

FARMING ACROSS THE YEARS: TEMPORAL AND SPATIAL DIMENSIONS OF LEARNING ORGANIC FARMING

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Abstract

In organic farming, it is generally accepted that a long-term perspective spanning across the years is necessary for the sustainability of organic field management. This paper analyzes the crossing over of annual boundaries during an organic inspection in an attempt to show how the long-term perspective is learnt in the practical organic vegetable farming. Within the speech turns that refer across the years, two main topics emerged. The first is the nutrient management, which was connected with plant growth and environmental regulations. The second is the sequence of crop rotation, appearing both as a list, detached from the fields, and as a temporal process of the fields. A weed problem, caused by couch grass, was repeatedly referred to by the farmer. It was not addressed at all from the several years' perspective. The results suggest that the nutrient issue within the administrative rules heavily impacts on organic farming. This leaves other important issues concerning production, such as the long-term weed management, with little emphasis. Reasons for this are discussed in the context of the sustainability of environment and production. Crossing over temporal boundaries is linked with many other boundaries.

Introduction

The temporal dimension of actual, specialized agriculture varies according to the type of production. Production of milk, beef, or perennial crops proceeds in long cycles of years, while chicken production or some forms of greenhouse growing enjoy many productional cycles per year. In arable farming, such as cereals or vegetables, a common productional time unit is a growing season, starting from the sowing time in spring and ending in autumn in harvesting and garnering the income from the yield.

The concept of sustainability, often present in debates on the use of natural resources, does not have a consensus of its meaning. The word sustainable is derived from the Latin *sustinere*, meaning to keep in existence, implying permanence or long-term support. (Rigby and Cáceres, 2001). The temporal dimension of an activity is, therefore, implicit in the concept of sustainability. The idea of the paper is not to argue about the sustainability of organic farming, but, rather, that a long-term perspective is necessary for organic farming for it to be sustainable. This is due to the fact that many of the natural processes take longer than the one-year production cycle prevalent in vegetable and cereal production. Biological nitrogen fixation, plant diseases, soil structure and perennial weeds are examples of these natural processes. In organic farming, where synthetic pesticides or soluble fertilizers are not used, a long-term perspective is required for the management of these natural processes of the field. The interest of this paper is especially in underlying the importance of crossing the limits of the annual production cycle, either to the previous or to the following year(s) to come. This is called "farming across the years". From the point of sustainability, it is of interest to examine how learning a new perspective that crosses over the years occurs in the organic farming

practice. Besides organic farming, it is assumed that learning to act across the years is necessary for learning many other sustainable farming practices as well.

In this paper, learning is means crossing the usual boundaries. The notions of “learning” and “boundary” are connected in two ways. First, the organic inspection under study here is a place for boundary crossing between the activity systems (Engeström, Engeström & Kärkkäinen, 1995) of the farm and the inspection body, which offers learning potential for both the farm and the inspector. The way the organic inspection is done shapes how organic farming is understood and what is considered important in it. Second, as stated above, crossing the annual boundaries indicates learning the long time perspective necessary in crop rotations and organic farming. Crossing the boundaries can also be a process of reconstructing boundaries (Kerosuo, 2001). Besides farmers, the new time perspective may be present challenge for inspectors as well. Crossing some cognitive boundaries, such as the time dimension here, may reveal a web of interconnected boundaries, all of which require learning effort.

The temporal expansion of the farming object also has spatial implications. Crops are planted in a certain sequence thus increasing diversity. Parts of the fields are being used for green manures mainly for fertilizing or soil improvement purposes. Historically, organic farming has been associated with small, self-sufficient family farms where animal and crop production existed side by side and where clovers and grasses had economic significance as fodder. Organic vegetable farming is developing from craft towards specialized, large-scale production: in vegetable farms, the fields with green manure are there only to benefit farming in the following years, especially in specialized agricultural regions with only little animal husbandry.

In this paper, “green manure” refers to those fields where either annual or perennial grasses and nitrogen-fixing plants are grown for soil improvement and fertilization purposes. A “fallow” refers to a field which is repeatedly tilled to combat the weeds. Most often there is a fallow during early summer, which is later sown as a green manure or grass.

The research questions are:

1. To what extent, and how, are the annual boundaries crossed during an organic inspection?
2. What is the implication of this for learning to farm across the years?

This paper studies an inspection of one farm, and thus we do not claim the findings to be common to all organic farms. However, we argue that the analysis of local and real practices may bring new perspectives to the discussion about organic farming and help inspectors and advisors in their developmental efforts.

1. Organic inspection and the Kola farm

The organic inspection in Finland, organized by state authorities, is obligatory for all organic farms, every year, and it is normally carried out during the summer of full growth. The inspection of the Kola farm in 1998, videotaped and transcribed, comprises the empirical data of this paper.

Here, the inspection data is analyzed from a learning point of view. There are various reasons for this. First, the inspection is part of a real practice, as the every-day learning of the farmers, that offers them a chance for reflection on their farming. Second, organic farming is still a relatively new and rapidly evolving sector, and there are new things to learn especially for beginners. Therefore, many problems of the farmers are taken up during organic inspections. The field walk of this particular organic inspection contained many problem-solving situations, indeed. For some farmers, organic inspection may be one of the few opportunities to talk about their fields and farming with anyone knowledgeable in organic farming. Farmers have to pay for both the advisory services and organic inspections. Often times organic inspections are carried out by organic advisors.

The Kola farm was earlier engaged in the production of flowering annuals in greenhouses. In 1991, they converted their fields (3.5 hectares) to organic farming, and the production of organic vegetables increased little by little. The Kolas obtained supermarkets as their new customers and, in 1996, acquired by rent an additional 5.5 hectares of fields. The greenhouse production continued until 1997. The production season of the data, in 1998, was the first one to build economically only on organic vegetable farming. They had larger acreages of vegetables than ever, in the effort of becoming a relatively large-scale and mechanized farm specialized in organic vegetables. The shift in temporal dimension from a greenhouse production with three productional cycles per year to farming with cycles extending across the years, was one of their major challenges in learning organic farming (Seppänen, 2002). The region where the Kolas live is specialized in cereal production. In cereal farming, where a common productional unit is one growing season, learning organic farming may bring changes in the temporal dimension. An advisor, experienced in both organic and conventional agriculture, expressed the challenge of farming across the years like this: An organic farmer must always look ahead for over at least one year, when choosing, for instance, crops for the next growing season, while in the conventional production, solutions can be made for one growing season only (Partanen, 1999). The Kola farm had to learn not only organic, but to manage change from greenhouse production to open field cultivation as well. The challenge that crossing the annual boundaries clearly presents to the Kola farm, may be a slight one to other farms.

3. Findings: Farming across the years

Unfortunately, the weather in 1998 was extremely bad and rainy, causing the Kolas much trouble, work and stress. Table 1 shows the route of the organic inspection. It started from the Kola house and went around all the fields. In the end, the inspection papers with acreages, important from the point of view of the subsidies paid, were filled in in the house. There, the discussion had another a more inspection-like character. The field visit provides roughly 2/3 and the inspection discussion in the house 1/3 of the discussion data. The discussion data is divided according to the place where the discussion occurred, because most often the place structures the conversation. A speech turn, a basic unit in Table 1, means a sentence or sentences said by a person, which is, in most cases, preceded and followed by talk of other persons in the discussion.

Field plots 3-10, owned by the Kolas, had smaller acreages than the rented fields 12-18. However, the latter received fewer comments than the fields owned by the farmers.

In Table 1, three columns on the right show the number of turns of the discussion where references to farming across the years appears. Only less than seven per cent of the data shows that kind of speech. The column "Ongoing 1998" includes speech referring to that particular growing season. Sometimes the discussion is about something in general where no time perspective can be recognized. These turns are also categorized in the column "Ongoing 1998".

Column B lists speech turns that refer across the years, but what happened in the past, or will happen in the future, is not linked in the discussion with the ongoing growing season under study. A very common topic in this category is the preceding crop, inquired after by the inspector or commented on by the farmer herself.

Table 1: Speech turns referring across the years in the discussion during the organic inspection on the Kola farm, 1998. The numbers refer to turns of talk in the data.

Place	Now	Speech referring across the years		
	A. Ongoing 1998	B: no link to “now”	C: with a link to “now”	D: other than field management
1. The Kola house	103 turns			
2. On the way to the field	45		5	
Field 3: Carrot 0.30 ha	174	11		1
Field 4: Carrot and red beet 0.35 ha	99			
Field 5: Onion 1.65 ha	103		30	
Field 6: Various 0.13 ha	132			2
Field 7: Red clover and ryegrass 0.25 ha	142	11	5	
Field 8: Berries 0.14 ha	145	14	8	15
Field 9: Potato 0.40 ha	171			
Field 10: Storage and packing hall	286			
11. On the way to hired fields	85	2		
Field 12: Potato and swede 0.30 ha	66	9		
Field 13: Vetch and ryegrass 1.62 ha	51	4	2	13
Field 14: Carrot 0.58 ha	44	2		
Field 15: Leek and potato 1.10 ha	66	4	2	
16. On the way to next field	90			
Field 17: Fallow 1.07 ha	40		11	
Field 18: Red clover and timothy 0.46 ha	35	11	9	
19. On the way to the house	217	3		9
20. The Kola house	1358	14		45
Altogether 3 687 turns	3452 turns 93.5%	85 turns 2.3%	72 turns 1.9%	85 turns 2.3%

Column C, Table 1, shows those pieces of data where the speech referring across the years is connected to the “now” situation of the present growing season. From the point of learning to farm across the years, this category is the most interesting one. It deals with the crop sequence, nutrients and plant growth, the yield, weeds or pests of the crops. Both the inspector and the farmer form these linkages between the “now” and the longer time perspective, showing that farming across the years has been learnt at least to some extent. Column D includes the speech across the years that concerns neither crop rotation nor field management. The topics in column D include previous activities of the farmers, the use of small

investments in the future, about renting fields, traffic, cooperation of organic farmers, administrative issues, etc.

The challenge in organic farming of extending the perspective across the years is about crop rotation and related field management issues such as the use of biological nitrogen fixation, improvement of soil structure, and suppression of plant diseases and perennial weeds. Therefore, the analysis concentrates on these questions (columns B and C in table 1). Field management issues were discussed during the field walk (rows 2-19, Table 1) and crop rotation was also handled in the Kola house (row 20, Table 1).

However, the categorization like the one in Table 1 loses the context of each of the field plots. Our assumption is that the field context determines the quality and quantity of the issues across the years that should be discussed. The farmer and the inspector, walking around the fields together, communicate not only with each other but also with everything they see in each of the field plots. Vision and classification are accomplished through encompassing activities, talk, objects and images (see Goodwin, 2000a, Goodwin, 2000b). It is not possible properly to analyze the discussion data without taking into consideration the situation in the field plot under discussion. Therefore, we will analyze more in detail some of the small “visits” to the field plots and show four examples: 1. speech referring across the years was not present although there was a need for it, 2. speech across the years was present but not linked to the actual situation, and 3. speech across the years with a link to the ongoing production season. The fourth concerned the crop sequence of the rotation.

Example 1 is from Field 15 growing leek. This crop was apparently new to the inspector and she asked if the Kolas had cultivated it previously (this is the speech across the years that is seen in Table 1, Column B, Field 15. The two turns in Column C deal with potato). The planting and fertilization of the leek were discussed. The farmer related that the couch-grass problem had caused them a lot of manual weeding. Annual techniques such as flaming, hilling and soil tillage were referred to in relation to weeds. It was not discussed, why the field got infected with the couch grass during the previous years, and what could be done to avoid it next year. The couch grass is a perennial weed that shows the need for a perspective spanning across the years in organic farming.

In Example 2 from Field 14, growing carrot, the link across the years is made. After stating that the carrot was not at all fertilized in spring, the farmer crossed the annual boundary by mentioning the preceding crop, a two-year clover grass that had been growing very well.

Excerpt 1. (All the excerpts are translated from Finnish by L. Seppänen).

Farmer: This is, you know, land that was not fertilized at all in the spring. It was a strong, two-year clover grass growing here (...) and [the carrot has] been totally under water, it is a wonder it survives...

The farmer described the wetness of the field and was amazed at how well the carrot was growing, despite the abundance of rain water on the field. Clover grass is a good preceding crop, in that, besides fertilizing, it also improves soil structure to make it better tolerate flooding. The way the farmer was taken by the growth of the carrot suggests that she did not link it to the effect of the clover grass from the previous year.

From the point of farming across the years, the field plots under green manures for fertilizing or soil improvement purposes are interesting, because their land use is meant to benefit farming in the coming years. That is, the temporal challenge is spatially well seen in the use of green manures or fallows. Example 3 comes from Field 17 that lies fallow, infested with couch grass. Entering the field, the farmer said:

Excerpt 2.

Farmer: Here, I don't know what would be worth doing here, we have tried to keep this an open fallow, because the couch grass problem is so terrible...

However, nine days before the inspection, the Kola farmer had been able to plough the field plot and to hoe it a little later. Therefore, during the inspection, neither couch grass nor other weeds could be seen above the ground.

Excerpt 3.

Inspector: So, this looks really neat...

For the inspector, the field looked fine. No couch grass in sight! In the following conversation, the farmer asked her question twice more. But then, it had a slightly different bias:

Excerpt 4.

Farmer: Now, we intend to put here – (sigh) – whatever we should then put here for the winter?

The question here was no longer about couch grass. There is the assumption that something should be sown to that field for the winter time - which is much influenced by the fact that for the autumn, according to the administrative winter-coverage requirement as part of the Agri-Environmental Scheme, 30% of the fields should be covered with vegetation during autumn and winter. This obligation had been discussed previously in the inspection of other fields. In fact a reduced tillage on vegetable fields would have been enough to fulfill the winter-coverage requirement, but obviously the inspector as well as the farmer followed the stricter part of the rule.

Sowing rye was suggested as a solution for field 17. Then, there is a leap backwards across the years: the inspector investigates the preceding crop and its fertilization. However, this is not done for combating the couch grass but for discovering whether rye would have sufficient nutrients, or “growing power”. The problem of couch grass, posed by the farmer, turns into a question of nutrient conditions for the growth of the rye. It is possible that the inspector was thinking of how well the rye would compete with couch grass although the rest of the inspection data do not confirm this line of thought.

The fourth example is about the crop sequence, Field 18, where red clover and ryegrass had been sown in the spring, without a companion crop. The farmer started by saying that the field with its sandy soil would be ideal for growing carrot.

Excerpt 5.

Inspector: You have not yet had carrot here?

Farmer: No.

Inspector: Any intention for it next year?

Farmer: No, it will be clover...

Inspector: Yes, yes, but after that?

(...)

Farmer: (to herself) It will be clover here. Yes, we had potato here...

Inspector: Yes?

Farmer: ...last year, it was so beautiful Nicola [potato variety]...

In excerpt 5, the farmer was “tasting”, learning by means of inner dialogue, the sequence of crops planned for this field. Even though the crop rotation plan, obliged by agricultural administration is made for five years, the most essential leaps across the years are to the previous and the following years. The carrot planned for two years ahead was still far away.

At the end of the inspection, the documents were filled in in the house (Table 1). The question about the crop rotation was then given as a sequence in both discussion and inspection documents (Table 2).

Table 2: The crop rotation plan of the Kola farm, as expressed in the inspection document, 1998.

Six-year crop rotation: clover I-II, vegetables, root vegetables, green manure, vegetables.

4. Discussion

Boundary 1: Time dimension

The time perspective within the organic inspection remained mostly within the limits of the ongoing growing season. The inspection is more about the detection of malpractice in organic production than finding shortages in the professional skills of the farmers. The crop rotational perspective is, perhaps erroneously, implicitly expected to be part of the expertise of farmers after having converted to the organic. The issues of nutrient management and perennial weeds of this study show the need to cross the annual boundaries in organic farming. The new time perspective, being a challenge for the inspectors as well, may take long to learn.

Such speech across the years that concerned with the field management was rather marginal in quantity (Table 1). Nevertheless, it shows that farming across the years has been learnt at least to some extent, and that it is likely to promote overcoming annual boundaries. Time-related considerations jump most often to the previous or next year. The nearest annual boundaries are the most crucial ones.

The temporal expansion in organic farming is not only a linear extension of time: it also includes changes in the short-term farming. The organic-cultivation techniques of vegetable production are not standardized, because they are built up in the local conditions of the field and farm. Taking care of the vegetable fields has to be synchronized with the management of green manures and fallows in the every-day practice of the farmers. The field conditions have a changing life of their own. Besides the long-term perspective also improvisation and quick action are needed (Engeström et al., 2001).

The analysis of farming across the years revealed a web of other boundaries that have to be managed simultaneously with the time boundary. Some of these are taken up below.

Boundary 2: How to see the fields?

The inspector was seeing the fields of the Kola farm for a first time. According to the actual inspection regulation, one inspector can inspect only twice one and the same farm. After that, another inspector will succeed. This leads inspectors to acquaint themselves with those things that are easy and clear to work with, such as nutrient management or bookkeeping.

In the third example of this paper, the Kolas had ploughed Field 17 that had the problem with the couch grass. However, ploughing did not solve the problem: the weed remained in the lower layers of the soil, to reappear and grow on later again. The inspector could only see a well-ploughed soil, free from weeds, which could mislead her from taking seriously the problem posed by the farmer. How to see the fields has an impact on the recommendations and actions taken. Example 3 shows that the inspector was “discussing” more with the field than with the farmer.

Boundary 3: Crop sequence, in the fields or on paper?

When filling in the inspection documents at the Kola house, crop rotation was talked about as an abstract sequence (Table 2). Thus, it may remain untouched by what actually happens in the fields. It seems that crop rotations are difficult to inspect. In this inspection, the crop sequence was discussed, to some extent, in the fields, as well. Excerpt 5 shows how the farmer was learning this sequence in Field 18 by converting the sequence to a process on her field plot. The question often repeated in the fields of “what was growing here last year?” may help farming expand the vision across the years.

The crop sequence clearly supports farming across the years by giving a necessary framework. The crop rotation has an administrative aspect, too. An accepted crop-rotation plan for the next five years is a precondition for passing as an organic producer (Heinonen & Kieksi, 1998). An institutionally stabilized way of tailoring crop-rotation plans for each organic farm is an important tool in learning to farm across the years. But, at the same time, this administrative nature of the crop-rotation plan is a weakness, possibly making it a rule that has to be followed. The bureaucracy around crop rotation plans can even prevent farmers from learning to rely on their experiences and flexibly re-planning their own land use.

The crop rotation as administrative practice focuses on the future. However, the boundary to be crossed may be the one to the past, as well. Understanding the historical development of the fields gives good grounds for planning and implementing both current and future actions. This is especially important now when many farmers have newly rented or bought fields they are unfamiliar with. It would be useful to add more than one preceding crop to organic inspection documents.

Boundary no. 4: Between nutrients and weeds

The nutrient question was prominent in the speech across the years. It focused either on plant growth or on environmental concerns in the form of protecting the waters and water habitats. In the case of the Kola farm, administrative regulations about nutrient questions mediated learning to farming across the years. The gravest problem of the Kola farmer, besides rainy weather, was how to cope with couch grass. This question was touched upon only slightly. Suppression of another perennial weed, the sow thistle, was discussed in across-the-years perspective, but not the couch grass. Neither did the discussion about soil structure cross the annual boundaries.

Why was the problem of the couch grass so ignored in the speech across the years? It may be a result of many boundaries. However, we argue that one of the main reasons is that nutrients and their leaching is constructed as such an important environmental and political question of agriculture that it may roll over other across-the-years aspects of production, such as the weeds or soil structure. In organic farming, nutrient and weed issues cannot be dealt with totally separately of each other. They are parts of a farming system that needs to be treated as a whole. According to Kaltoft (1999), the “nutrient paradigm” comes from conventional agriculture, but it is gaining importance in organic farming. In Fields 7 and 17 beset with weed problems, the decision about the following actions was heavily influenced by the crop-coverage requirement, which is part of the Agri-Environmental Scheme. According to an official responsible for organic inspection in the regional Rural Department, perennial weeds are the major problem in organic farming (interview September 20, 2001). This study reveals the urgency to include more closely the production point of view, besides the environmental one, in organic inspections.

Hilary Tovey (1997) analyzes interviews with different actors within the organic farming movement in Ireland. In EU programs, organic farming is included as one of the options available within the Environmental Protection Schemes. According to Tovey, organic farming is most of all an alternative method of producing food, and the “environment” is considered internal to farming. It has its own vision of the relations humans should develop with both nature and society (Tovey, 1997; 33). The environmental schemes, however, consider that the environment which is in danger of being polluted by farming is something external to the food production system (ibid; 35). The analysis of the organic inspection here fits well in the framework of Tovey.

Nutrient questions are easily transformed into numbers, appropriated by the agricultural research and policy. This has not been the case with the anticipation-type of crop protection, which is important in organic weed control. Anticipatory crop protection addresses issues

such as right timing and organization of work, adjustments of machines and drainage. These are much more difficult for an inspector or an advisor to interfere with than nutrient management. Moreover, agri-environmental regulation, organic included, seldom has clear rules about anticipatory crop protection. Therefore, it remains with little attention during inspections.

One explanation for the question why the couch grass problem was so overlooked in the Kola inspection could be that the inspector was not listening at the moment or she did not have advisory skills. We argue that from a developmental point of view it is more useful to consider Example 3 not as a question of individual skills but as a boundary between two societal activities: advising and inspecting. The advisory service would lead a person to listen and help the farmer. In inspection, one of the main tasks is to evaluate the fields. The inspector on the Kola farm seemed to fulfill the latter task in Example 3.

Conclusions

The inspection discussion touched only little with issues across the years (Table 1). Within the speech turns that refer across the years, two main topics emerged. The first is the nutrient management, which was connected with plant growth and environmental regulations. The second is the sequence of crop rotation, which appeared both as a theoretical listing, detached from the fields, and as a temporal process of the fields. The topics crossing the annual boundaries were partly linked with the “now” situation of the present growing season and show that to some extent farming across the years has been learnt. The inspection failed to bring forth the long time perspective in the control of the weed couch grass that would have been necessary on the Kola farm. The boundary in the temporal dimension was linked with other boundaries, such as how to see the fields, the form of representation of the crop sequence, and the nutrient question.

This analysis of a local and real practice of an organic inspection suggests that in order to promote balanced learning, organic inspections should be based on a broad view of the farming system. Besides environmental issues, the production point of view should be considered. The findings will contribute to the discussion about organic farming and what is important in it. They also open up the controversial relationship between inspecting and advising that should be discussed when developing these activities.

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