

# Values about Nature in Organic Farming Practice and Knowledge

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ORGANIC FARMING IS often considered to be a separate and distinctive way of farming. However, organic farming practices turn out to be just as diverse as views of nature and value assumptions involved. This paper is mainly concerned with differences in values and practices within organic farming at the level of the individual farmer. Secondly, it examines differences in values and practices at the level of agro-scientific knowledge related to organic farming. Thirdly, I discuss findings on the impact of values concerning nature on practice and knowledge in relation to the ongoing institutionalization of organic farming. The general aim is to show how value assumptions and orientations influence physical-material farming practice, as well as the contents and development of agro-scientific knowledge.<sup>1</sup>

At the level of the farmer it is the stories of individuals, their backgrounds, education, training, attachment to different groups and ideologies, access to knowledge and different kinds of knowledge, and events in their lives which mould the explanation of actual farming practice. Different farming practices have distinctive values inherent or embodied in them as a result of complex stories. Investigation at the level of individual farmers takes the form of a case study. Some of the differences in values and practices can be explained at the level of knowledge, by analysing the history of different branches of agro-scientific knowledge related to the organic way of farming.

Other scientists (Christensen 1998; Kristensen 1997; Kristensen and Nielsen 1997; Rasmussen 1995–6) have described how organic farming in Denmark has entered a phase of institutionalization. On the basis of two levels of analysis of

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values and practices in Danish organic farming, I will show how this process of institutionalization involves a tendency to reduce diversity in practices and philosophies. Diverse practices and philosophies within the organic movement can be seen as an important source for the future development of environmentally sustainable kinds of agriculture. From this perspective, diversity is an important resource deserving development rather than reduction.

### Danish organic farming becomes institutionalized

The history of Danish organic farming can be seen as the history of a social movement moving from a marginal position to integration by society (Christensen 1998; Rasmussen 1995–96). As Christensen points out, both the organic movement and society change and converge during this process. Nevertheless, I focus entirely on the organic movement here.

During its marginal phase, the organic movement was identified with the activities of the alternative, left-wing and environmentalists movements, while biodynamic agriculture was leading its own, rather isolated, life. Acceptance occurred as official politics and public opinion took an increasing interest in environmental issues. The process of institutionalization was clear by 1988 when Denmark introduced a national governmental certification of organic farming, followed by financial subsidies. Definitions and rules were negotiated and formulated. The broader, value-laden, and ideological formulations of the Danish Association of Organic Agriculture were *reduced* to technical and quantitative definitions and rules.

Initially, a separate advisory service was established for organic farming. This advisory service was merged with the ordinary extension and advisory service run by the Danish Family Farmers' Association and the Danish Farmers' Union in 1995–96. This merger aimed to facilitate the diffusion of organic farming among conventional farmers. The diffusion was followed by demands for more specialized and technical advisory services. Consequently, agronomists without any special organic or ecological background are by now advising organic farmers.

A final aspect of the institutionalization of organic farming, how secondary production and distribution of organic products have developed rapidly, with a tendency towards professionalism and commercializing (Kristensen 1997; Kristensen and Nielsen 1997), should also be mentioned. Organic products are nowadays mainly distributed through ordinary channels like supermarkets. This development makes new demands on farmers regarding quantity and stability.

There are many questions about the effects of this institutionalization. My own work has been affected by the question what becomes marginal in this process of institutionalization. My aim is to make visible different strategies within the organic movement, not only in terms of practice but also of ideol-

ogy. It is also important to consider the potential of other directions for sustainable agriculture, and to shed light on the strategies and practices facilitated (or otherwise) by the dominant development. This may be called a project of conceptualizing in order to defend diversity or multiplicity in organic farming. My hypothesis is that the view of nature and ethical thinking integrated in practical action and as value assumptions in scientific research and agronomic knowledge, play an important part in the constitution of different strategies and practices.

### **The methodology of the case studies**

The empirical investigation was conducted as a qualitative study of the views of nature and practices of six farmers. Methodologically the investigation is inspired by phenomenology and anthropology. I have viewed the investigation as fieldwork in one's own culture (Hastrup 1987), and have concentrated on going beyond the nature–culture split by means of Latour's ideas about symmetrical anthropology (Latour 1993). The idea is to abandon all previous judgements about what is objective, factual, natural or scientific, against what is subjective, historical, cultural or religious in order to monitor the specific construction of these borders by each farmer. Within this frame of understanding qualitative research interview methods (Kvale 1983) have been followed. Each interview has been lifeworld focussed, which means that dialogue begins at (or does not move further than) the level of everyday experience: practices, daily choices, pleasures, pains, conflicts and so on. All interviews were transcribed in full and analysed in two steps: a phenomenological analysis discussed with the interviewee, and a further, more selective and interpretative, analysis.

The idea of the more selective analysis was to conceptualize the view of nature held by each farmer, not only as spoken in words, but also as interpreted in daily practice. I call my theoretical framework for this conceptualization environmental ethics as a concept of practice. This concept of ethics is inspired by the philosopher MacIntyre, among others. MacIntyre argues in his book *After virtue* (MacIntyre 1985) for the Aristotelean concept of ethics, virtue ethics. Different moral theories are viewed by MacIntyre as theoretical concepts of aspects of a phenomenon in human life, which cannot be derived from a single moral law (rights, Kantian ethics), or be reduced to the question of individual interest or feelings (emotivism). Instead MacIntyre introduces the Aristotelean concept as a more comprehensive and better description of ethics as it occurs in practice. There are similarities between MacIntyre's and Latour's ideas, as the title of Latour's book *We have never been modern* (1993) indicates. Seen as a modern conception, the main feature of virtue ethics is viewing ethics as rooted in social practice, which does not mean that there is no objective evaluation. Every concrete action can be evaluated objectively as good or less good with respect to some specified conditions. This was the idea of the old virtues: as men

were living in a social context some kinds of actions were good for facilitating or securing the future of the family. Of course, the old virtues do not make much sense in society today, but the idea of concrete objective evaluation of actions can be adopted leaving the criteria for evaluation entirely open. Nature is such a discussion of criteria. The limits of ethical responsibility towards the surrounding nature are discussed within moral theory. Theories vary from being strictly anthropocentric to including animals or life as such or even the cosmos as an object for human ethical consideration. In the empirical analysis, concepts from moral theory are used to define characteristic features of ethical thinking or acting on the part of the farmers. Moral theory used to conceptualize farmers' values ensures that the whole spectrum of anthropocentric and non-anthropocentric viewpoints are included. Precisely these perspectives would be lost if the study were based only on sociology, techno-science or agro-science and anthropocentric philosophy.

The farms and farmers were selected with a view to obtaining variation, extremes. The selection was not based on formalized criteria, but was inspired by the topology of organic farmers made in a Norwegian sociological survey (Blekesaune and Vartdal 1992). The six farms and farmers are very different in scale, practice, thoughts and beliefs. Each farm has been described separately (Kaltoft 1997), and I have been and still am fascinated by the overwhelming details, which cannot be presented in this paper. Details not directly related to the conclusions have been left out in the following presentation of the case studies. Complexity has been reduced and themes present in only one or two of the case studies, such as aesthetics, landscape values and ideas about the role of technology in agriculture, are left out.

### Views of nature and practices: six case studies

*Back to the countryside couple* I associate the couple Peter and Anne with the more 'traditional' organic way of living and thinking. They bought a farm together with another couple fifteen years ago; all of them were townspeople with ideas about a life in contact with nature, growing plants in a healthy way. Farming is not a job for Peter and Anne, but a life project. They tell their story with a measure of ironic distance: they were absolutely non-professional, and have been through 100 years of farming history in fifteen years. They began by doing everything more or less manually. One reason being that they did not want to compact the soil. Today they have a farm with 35 ha of land, thirty animals (beef cattle), 200 chickens, and ten sheep. They produce the fodder for their own animals and grow a lot of vegetables (8 ha). They sell everything – vegetables, meat, eggs – directly to consumers. This is very essential for them it is an ideological position. They are very critical of the tendencies which give the big supermarkets increasing power and control. They do not identify themselves with neighbouring farmers. They identify with other 'alternative'

people. Ecology is used as the framework of explanations regarding organic farming. They use a very broad concept of ecology, which transcends the scientific concept of ecology although they are unaware of this distinction. The main task, according to Peter and Anne, is to take care of the soil, recycling organic material, and in return the soil will provide them with nice crops.<sup>2</sup> The way in which Peter and Anne talk about the soil resembles to some degree an 'organic worldview' (Merchant 1980), including assigning subjectivity to soil and plants. Ethically, it appears as care-taking ethics (Wolf 1990a), meaning ethics that has to do with taking care of life and is in conflict with human demands. Peter and Anne discuss this with each other: Peter gets annoyed with all this (female?) taking care of the partridge, the individual plant and so on, saying that they have to survive too. The discussion demonstrates the inescapable conflict associated with ethics as care taking (ethics in the sense of Løgstrop).

*Reflective biodynamic farmers* Hanne and Hans Peter have several educations within the anthroposophic movement. They have chosen to become biodynamic farmers after having tried a variety of other things. Both have a very comprehensive theoretical and philosophical knowledge and reflect on every single practical step or action. They cultivate a lot of herbs and vegetables on a small farm, only 5 ha, which is not enough to live by. Hans Peter produces the biodynamic preparations together with two other farmers. But he does not just stick to the recipes (from the agricultural lectures given by Rudolf Steiner in 1924). Based on research in Germany in the anthroposophic scientific community, he tries to improve the processes and understanding of the preparations. These preparations also help to catalyze non-material processes in the compost, in the soil, and in the plant. It is very important for Hanne and Hans Peter that they are providing not only crops for material survival, but also crops which contain resources and forces for the human mind. They believe they have a responsibility regarding the development of the soil. Using compost is essential for biodynamic farming – and for Hanne and Hans Peter. But again, it is not only to ensure fertility. With the help of the preparations, they try to develop the soil further than nature itself could ever do so.

*'Old-fashioned' and biodynamic farmer* Among the interviewed, Jens has the biggest variety: 85 ha land, seventy-five milking cows, pigs, calves, chickens, ducks, geese, sixty different kinds of vegetables, and fruit and berries throughout the season. He uses compost and special biodynamic preparations, but he also has liquid manure. Jens is around sixty years old. His son is about to take over the farm just like he himself took over from his father. This means that he is attached to the local community through a history that stretches far back in time. His primary identity is as a farmer. The well-being of the farm defines what is going to be done, by whom and when. He despises regulations about

working hours and is completely intolerant towards farmers' wives wishing for independent careers. He has been farming biodynamically for twenty-five years. I had expected a lot of typical anthroposophical explanations, but I did not get any at all. Jens does not refer to any theory, anthroposophy or philosophy, only to very concrete stories about his animals, to discussions with stupid environmentalists (townspeople) and so on. For Jens farming has to do with experience, it is a craft. You cannot study how to do it right, and experts cannot tell you anything. Even without a single anthroposophical explanation, his many concrete stories make it clear that he believes the world to consist of material substance and mind (not further described or differentiated by him): the temperament of the cow matters when choosing cow dung for one of the preparations, and the purity of the person doing the preparations matters for the quality of the preparation. From Jens' story, I conclude that the biodynamic way of farming can be seen as an articulation of aspects of old-fashioned, non-industrialized and traditional agriculture. Jens' lifestyle is furthermore impossible to choose, since it is inseparable from tradition, making virtue ethics in the old sense a relevant way of conceptualizing.

*Academic farmer* Hans is educated as a natural scientist and worked in research on food quality until he was forty years old. Research shows, in Hans' opinion, decreasing food quality which cannot be changed except by changing farming practice. These thoughts, together with a personal tragedy, formed the background for quitting his job and becoming a farmer (20 ha land). His aim was to do organic farming on a natural scientific basis – no mystification, no religion – and to produce ordinary products as opposed to health food, and to do it at ordinary prices. He sees himself very much in opposition to biodynamic farmers, especially their philosophy. This is despite the fact that he also makes compost and is very much against the use of liquid manure. Liquid manure has qualities similar to mineral fertilizers, which are unwelcome in organic farming.

Hans underlines the limits of science. He dichotomizes the rational, which can be conceptualized by science, and the irrational and non-conceptual. He believes farming has a lot to do with the non-conceptual parts of life. Some gardeners have 'green fingers,' others do not and it is the same with farmers. He is very aware of the contact between himself and his animals. He can hide feelings for his family which he cannot hide for the animals. He regards both phenomena, the 'green fingers' and the man-animal relation, as non-conceptual communication between humans and the surrounding nature. Farming, like many other things, depends on this communication. Hans has found a suitable worldview in the old Chinese thinking of Taoism which, in his eyes, combines modern scientific knowledge with a non-dualistic view of mind and matter.

*Modern, rational farmer* Karl has a traditional farmer's background. He took over his father's farm and converted to organic farming after several years.

Farming is a job, not a life project. He tries to lead a normal modern life, with a wife working off the farm, and children. He considers this a strong argument for a simple farm. He has one product for sale: milk (70 ha land, sixty milking cows). He was offered a good contract by the milk company, which made the transition to organic farming financially attractive. But the economic argument was accompanied by feelings mainly related to repeated health problems among his cows. Today Karl does not like his own arguments for conversion. His former position has changed and if organic farming becomes unprofitable, he will not return to 'normal' farming, but leave the profession. He simply finds the organic way of farming professionally more interesting, apart from environmental considerations. Karl regards the organic way of farming as a technical solution to environmental problems related to agriculture (nitrogen and pesticide pollution). Through low external input and closed internal circuits he gained better control over the farm, and solved the cows' health problems. Karl refers to the experts when he argues in favour of liquid manure, asserting that liquid allows a better control of nutrients than stable manure. Soil and plants are certainly not ethical matters for Karl. He sticks to an anthropocentric view: we should solve environmental problems for the sake of humans. His point of view is not, however, entirely anthropocentric since his cows are objects of ethical concern. Talking about the reactions of his conventional neighbour farmers towards his conversion, he told me that they were full of respect after having seen that it is possible to grow without fertilizers and spraying. I have encountered exactly the same story several times among newly converted farmers. It indicates a respect for the natural processes themselves, but it is impossible to judge whether these feelings are based on nostalgia for old-fashioned agriculture, or whether they arise through contact with the soil, plants and life processes (non-anthropocentric ethics).

*Globally informed farmer* Martin has a farm very much like Karl's: 80 ha land, sixty-five milking cows, low product diversity, liquid manure and stable manure which is ploughed in. Martin had started conversion to organic farming three months prior to my visit and interview. He was chosen for this research because I was lacking more 'instrumental' organic farmers. There is a myth in Danish organic farming (Michelsen 1997) about newcomers converting for purely economic reasons, and treating the rules as a form of external authority instead of the explanation of some kind of inherent ideology/values. This was the background to my requesting an extension and advisory service for a farmer who had just started conversion with a conventional farming education, and living on a family farm. I came to Martin with a number of negative preconceptions. Martin had many ideas: he wanted to start growing vegetables within a few years, he would not exclude the possibility of becoming a biodynamic farmer one day, and so on. On the other hand, he was starting something that he regarded as being very safe and manageable. This included build-

ing a new stable and producing liquid manure. He was strongly advised to build that kind of stable by the local extension service for two reasons: animal welfare and optimal nutrient management. Working in third world countries provided the motivating experience for Martin to go into organic farming. Production without any external input is his ideal, as observed in Africa. This global perspective, including the world-wide distribution of resources, characterizes Martin's motivation and beliefs.

Figure 1: *Farmers' ethics and views of nature*

Farmer	Characterization regarding ethics and view of nature
Jens: 'Old-fashioned' and biodynamic farmer	Virtue ethics: tacit knowledge, experience-based knowledge, no limits for ethical object Mind in nature
Hanne and Hans Peter: Reflective biodynamic farmers	Mind in nature Mind-matter dualism Man develops nature
Peter and Anne: Back to the countryside couple	Biocentric ethics Care-taking ethics Mind-matter undivided (partnership)
Hans: Academic farmer	Ethical object: cosmos Mind-matter undivided (partnership) (Taoism)
Karl: Modern, rational farmer	Emotivism (including animals who can feel pain)
Martin: Globally informed farmer	Controlling nature (closed circuits)

### Summary of the farmers views of nature

The six case studies exemplify a variety of relations between view of nature and practice. Figure 1 gives a schematic presentation of the kind of ethical stands and views of nature, either as directly expressed or interpreted from the interviews and observations. The characterization uses concepts from the theory of ethics mainly concerning which parts of nature can be included as ethical objects, and concepts from philosophy concerning the relation between mind and matter. Many other interesting aspects of the view of nature, such as aesthetics, are left out.

The farmers represent non-dualistic thinking and two different kinds of dualistic thinking with regard to mind and matter. The first kind of dualistic thinking is found in anthroposophy and in biodynamic agriculture. Mind and matter constitute separate spheres (transcendence), human consciousness being one of these spheres. Both spheres are objects of ethical responsibility. The other kind of dualistic thinking is represented by Karl and Martin. Like Jens,



they do not themselves reflect on these theoretical concepts. The views of Karl and Martin correspond to ordinary thinking in our culture, namely viewing nature as matter and mind as identical with human consciousness. Ethical responsibility is restricted to humans, though both also embrace higher animals as ethical objects: Karl his cows and Martin animals as such. Peter and Anne, and Hans express non-dualistic points of views as explained in each case story. Dualistic or non-dualistic points of views have consequences for conceiving of the role of man. The non-dualistic point of view sees the relation between man and nature as a partnership, that we are equal creatures. The dualistic points of view place man in a more active role as a developer of nature (anthroposophy) or as a controller/manipulator (Cartesian and Newtonian thinking). Figure 1 shows the main differences regarding views of nature: the first four farmers have a broader concept of the object of ethical responsibility than the last two farmers in the scheme.

### **Summary of the farmers' practices**

The six case studies exemplify a variety of practices. I have focussed on three aspects of practice in the analysis: product diversity, manure usage, and the way of treating the herd. In conclusion, I shall concentrate on product diversity and manure usage, because these two aspects reveal great differences in physical practice within organic farming. Figure 2 shows the six farmers organized with respect to product diversity and manure usage.

Diversity was one of the keywords in the more 'traditional' explanations of the idea of organic farming, opposing the tendencies to monoculture. What diversity means today in organic farming varies considerably, as the six case studies illustrate. Another keyword was soil fertility. The six case studies show different ways of treating the manure, some of them relating to the concept of soil fertility, others to nutrient management. Scientific explanations related to each different strategy will be examined below.

### **Relations between views of nature and practices**

Two main relations between view of nature and practice, based on the six case studies can be distinguished. If Figures 1 and 2 are combined, the first four farmers from Figure 1, those with the broader concept of the object of ethical responsibility, have a higher product diversity and use compost (or 100 per cent stable manure); whereas the two last farmers, with the narrower concept of the object of ethical responsibility, have a low product diversity and use liquid manure and plough in stable manure.

The two main relations between views of nature and practices are connected by an historical dimension. With the institutionalization of organic farming, practices have changed from being graphically situated in the right and upper

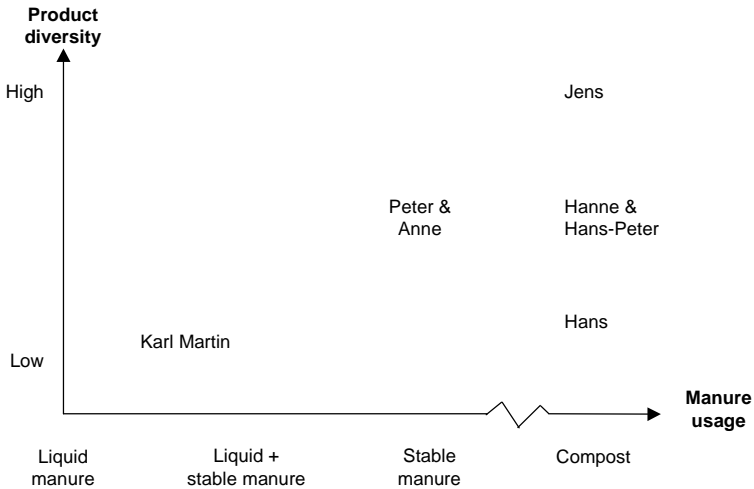


Figure 2: *Product diversity and manure usage*

The diversity axis is a true axis showing the diversity of products. Lowest diversity is one product, milk. The livestock manure usage axis is discontinuous. Liquid manure is the absolute zero of the axis because – due to rules of animal welfare – an organic farm can never have only liquid manure. Going right, the rate stable manure/liquid rises until the point of 100 per cent stable manure. Here is the discontinuous break: going from ploughing in stable manure to compost.

parts of the system of co-ordinates in Figure 2, to being situated in the left and lower parts today with respect to number of organic hectares grown and numbers of farmers. This is a change from higher product diversity to lower, and from widespread compost usage to a nutrient focused manuring strategy. The reduction of organic farming, mentioned at the beginning of the paper, can be conceptualized as this change of practice and view of nature (they are inseparable). Possible changes in practice and views of nature by the newly converted farmers, such as Martin, who is very keen on further reaching ideas and practices are left out.

The reduction of ideology seems to be one characteristic of the ongoing institutionalization of organic farming. Tovey (1997), for example, writes about the Irish situation: “The attitude of the Irish state towards organic farming has been to disregard, ignore, or repress the ideological content of the movement – its visions of the relations humans should develop with both nature and society – attempting to wrench the production practices free from this and slot them into a different context in which they do not in fact fit at all easily.” (p. 33). What can be added from these case studies is that practices cannot be wrenched free of ideology, since this produces another practice. Organic farming practices are being changed along with institutionalization.

Leaving the level of individual farmers, differences in practice can also be explained as different strategies for sustainable agriculture. Two kinds of environmental sustainable agriculture within organic farming can be distinguished: a non-poisonous agriculture, and a soil fertility and crop quality sustaining agriculture. I explain this by shifting focus from the level of individuals to the level of knowledge.

### Relations between views of nature and organic farming knowledge

All the farmers interviewed, except for Jens, had ideas about explaining scientifically what they were doing, for example in relation to manure. They referred to the science of ecology (Hanne and Hans Peter, Peter and Anne, Hans), or knowledge produced in the scientific community of anthroposophy (Hanne and Hans Peter) (a phenomenologically based natural science, founded on the ideas of Goethe, developed by Rudolf Steiner and others), or new theories about plant communication (Hans), or the expert-knowledge of advisors from the extension service (Karl, Martin). This kind of knowledge is not just farmers' knowledge. It is knowledge shared by *some* farmers, *some* agronomists in extension and advisory services, and *some* agro-scientific researchers.

Going from the level of the individual farmers, the case-study level, to an analysis of knowledge changes the focus of explanation from individual life stories to the 'life stories' of knowledge production. Many aspects of the case studies are eliminated, creating instead explanations that relate farmers' practices to scientific practices, and extension service practices. Aspects of farmers' narratives are part of the broader narratives including the sciences and professional practices.

The analysis of knowledge related to organic farming was based on the same theoretical background as described for the case studies. That means using the social constructivist perspectives from the sociology of science (for instance Latour 1983) and the sociology of technology (Bijker et al. 1987). The kind of common-sense thinking associating the conventional point of view with natural scientific knowledge, the ecological point of view with some kind of holistic thinking, and the biodynamic way of thinking with spirituality had to be abandoned. Instead, all the different knowledge about soil and plant growth was regarded as natural scientific knowledge, but a knowledge including different views of nature and different value assumptions.

Using the case studies and literature, I ended up by describing four paradigms of knowledge. The concept of a paradigm refers to Thomas Kuhn, but these paradigms are not Kuhnian in, at least, three ways: i) They co-exist, not following one after another in time; ii) The Kuhnian paradigms exist within one scientific discipline, physics, whereas these paradigms of knowledge relate to different disciplines such as ecology, chemistry, phenomenological descriptions of nature (Wolf 1990b; Heide-Jensen et al. 1995), and biosemiotics (Hoff-

meyer 1996); iii) The Kuhnian paradigm is purely scientific. Agro-science as well as technical science can not be paradigmatic in the Kuhnian sense because they are 'applied' sciences. Nevertheless I stick to the term paradigm because each 'paradigm' represents a coherent and logical system of thoughts, for example opposed to the term 'narrative' or 'discourse.' The four paradigms of knowledge related to organic farming are:

- the paradigm of nutrients (the conventional point of view);
- the paradigm of soil fertility (the traditional, ecological point of view);
- the biodynamic point of view seen as a paradigm;
- the paradigm of communication (an intermediary point of view).

Each paradigm is described in terms of its contents, analysed with respect to philosophy of science, and consequences for knowledge in action, for instance manuring strategies (Kaltoft 1997). The results of the analysis are summarized in Figure 3. A few comments are in order: The paradigm of nutrients is dominated by empirical results. The basic scientific explanations date back to the chemist Liebig, who proposed his so-called mineral theory in 1840. Liebig is usually seen as the founder of commercial fertilizers. However, others see him as one of the theoretical founders of organic farming (Siebeneicher 1996). How can this be?

	The paradigm of nutrients	The paradigm of soil fertility	The biodynamic paradigm	The paradigm of communication
<b>Central issue</b>	Plants need nutrients to grow	The important role of humus to soil fertility	Enriching matter with mind (life forces)	Matter 'carries' information
<b>Knowledge of nature</b>	Liebig + empirical results	Soil ecology (edaphology)	Soil ecology (edaphology) + phenomenological knowledge about nature	Semiotic knowledge of nature
<b>View of nature</b>	Nature as matter Cartesian-Newtonian	Non-dualistic, teleology in nature is connected to ecosystems <i>or</i> nature as matter, non-reductionism	Mind-matter dualism Spheres of mind	Non-dualistic, teleology on all levels of nature <i>or</i> nature as matter, 'teleology' a result of complexity of systems
<b>Role of man</b>	Manipulator In control	Cautious co-operation	Developer, to create farm individualities	To interpret communication
<b>Manure</b>	Mineral fertilizers (conventional) liquid manure + ploughing in stable manure (organic)	To work for fertile soil, increasing humus in soil	Compost using biodynamic preparations	High level of nitrogen gives low quality of crops and vice versa

Figure 3: *The four paradigms of knowledge related to organic farming*

It is interesting to discern how certain aspects of a theory can be separated from the rest and transferred to a new context, where they contribute to the opposite conclusion. Liebig devoted years of his life to fighting the use of nitrogen fertilizers, and his theory is seen as the theoretical basis for doing exactly this!

The paradigm of soil fertility is based on soil ecology and views of nature inherent to ideas of ecology, and containing the same metaphors of organisms and inherent values in the ecosystems as in ecology as such (Worster 1994). Biodynamic research is rather isolated, but contains very interesting supplementary knowledge of nature: phenomenological knowledge. The fourth paradigm I have also called intermediary, because it can be combined with both the paradigm of soil fertility and the biodynamic paradigm. I base it mainly on an analysis and interpretation of the work of the Danish agro-researcher Ane Bodil Søgaard (Søgaard 1997). Her work can be understood in terms of semiotics, as developed methodologically by Hoffmeyer (Hoffmeyer 1993).

The paradigm of nutrients is basically conventional farming thinking, but also exists in organic farming where it is gaining influence. Extension and advisory services refer to this paradigm for instance on the question of manure. As a consequence the central issue is seen as being that of saving nutrients in organic farming to increase output. The paradigm of nutrients is strongly supported in agronomists' education. And as organic farming becomes increasingly dominated by professionals, including agronomists, this influence will grow. One of the case-study farmers, Martin, was advised by an agronomist to build a certain kind of new stable. This stable will determine manure practice on the farm for many years as nutrient focussed rather than soil fertility focussed. This occurred despite the sceptical attitude the farmer revealed towards what he experienced as the experts' focus on nutrients.

The paradigm of nutrients used in organic farming supports the idea of sustainable agriculture as a question of poisons or not (fertilizers and pesticides), while the other three paradigms support the idea of sustainable agriculture as a question of soil fertility and crop quality. The first way of thinking is more 'mainstream,' easier to connect with technical education, easier to inform conventional farmers about, easier to state as quantitative rules, whereas the three other ways of thinking presuppose awareness of different views of nature and different value assumptions. It is not possible to foresee the consequences of institutionalizing organic farming on research and knowledge production in this field. But a struggle between two basically different understandings of a sustainable agriculture is taking place.

### **Conclusion: How to secure diversity?**

Organic farming offers practices that are environmentally sustainable. Certain views of nature are included in these practices. It is a challenge for extension

services and research and education in universities, as well as for national (or even European) regulation, not to reduce the variety of organic farming practices, but on the contrary to sustain different strategies. I believe that the acknowledgement of different value assumptions is a very important step towards ensuring diversity.

The split between nature and culture as institutionalized in universities is producing a lot of problems. In the studies concerned with nature (natural sciences and, even worse, in the 'applied' sciences), students do not confront the values inherent in the knowledge, as they are being taught. Evaluation and ethical consideration are seen accordingly as something outside the field of their profession, although they are judging and choosing values all the time in concrete action. Many organic farmers, unlike professionals, are aware of the existence of different values and scientific knowledge based on different value assumptions.

## Notes

1. This article is based on my Ph.D. thesis (Kaltoft 1997).
2. Taking care of the soil to provide 'nice' crops is one of the cornerstones of 'traditional' organic ideology. It conflicts with the idea of contemporary industrialized agriculture, where plants are fed with nutrients in order to obtain nice -big - crops.

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