is supported by policies, which acknowledge the wide diversity of farming systems. Market and price support measures for dairy products, beef, sheep and cereals are important to provide incentives for sustainability in agriculture. In addition, the public increasingly demands healthy and safe food.

The agrifood sector plays a vital role in the attempt to meet environmental requirements and is safe for human and animal health. Retailers and food processing industry, for example, are demanding better and audited farming systems in response to changed consumer demands. In doing so, they promote sustainable practices in agriculture. Therefore, agriculture must respond to and work with others in the agrifood chain. Public-private partnerships may be the way forward for meeting societal demands to the agricultural sector.

The incorporation of environmental concerns in marketing strategies from retailers could change farming practices and also contribute to reduce efforts needed for meeting public policy objectives.

Cross compliance is an instrument to reinforce the enforcement of legislative standards related to environment, nature and landscape. It is a basis to express social responsibility of the agricultural sector that provides food and has a supplementary role to manage the rural countryside. Cross compliance is part of the process to integrate environmental, food safety, welfare and nature concerns in the CAP,



but essentially meant to maintain the status quo and not meant to promote the provision of public goods beyond what is legally required. Being part of the first pillar of the CAP, it implies direct payments might be withdrawn in part when farmers do not respect the requirements. Of the 18 pieces of legislation, five are environmental and will be applicable from 1 January 2005, including the Birds and Habitats Directives. Rather than giving positive signals to farmers, cross compliance is an instrument suitable to reverse farming practices that are harmful for the environment and nature.



The agrifood sector and sustainable agriculture

Major structural changes are taking place in the European agrifood sector. Processes of concentration and internationalisation have given food retailers substantial market power vis-à-vis their suppliers. This in turn has triggered a process of consolidation among food processing industry, wholesalers and even farmers. All firms participating in a production and distribution chain for agricultural and food products - farmers, processing industry, wholesalers and retailers - are increasingly working together to gain efficiencies in logistics and information exchange and to set up quality monitoring and control systems throughout the chain.

Consumers in Europe have become more concerned about the quality of food products, but also about the quality of production and processing methods applied on the farm and in the manufacturing plant. Such consumer concerns relate to food safety and quality, environmental sustainability and ethically appropriate methods of production. As a result, farmers, food processing industry and retailers have initiated efforts to guarantee safe products produced in a sustainable way. The environmental issue has even become part of the competition strategy of farmers, food processing industry and retailers.

Food retailers have become particularly concerned about the quality of fresh produce because either they sell top quality products under private label or they advertise their company as being an environmentally conscious food supplier. Not only fresh produce like fruit and vegetables are increasingly sold under private label, also

chilled foods, ready-to-eat meals, prepared vegetables and fruit salads are popular products within the own-brand strategy. For private label products, retailers take responsibility for quality, because it is their brand that is at risk if quality flaws appear.

These structural changes in food processing and food retailing lead to more elaborate quality control systems throughout the whole agrifood chain. Quality control at the point of purchase is no longer sufficient, as some quality characteristics cannot easily be measured and as the cultivation methods used on the farm have become part of the quality characteristics of the final product. Food processing industry and retailers set strict requirements for sustainable cultivation practices by their suppliers. Quality monitoring and control systems also give food processing industry and retailers more insight in the primary production parameters, and thus more options for (re) directing cultivation decisions. Once measurable sustainable agriculture indicators have been established, it becomes possible to select and reward suppliers on the basis of their score on these indicators.

Concluding remarks

The integration of public concerns (e.g. food safety, environment, animal welfare, climate change and biodiversity) in farming practices is a key phenomenon to promote sustainable agriculture. Efforts to promote such practices are taken by the agrifood sector as well as in public policies. They put constraints to farmers, increasing cost prices and possibly affecting competitive position. However, such efforts could also be an important area to explore new markets.

