

13 Ecological Modernization Theory and Agricultural Reform

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Introduction

In his comparison between rural sociology and environmental sociology, Buttel (1996) shows that environmental sociology finds its roots in rural sociology but has slowly 'emancipated' into a full, relatively independent, subdiscipline. In its maturation, environmental sociology has profited from rural sociology due to the similarities in their objects: the material and biophysical underpinnings, the 'materiality,' of social structures and social life. Buttel claims that, notwithstanding the growing apart of both subdisciplines, rural sociology will continue to play its formative role in the development of environmental sociology. While this may be true for the American tradition with which Buttel is concerned, it is less so for western Europe. Notwithstanding their common origin, the two subdisciplines show a remarkably low level of cross-fertilization in western Europe. Theories, concepts and 'story lines' recently developed in rural sociology hardly influence environmental sociology. More interestingly, and in a similar way, recent developments in environmental sociology, as portrayed by Buttel among others, hardly inspire its 'founding father' rural sociology. This is especially remarkable since one of the central axes of rural transformation in Europe at the moment centres around 'the environmental question.' It is the environmental problem that challenges the long-standing institutions that have characterized postwar European agriculture. While numerous contributions in rural sociology have analysed (often in great detail) various aspects of these transformation processes, a more general perspective or interpretative scheme of environmentally induced social transformation in agriculture seems scarce or absent. In this contribution we therefore reverse Buttel's claim of rural sociology being a formative power in the development of environmental sociology, by examining the value of one of the more elaborated theories in environmental sociology – the ecological modernization theory – for understanding the processes of environmentally induced transformation in agriculture.

The notion of ecological modernization has become rather popular lately in the social sciences and beyond. Different authors – social scientists,

environmental activists, political parties and managers – frequently use the notion of ecological modernization, although not all in the same way. This notion of ecological modernization has appeared in distinct contexts, which has led to some confusion as to its exact meaning. For our purposes, it is clarifying to distinguish between ecological modernization as a *theory* of social continuity and transformation and ecological modernization as a *political program* for change, that is, environmentally inspired reform or ecological restructuring of contemporary industrial society. The two denotations are interdependent, but should be separated analytically. Authors like Simonis (1989), Weale (1992) and Andersen (1994) have each made significant contributions to the definition and promotion of a political program of ecological modernization as the new agenda for western European environmental politics.¹ Environmental sociologists, on the other hand, have constructed a social theory labelled ecological modernization (cf. Huber 1982; Spaargaren and Mol 1992; Wehling 1992; Jänicke 1993; Hajer 1993; Mol 1995). Starting from an analysis of changing social practices of production and consumption, environmental politics and environmental discourses, the latter have constructed a theoretical approach to generate a sociological understanding of transformations in contemporary industrial societies when dealing with ecological challenges. In this contribution we are especially interested in the latter connotation of ecological modernization.

In assessing the value of ecological modernization theory for understanding processes of environmental reform in agriculture, we start by locating ecological modernization theory within the broad range of so-called modernization theories. After outlining the analytical innovations of ecological modernization theory, its conceptual framework is substantiated by clarifying the kind of institutional transformations that can be expected and that have been found *in statu nascendi* in the sphere of industrial production. The ecological restructuring of agriculture is subsequently analysed with respect to the 'impact' of the environment on technological development, market features, politico-administrative characteristics and its relationship to (non-agricultural) social movements.

Modernization Theory and the Environment

The process of modernization out of the phase of premodernity has been analysed by Polanyi (1957) and Giddens (1990, 1991), among others, as a process of 'disembedding.' Social relations are lifted out of their local and traditional structures and contexts and are rearranged across (world)wide time-space distances. As Polanyi describes in *The Great Transformation*, the process of disembedding by which traditional pre-modern society was transformed into the modern capitalist economy of the nineteenth century, can be interpreted as the differentiation of society into

an economic sphere, a political sphere and the lifeworld. Economic processes, for instance, grew increasingly independent from traditional structures such as religion, family and kinship relations and began to follow a specific economic rationality. One of the consequences of the growing independence of especially the economic sphere and the emergence of economic rationality has been the deterioration of nature, as Polanyi and others have indicated.

A kind of 'reembedding' should take place, according to ecological modernization theorists, to restore the balance between nature and modern society. But modern social relations and practices cannot be reembedded in traditional and local structures and contexts. Criticizing demodernization and deindustrialization theorists such as Ullrich (1979) and Sarkar (1990), the ecological modernization theory states that reembedding contemporary economic practices with the aim of respecting ecological limits cannot be a reversal of the historical disembedding process. Contemporary economic practices are firmly rooted in modernity, characterized by a high level of time-space distancing and a relatively independent economic rationality, and connected with modern scientific-technological and state institutions. Consequently, the ecological modernization theory analyses possibilities for a process of 'reembedding' economic practices – in view of their ecological dimension – *within* (the institutions of) modernity. This modern 'reembedding' process should result in the institutionalization of 'ecology' in the social practices and institutions of production and consumption. The institutionalization of ecological interests in production and consumption processes, and thus the redirection of these basically economic practices into more ecologically sound ones, involves an 'emancipation' or differentiation of ecology. The differentiation of an ecological rationality and an ecological sphere, both becoming relatively independent from their economic counterparts, is the logical theoretical step.

The process of an ecological transformation of our modern economy can be interpreted as the differentiation of an ecological sphere. Needless to say that these 'spheres' should not be interpreted as distinct areas in society that can be empirically identified. The object is to draw an *analytical* distinction, pointing out the possibility, necessity and value of considering contemporary institutions and social practices from a specifically ecological 'point of view.' Making conceptual space for a relatively autonomous ecological sphere enables us to study the extent to which ecologically rational action is institutionalized in the central institutions of modernity. The process of differentiating the ecological sphere from the socio-ideological and political spheres had already started, in most industrial societies, in the 1970s. Since then, the ecological sphere has become relatively independent from the political and socio-ideological spheres, and is becoming increasingly independent from the economic sphere. Since the growing independence of the economic sphere and rationality in the process of disembedding proved especially significant for 'the ecological

question,' the crucial phase in the process of reembedding ecology will be related to this economic dimension. The result will be that economic processes of production and consumption will be increasingly analysed, interpreted and judged as well as designed from an economic *and* an ecological point of view. This process of emancipation from the economic sphere, and the subsequent reembedding of ecology in the institutions of economy, is seen as vital in ecological modernization theory, resulting in a balance between two (increasingly equal) interests and rationalities.

The emergence of an ecological rationality parallel to economic rationality is at the heart of this emancipation process. By putting the ecological sphere analytically on a par with the economic, political and socio-ideological spheres, the status of an ecological rationale becomes equal to that of the economic rationale, among others. In modernity, different social domains can be rationalized in terms of very different values and goals, and what is rational from one point of view or in one domain may be irrational in another. Political rationalities are bound to prevail in the political domain, although economic rationalities will never be absent. In the same way, production and consumption processes are primarily part of the economic domain; as a consequence, they have been traditionally dominated by economic rationality. Although economic rationality should still be analysed as the dominant rationality in contemporary processes of production and consumption in western societies, other rationalities have imposed limits on a purely economically rational production and consumption. Such constraints on economic rationality have been imposed via social struggles, conflicts and disputes, such as those over the exploitation of labour. The ecological rationality which has been gaining ground during the last quarter of the twentieth century aims to impose similar constraints on economic processes. Ecological rationality focuses on (re)directing these economic processes and developments according to ecological criteria and towards ecological goals. Ecological restructuring can be interpreted as a process whereby ecological rationality is catching up with the long-standing dominance of economic rationality.

By making conceptual space for a relatively autonomous ecological sphere and rationality, ecological modernization theory brings the environment (back) into the centre of social theory. The environment can no longer be depicted as external to the institutional developments and social practices of modernity, and in this sense ecological modernization theory parallels the idea of reflexive modernization. The environment is no longer analysed as being 'passively' brutalized by a monstrous, all-pervasive technosystem as the demodernization theorists did. Ecological modernization theory (as well as the theory of reflexive modernization) is diametrically opposed to this view: it emphasizes and analyses the active and reflexive (re)design of central institutions of modernity in dealing with the ecological crisis and on the basis of environmental criteria.

The Contingent Nature of Ecological Modernization

Analytical refinements as developed above may be conceived as both the product of and the condition for the material and discursive practices in which social actors are engaged. This is of course all the more true in an era that is often labelled as that of reflexive modernization, in which institutions and social practices are constantly reexamined and reshaped and the idea that social and natural environments would become increasingly subjected to rational ordering has ended. This is the sociological way of saying that things may always evolve differently and that the rather 'straightforward' conceptual analysis of the differentiation of an ecological sphere and rationality drawn above is not meant to suggest any evolutionary or deterministic development. Nor does the notion of 'modernization' imply any evolutionary perspective, as if the institutional developments referred to would automatically result in more 'modern' institutions than the 'traditional' ones.² What is 'modern' to ecological modernization is the 'emancipation' of ecological rationality – or 'sustainability' – in relation to other social and economic rationalities.

As sociologists we should remain aware that even the 'material' systems and phenomena which are referred to by the term 'ecological' are socially determined and defined in permanently evolving (scientific, political, 'ethical') discourses in society. This does not mean to say that ecological modernization is just one storyline among a dozen others, as discourse analysts and strong social constructivists sometimes want us to believe. There is a 'material' basis behind these social constructions and interpretations: a changing interaction between society and its natural environment. But the institutional transformations related to these changing interactions between society and nature – to be elaborated upon in the following sections – are to some extent contingent and their future character is difficult to predict. Substantial institutional transformations following these analytical concepts of ecological modernization theory are not thought to be a regular, automatic and one-way process.

Having said this, the idea of a relative (and growing) autonomy of the ecological sphere facilitates the analysis of *institutionalization* processes of the ensuing (that is, environmentally induced) reforms regarding technology, markets, state interventions and social movements. This can be seen as the second, less abstract or 'middle range,' level of ecological modernization theory, involving the analysis of substantial institutional reforms. It is exactly the above four categories that take a central position in theories of environmental restructuring in environmental sociology, and the – second level – analysis of ecological modernization theory of their institutional reforms differs to some extent from competing theoretical perspectives.

Ecological Modernization Theory and Institutional Reform

'Middle-level' analysis of ecological modernization deals primarily with the institutions of modern technology, (market) economy and state intervention, according to Zimmerman *et al.* (1990), Huber (1991), Spaargaren and Mol (1992) and Jänicke (1993), among others. This analysis has been developed and refined in continuous debate with other social theories of environmental reform, such as Risk Society theory, so-called postmodernist theories (cf. Bauman 1993; Gare 1995), neo-Marxism and counter-productivity theories.³ In outlining this ecological modernization perspective we shall pay attention to the dominant role of science and technology, the importance of market actors and dynamics, changing state intervention, and the contribution of new social movements.

Science and Technology

Ecological modernization theory identifies modern science and technology as central institutions for ecological reform (not least as the culprits of ecological and social disruption). The idea that science and technology are essential institutions in environmental reform is summarized in the notion of *ecologizing economy*. In the era of reflexive modernity and in confrontation with the ecological crisis, scientific and technological trajectories are changing in two ways. First, 'normal' scientific and technological developments are increasingly triggered by ecological motivations. And second, the use of science and technology for 'ecologizing the economy' provides proof of a more sophisticated and advanced kind of 'environmental technology' than that dominant in the 1970s. The simple end-of-pipe technological regimes, which were so strongly criticized in the 1970s (e.g., Jänicke 1979), are being increasingly replaced by more advanced environmental technologies that not only redirect production processes and products into environmentally sounder ones, but are also starting to engage in the selective contraction of large technological systems that can no longer meet stringent ecological requirements. In this way, technological measures within ecological modernization are not limited to 'just another artefact'; and technological-fix criticism – so often addressed to ecological modernization theory (cf. Hannigan 1995, p. 184) – is therefore hardly adequate.

The motivations for industrial enterprises to move in the direction of more advanced, environmentally sound, technological trajectories are diverse and it is often difficult to identify a simple cause – effect relationship. Motivations include the enforcement of (increasingly stringent) environmental policies by state agencies; public relations and public pressure by environmental NGOs and consumer organizations; economic motivations, such as the danger of losing the market share to more environmentally progressive competitors; requirements from customers backed

by liability law; requirements from insurance companies; cost reductions following the polluter pays principle; and possibilities to open up new markets. 'Internal' motivations include, for instance, environmentally concerned employees, environmental coordinators, R&D sections or managers. These motivations and factors inducing environmental innovations differ, of course, between different kind of industries, according to size and branch. Those who most confront the environmental impact they provoke are generally at the forefront in changing technological trajectories (for example, the chemical industry and the metal industry). Smaller, environmentally backward industries are usually forced by the state, while larger industries also find economic mechanisms among the triggers for environmental reform. The latter are also more responsive to public opinion and pressures, while small innovative ones are eager to look for new niche markets.

Economic and Market Dynamics

Ecological modernization theory also stresses the increasing importance of economic and market dynamics in ecological reform. In this it follows the Brundtland concept of sustainable development (cf. WCED 1987) in rejecting the fundamental opposition between economy and ecology. Economic development and ecological quality are interdependent and not antipodal or incompatible in a simple monocausal way, as was proclaimed in the 1970s. Environmental improvement can be paired with economic development through a process disconnecting economic growth from natural resource inputs and outputs of emissions and waste. However, in order to do so, the nature, content, pace and geographical allocation of this economic growth would have to alter fundamentally. Modern economic institutions and mechanisms can be, and to an increasing extent are, reformed according to criteria of ecological rationality. Similar lines of argument challenge social theories of environmentally informed legitimation crises in capitalist economies. The theory of ecological modernization points to the fact that the conflict between legitimated state action on the environment and related mass loyalty, on the one hand, and the imperative of capitalist accumulation, on the other, is not as fundamental as once thought (cf. Weale 1992, p. 89). The internalization of external effects via *economizing ecology* is one of the mechanisms put forward within the project of ecological modernization (cf. Andersen 1994).

Nature is integrated into economic decision making to a certain extent by the economic valuation of the third – and long forgotten – production factor. In addition to these market dynamics ecological modernization stresses the role of market parties such as innovators, entrepreneurs, customers/consumers and other economic agents in bringing about ecological reform. Environmental 'standards' are articulated in economic processes by insurance companies, credit institutions, (industrial) cus-

tomers/consumers, certification organizations, branch associations, and so on. This emergence of economic actors and mechanisms is not so much instead of, but rather in addition to, the activities of state agencies and new social movements in protecting the environment, although the role of the latter two changes significantly (see below).

The forces that induce ecological reform are also found increasingly in the market sector. Customers articulate environmental criteria, in addition to traditional economic criteria of price and quality, because of liability and insurance regulation. Some branch associations try to set the environmental agenda, keep direct state regulation at some distance and fortify their position within the economic network. This is done by taking up environmental tasks, such as environmental interest representation towards the state, stimulation of and assistance with environmental management systems, the monitoring of environmental impacts, formulation of branch-wide environmental performance standards and the certification of environmentally sound products and production units. Their room for manoeuvre is of course severely restricted by conservative members. While in some industrial sectors these associations shadow the large member industries, in others they manage to take a more independent position *vis-à-vis* their members, although the resources for enforcing environmental measures on their members remain limited. In other industrial sectors, branch associations have a more conservative stance, adopting the environmental outlook of members lagging behind.

Certification turned out to function as an important market dynamic. Initially, it was believed to provide the certified enterprises with competitive advantages (which still holds for ecolabels on industrial products), whereas it now appears that not having a certificate (for example, on EMAS) means a severe disadvantage within a few years. Some – often smaller – enterprises try to occupy an environmental niche market, backed by certification systems and strategic niche management by the state (cf. Schot *et al.* 1995).

Political Modernization

A third feature of ecological modernization theory, especially in distinction to other social theories of environmental reform, relates to the state. Following the discussions on state failure in, among other things, environmental policy (cf. Jänicke 1986) ecological modernization restores the traditional central role of the state in environmental reform. Although ecological modernization is critical of the role of a strong bureaucratic state in the redirection of processes of production and consumption,⁴ it does not deny the state's indispensability in environmental management, as some of the theory's critics would have it. Rather, the role of the state in environmental policy (will have to) change(s) from curative and reactive to preventive; from 'closed' policy making to participative policy mak-

ing, from centralized to decentralized, and from dirigistic to contextually 'steering.' Moreover, some tasks, responsibilities and incentives for environmental restructuring are shifting from the state to the market. Private economic actors become involved in environmental reform, for instance through the certification of products and processes, by asking for environmental audits, and by environmental performance competition and the creation of niche markets. By leaving less – albeit essential – elements of environmental policy making for the central state, and by changing the interrelation between state and society/economy, the state is prevented from becoming an environmental Leviathan (cf. Paehlke and Torgerson 1990). In response to his earlier analysis of state failure, Jänicke (1993) has strongly emphasized this changing role of the state in environmental policy making by presenting the process of political modernization along the lines mentioned above, as part of a process of ecological modernization. Others have referred to similar tendencies in using the concept of reflexive governance (cf. Le Blansch 1996).

Evidence for this new state approach is found in Dutch environmental policy with respect to industrial production, the emergence of the 'target group approach,' the increasing use of voluntary agreements,⁵ environmental management and audit systems, ecolabelling, and the integrated region-oriented approach towards, for instance, the industrial areas of Rijnmond and Sas van Gent-Terneuzen. And this approach is not limited to the Netherlands (Mol *et al.* 1996). This does not mean that the traditional command and control approach have completely been set aside. It still functions as an important stick in those situations in which this new consensual policy style fails. Besides, industrial representatives themselves often ask for legal formalization of these more voluntary agreements and approaches after some time, to limit the possibility of free riding.

'New' Social Movements

The reorientation of state and market in ecological modernization theory also modifies the position and role of social movements in the process of ecological transformation. The initial role of environmental organizations, as the prime initiators and carriers of proposals for ecological restructuring in the 1970s, was to put the environment on the public and political agendas and to question the limited rationality of techno-economic developments. With incipient institutionalization of the environmental question in state, market and scientific-technological developments (as set out above), the role of the environmental movement has slowly shifted from that of a critical commentator at the margin of societal processes to that of a critical – and still independent – participant in developments aimed at an ecological transformation. The movement's ability and power to generate (alternative and innovative) ideas, mobilize consumers and organize public support or disapproval is increasingly used to support and

cooperate with those societal forces that aim at an ecological reconstruction of modern society. This parallels an ideological and, for some radical northern and southern environmental activists, controversial (cf. Sarkar 1990) transformation of the main environmental NGOs in industrialized countries. Whereas in the early 1980s the Dutch sociologist Tellegen (1984) saw the idea of demodernization or anti-modernity as the central common denominator of environmental movements throughout the world, this characterization is no longer valid for the major environmental organizations in industrialized countries by the early 1990s.

Ecological Modernization and Agriculture

A First Look at the Ecological Restructuring of Agriculture

If there is any sphere of production that is a predestined place for the 'emancipation' of ecological rationality, agriculture would be the most likely candidate. Invested with the custody of much of our natural resources it is engaged in maintaining the physical base of our existence. In the highly intensive agricultural production system of the Netherlands, the need to constrain the dominant economic rationality in favour of an 'ecological rationale' imposes itself on pain of environmental cataclysm. Alarming developments related to plant and animal diseases, the pollution of drinking water by nitrates and pesticides, decreasing bio-diversity and dehydration of soils, really urge the ecological restructuring of agriculture.

Recent changes in Dutch agriculture seem at first sight to constitute ecological modernization and its corresponding institutional reforms. Since the mid-1980s, the bulk of national agricultural policy making is bound to be *agro-environmental*. Government has concluded environmental agreements with representative agricultural interest organizations and constantly emphasizes the importance of farmers' support for the efforts to make Dutch agriculture 'clean' or 'sustainable.' The national Board of Agriculture, comprising all representative farmers' organizations, even launched an 'integral environmental action plan' at the end of the 1980s, which embraced the whole of the agricultural sector and proposed an impressive range of short and long term measures, mainly of a technological character, to realize an environmentally friendly agriculture in due course (Landbouwschap 1989). New environmentally benign technologies indeed now abound, ranging from energy saving and biological plant protection methods in glasshouse horticulture to animal housing systems and manure spreading machinery that considerably reduce ammonia emission. Agro-environmental, green and eco-labels are becoming prevalent in supermarkets; retailers are forcing up their environmental accountability requirements, and the environmental aspect is becoming an integral part of all projects meant to guarantee the quality of food prod-

ucts. Following the mainstream environmental organizations, even the radical wing of Dutch environmental movement recently publicly renounced its oppositional attitude and adopted a strategy of cooperation with the farming community.⁶

So recent developments in state policies, science and technology, agricultural markets and environmental organizations seem indeed to reflect the emergence of an ecological rationality parallel to and relatively autonomous from economic rationality. It is not too difficult, however, to point to some 'counter-factual' developments in these institutional domains that undermine such a facile and unambiguous conclusion on the ecological modernization of agriculture. The manure policy process is a case in point (Frouws 1997). It is characterized by endless delays and postponements, lack of legitimacy, both among farmers and in society at large, a large amount of bureaucratic interventionism and a failure to match European standards. We might also refer to the other stumbling block of Dutch agro-environmental policies, which is the issue of pesticides. Evaluating the results of the long-term agreement on crop protection with the farmers' organizations, the Minister of Agriculture recently threatened to revert to measures of command and control, stating that no substantial reduction of pesticide pollution of surface waters had occurred and that there had been no fundamental change to technologies reducing dependence on chemical plant protection products.⁷

So the question is whether the ecological restructuring of agriculture is really taking place at all, that can be understood in terms of ecological modernization theory. To answer that question, we will start by examining the specific characteristics of the 'central institutions' in agriculture, which represent the key elements of the 'middle-level' analysis of ecological modernization (that is, technology, markets, state interventions and social movements). This enables a subsequent reinterpretation of the superficial 'first sight' of the ecological modernization of agriculture, as presented above.

Science and Technology

It is clearly beyond the financial and organizational capacity of most individual agricultural holdings to set up their own scientific research projects. The importance of scientific research that is collectively organized by groups of farmers, or farmers' unions generally, is rather modest too. So the bulk of technologies applied at farm level (taking the form of inputs, machineries, farm buildings and so on) is developed off the farm. This involves a complex technology transfer as an external logic, comprising premises of specialization, standardization, scientification and 'industrialization' enters the world of agricultural practice, with its dependence upon 'natural' processes and its great diversity of physical, economic and social conditions. The externally designed methods and technologies

contain prescriptions, norms and codes of conduct, which are to be inserted at farm level under highly variable circumstances related to soil characteristics, climate, labour qualifications, the set up of the farm, the structure of plots and so on (van der Ploeg 1987). The outcome of technological innovation is thus very dependent upon the interrelations between farmers (who are going to apply the technology) and researchers (who are developing the technology), and upon the farmers' capacities to 'fit in' the technology at farm level. If these interrelations are well organized, based upon a two-way flow of information and supported by a network of interested and 'knowledgeable' farmers, scientification and technology transfer may be smooth and successful processes, as Vijverberg (1996) has demonstrated in the case of glasshouse horticulture. However, in other sectors of agriculture, less 'market oriented,' less well organized and unsuited to 'industrialization' and 'artificialization' on the scale of the glasshouse industry, scientific and technological developments may produce frictions, alienation and marginalization of farmers' expertise and craftsmanship. These complexities of technology transfer in agriculture have to be taken into account in considering the *ecologizing* of agricultural production. Referring to the horticultural sector once more, clear market incentives (such as German retailers' requirements) and strict state directives (concerning for example, energy prices, investment subsidies and the banning of soil disinfectants and pesticides), combined with the flexible and ramified knowledge system in the glasshouse industry and the 'market sensitivity' of the growers, proved to be rather conducive to the development of energy saving and alternative pest control technologies. The impact of the market is less direct and more ambiguous in the livestock industry, on the other hand. Governmental steering of research priorities and ecological yard-sticks are characterized by indeterminacies related to the conflict-ridden process of manure policy making. And the knowledge system does not share the interactive network features of the glasshouse industry. As a result, the development and introduction of environmentally benign techniques is a much more painful and even frustrating process, which does not fit with farmers' possibilities and endowments concerning ecological knowledge, experience, perceptivity, record-keeping and financing.

Economic and Market Dynamics

The relation of primary agricultural production to the final (consumer) markets passes characteristically through one or more trading or processing links. In many branches of agriculture farmers hardly had to bother about marketing, if at all, as their rights of delivery were guaranteed. In case of protected products like milk, meat, sugarbeet and cereals, these were even accompanied by price guarantees. It was up to the traders and processors, in the first place, to comply with the demands of customers;

the farmers 'only' had to stick to basic requirements of hygiene and food safety. However, consumers' interests have become of considerable importance, especially during the last decade or so. This has resulted in more and stricter requirements with respect to the wholesomeness of agricultural produce, the sustainability, naturalness and animal friendliness of its methods of production and additional qualities related to consumers' tastes and lifestyles. In this sense, market dynamics in agriculture may indeed be considered to stimulate the 'ecologizing' of the economy. These dynamics, which are strongly influenced by leading retailing companies, necessitate the interdependence, coordination and control of all links in the chain of production, ranging from primary production to retailing. This process of chain integration entails a reorientation and rearrangement of the relations of agricultural and food production. Some individual producers have captured their 'own' niche of quality produce. Others have done so collectively by setting up producers' associations. For many agricultural producers these 'chain dynamics' are a matter of economic power relations, involving the determination of farming methods and the distribution of revenues, and thus touching upon their autonomy as a farmer.

The Omnipresent State and Political Modernization

Agriculture is a classic example of massive state interference with its markets and its external conditions of production. In contrast to labour unions and industrial workers, farmers' unions and farmers are traditionally strongly oriented toward the state. The relationship between farmers and the state has generally resulted in corporatist arrangements. These followed from the commitment of most northwest European governments to extensive but indirect agricultural supports. Intermediate organizations, representing farmers at the national level, were given the key role managing the complex two-way flow of information between producers and the state. These organizations were to legitimate the policies agreed upon with respect to their constituency, and to ensure the responsive implementation of agricultural policy. The omnipresence of the central state in agricultural policy making is thus typically combined with considerable involvement of private actors (that is, farmers' representatives).

State intervention in agriculture and the related public-private partnership of agrarian corporatism has been legitimized, rather paradoxically, with a strong ideology of entrepreneurship. The agricultural 'entrepreneurs' ran the risks of agricultural modernization, namely growing financial burdens and elimination of the 'losers,' in exchange for massive state support. This support was not perceived as a constraint on farmers' freedom and independence, however, as it was mostly centrally supplied in a uniform manner to provide all agricultural producers with equal opportunities and competitive conditions. Price protection, extension

services, investment subsidies, financial compensations and so on, did not directly interfere with farming practices. All agricultural 'entrepreneurs' were expected to respond alike, *grosso modo*, to government policies. They were assumed to develop their holdings according to a unilinear model of specialization, intensification and farm enlargement (dubbed the 'frontrunner model,' see van der Ploeg 1985). In contrast to the supportive and stimulative policies that represented the mainstay of agricultural policy during the last decades until the beginning of the 1980s, much current agro-environmental policy actually targets farm practices. This makes its results heavily dependent upon individual farmers' activities and cooperation at farm level. Farmers' acceptance of these measures is of vital importance, so that centrally imposed, uniform regulations which do not take into account regional diversities and farming styles and preferences, may well be rejected by farmers as constraining, rigid and inefficient (Frouws *et al.* 1996). The agro-environmental question became such a bone of contention between the state and the representative farmers' organizations that the latter could no longer fulfil their intermediary and legitimizing role. The ensuing erosion of agrarian corporatism reinvested the state with the sole and central responsibility for agro-environmental policy making. This partial ('consensual' policy making continued in some policy fields) shift from corporatist to etatist regulation certainly produced results in those cases where straightforward rules of command and control were feasible, and where financial or 'persuasive' policy instruments could be effective. However, many strands of agro-environmental regulation produced little more than an accumulation of rules caught in its own intricacies and running up against much reluctance and opposition from the agricultural producers.

A new mode of conditioned self-regulation, characterized by less elitism and more engagement by the farmers concerned, seems to be the only way out of the impasse of agro-environmental regulation.

Social Movements

Given the existence of a rather insulated corporatist Agricultural Policy Community, non-agricultural interest groups and social movements were hardly interested, if at all, in agricultural matters and politics. This was the *terra incognita* of agricultural specialists and experts running their own business. As long as this business produced wealth and foreign currency, it was left alone, except for some recurrent conflicts about local projects of land reclamation or land consolidation. This attitude of relative indifference on the part of the environmental movement only really changed during the 1980s. Awareness of the adverse environmental effects of modern agriculture grew rapidly during these years. The ensuing attacks by environmental organizations caused fierce struggles, fostered by mutual ignorance of respective social backgrounds, motivations and positions, due

to the traditional isolation of agrarian corporatism. The realization that farmers treated nature, the primary source of their wealth, in an 'irresponsible' manner, came as a shock to environmentalists. Stigmatization as polluters, without any understanding of the economic pressure that forced them to intensify their production, aroused farmers' indignation, in turn.

There were early attempts to remedy this polarization and to harmonize agricultural and environmental interests. The Centre for Agriculture and Environment (CLM), founded in 1986 and composed of a coalition of scientists and progressive farmers exploring *practical* ways of combining economy and ecology, was one such attempt. The CLM gradually gained influence and authority, both in the farming community and in agricultural politics.

Whilst agro-environmental policies were being developed and the Agricultural Policy Community was being prised open, institutionalized environmental organizations like the Dutch Foundation of Nature and Environment and provincial environmental associations came to be engaged, albeit often with great difficulty and reluctance, in agro-environmental policy making. This process of gradual 'inclusion' (Termeer 1993) has resulted in regular contacts between agricultural and environmental organizations.

The environmental social movement thus became engaged in regional plans for development and environmental protection, projects for nature management by farmers, agreements with local authorities on the provision of environmental permits to farmers, a covenant with producers' organizations on the reduction of pesticide use, and so on.

The overall participation of the environmental movement in an alleged 'ecological transformation' of agriculture still is of marginal importance, however. Polarization still looms large. The continuing problems of manure surpluses and pesticide pollution of surface water may well alienate agricultural producers and the environmental movement once again. There is, in some respects, still a considerable gap between the social representation of an ecologically sound mode of agricultural production in 'green' and 'rural' surroundings nurtured by many environmentalists, on the one hand, and the social representation of a technologically advanced, clean and controlled 'modern' agribusiness system on the other.

The Ecological Restructuring of Agriculture Reconsidered

Having examined the institutions which are seen as primordial domains of the environmentally induced transformation of agriculture, we now return to our initial question of whether current institutional reforms can be interpreted as a process of ecological restructuring along lines of the ecological modernization theory.

The ecological 'imperative' has considerably influenced the development of science and technology related to agricultural production. The 'ecologizing' of farming practices and techniques, nevertheless, appears to be a tardy and as yet far from complete process due to the complexities of technology transfer in agriculture. Clearly, ecological restructuring is not a predetermined process following a predestined path. Messages concerning the required quality and degree of 'sustainability,' ecological soundness or 'naturalness' mediated to the farmers through science and technology, are divergent, ambivalent and sometimes even contradictory. The precarious and strongly context-related interaction between technological design and farmers' practice implies that the feasibility of ecologizing of agricultural production depends crucially on the 'co-production' of technological development by farmers and researchers.

Despite its inherent dynamics, the existing economic structure of agriculture (size of holdings, property rights, capital need, financial structure, management capacity) may evolve, in due course, to become a barrier to *ecological* restructuring, which may arouse growing pressure towards a parallel process of economic restructuring. Both 'biological' production, needing large areas of land and relatively much labour, and 'cleaning' agricultural production with help of capital-intensive technologies, demand investments and more particularly entail takeover costs that render the reproduction of farmers' ownership increasingly difficult. A separation of capital ownership and management may be the outcome to which both 'green' investment funds and elements of the agribusiness chain would be able to contribute. Farmers' associations may represent another strand of economic restructuring by putting together the required amounts of land, capital and labour. As far as such horizontal integration, as well as the vertical integration in agribusiness chains referred to earlier, are inspired by ecological imperatives, the 'ecologization' of the agricultural economy can be considered as a factor contributing to the elimination of the (one man) family farm as the dominant form of agricultural production.

Erosion of the 'traditional' corporatist partnership between the state and intermediate organizations in agriculture and the simultaneous increase of interventionist agro-environmental rule making, has resulted in a form of 'political demodernization,' as the shift towards etatist regulation can be denoted. However, agro-environmental politics has also been a favourite playground for experiments in political modernization, which surely represent a (partial) response to the deadlock of the etatist route. Both ministries concerned, Agriculture and Environment, have, since the beginning of the 1990s, made a concerted effort to develop a new way of 'steering' that offers more room for the initiatives and creativity of the different actors engaged in the agro-environmental problematic, thereby placing the state in a far less hierarchical position (MANMF 1994). Attempts at conditioned self regulation are thus given a chance, notwith-

standing the tenacious bureaucratic propensity to dos and don'ts, control and surveillance which tend to prevail on the 'big issues' of manure surpluses and pesticide pollution. Environmental cooperatives have been stimulated to present plans for tackling the local agro-environmental problems in an integrated way,⁸ and have been granted subsidies and exemption from existing regulations in return. Similarly, local farmers' groups (of about twenty members) have entered into contracts with provincial authorities for establishing 'integrated collective environment licenses' that also address the protection of environmental quality, scenic beauty and biodiversity. Local state agencies, environmental associations and agricultural organizations are implementing regional plans, which have been rewarded and subsidized by government, aiming at farm development, environmentally benign agriculture and nature conservation. Finally, so-called mineral contracts are being initiated, whereby farmers' unions, environmental organizations and provincial authorities establish mutual agreements to reduce the production of manure phosphate in exchange for investment subsidies; the farmers' unions have assumed the responsibility for a forced reduction of animal numbers in case the livestock holders fail to meet their obligations.

These and other experiments of self-regulation, including private arrangements of product certification, environmental liability and insurance, may evolve into more structural arrangements of institutionalized learning and consensual steering. However, there still is a long way to go to bridge the gap between bureaucratic culture, with its needs for quantifying, controlling and routinizing, and farmers' preferences for autonomy and flexibility. The political modernization of agro-environmental policy making is also dependent, moreover, on new forms of local representation of farmers' interests, alternative strategies of negotiation and agreement between farmers' associations and state agencies, and additional modes of democratic legitimation of this kind of public-private 'co-production.'

Great public concern with food and environmental quality makes the social legitimation of agriculture's shift towards ecological soundness a matter of vital importance. In essence, ecologically modernizing agriculture is tantamount to redefining the *social contract* between agriculture and society (social movements, individual citizens, consumers). However, this redefinition process is infested with a multitude of ideological arguments and conflicting interests. Ecological rationality *per se* is not only an 'essentially contested concept' (Connolly 1983, cited in Tromp 1995); many more rationalities and sub-rationalities are entering the renewal of this social contract, as is exemplified by concern over animal welfare, resistance to full-fledged technologizing of agricultural production (as, for example, in the opposition to genetic engineering), emphasis on the 'spatial quality' of rural areas, and preoccupations with nutrient depletion and food supply in developing countries.

From the foregoing analysis, we may conclude that current changes in agriculture can well be investigated from the perspective of ecological modernization theory. Environmental sociology seems, in this respect, indeed capable of being a 'formative power' in the development of rural sociology. Its contribution is especially valuable to clarify the all-embracing impact of the environmental question on the technological and institutional reconstruction of agriculture, and to address its social, political and economic implications. Concerning these implications; this brief exploration also revealed, between the lines, the socio-political contestability and indeterminate outcome of ecological modernization as a *political program* for agricultural change in the Netherlands.

Notes

- 1 The ideological vanguard of especially Dutch and German environmental organizations and political parties has contributed on a more practical level to the political acceptance of the idea of ecological modernization. See, for instance: Schöne (1987), Fisher (1991), Friends of the Earth Netherlands (1991) and van Driel *et al.* (1993).
- 2 As if, for example, covenants or other forms of 'consensual steering' were more modern than state regulations. First, most voluntary policy arrangements are backed by firm juridical means to be applied in case of non-compliance. Second, the alleged modernity is bound to be superseded as soon as 'new' regulatory alternatives occur, like the certification of production processes, rules of liability and risk insurance, the statutory obligation to keep environmental accounts and the like.
- 3 The different schools of thought in environmental sociology from the late 1960s onward, have been analysed in Mol (1995, pp. 7-26).
- 4 The bureaucratic state environmental policy of the 1970s and 1980s is regarded as inflexible, economically inefficient and unjust, slowing down rather than propelling technological innovation, unable to control the billions of material and energy transmutations each day, and incapable of stimulating progressive environmental behaviour by companies (e.g., Jänicke 1986; Huber 1991).
- 5 In the period 1985 to 1995, over one hundred environmental covenants were signed between industry and the state.
- 6 *Boerderij*, 82 (17), January 21, 1997.
- 7 Ministry of Agriculture, Nature Management and Fisheries, Letter to the Second Chamber of Parliament, DL 964642, December 20, 1996.
- 8 These plans encompass, among other things, a mineral account system to monitor and reduce nitrate and phosphate losses, reorganization schemes implying a reduction of ammonia emission at regional level, manure processing at farm level, purification of waste waters, and the conservation of nature and landscape by farmers.