ELSEVIER

Agriculture, Ecosystems and Environment 63 (1997) 201–220

Agriculture Ecosystems & Environment

Nature and landscape development on organic farms

J.F.H.M. Vereijken *, T. van Gelder, T. Baars

Department of Biodynamic and Organic Agriculture, Louis Bolk Instituut, Hoofdstraat 24, NL 3972 LA Driebergen, Netherlands

Abstract

The question: 'What do we see as a good landscape?' should not only be answered by landscape ecologists and architects but also by the farmers themselves. The basic farming concept in biodynamic farming is referred to as managing the 'farm individuality' (or farm identity). Therefore, this concept can be used as an appropriate criterion for nature and landscape development on organic/biodynamic farms. Then the question arises: How can we use the concept of farm individuality in landscape planning? At least three problems have to be solved.

First, we must have a method to describe the farm individuality. Secondly, the people who live and work on the farm are part of the farm individuality, so they should participate in the planning process. Thirdly, landscape is perceived as a dynamic system and individuality is also a dynamic concept.

In this paper a scientific method is presented, designed for landscape development at farm level, based on the concept of farm individuality and a Goethean-phenomenological approach. This method, complementary to the usual scientific approach, is used to come to grips with the farm as 'a whole', as 'an individuality'. The method can be characterised as a 'bottom-up' rather than a 'top-down' approach. It enables farmers to cooperate in landscape planning with all their ideas, feelings and future plans about their farm. The method will be illustrated on work recently done on a Dutch biodynamic farm, the 'Noorderhoeve'.

As identity is a recent overall goal for landscape management, as formulated by the Dutch government, the method is not only relevant to biodynamic farmers, but to conventional farmers as well. © 1997 Elsevier Science B.V.

Keywords: Organic (biodynamic) agriculture; Nature and landscape development; Goethean-phenomenological approach; Farm individuality; Identity

1. Introduction

Organic farming is more dependent on the (local) environment (soil, weather) and has less powerful tools for instant growth regulation than non-organic farming methods. Therefore, local differences in the environment cause differences between organic farms. This means that the solutions to problems on one farm do not necessarily solve the 'same' problem on another farm. Tailor-made solutions are therefore necessary. This means that, in as far as scientific support is demanded, the research methodology should be adjusted to this situation. The Louis Bolk Institute is active in developing such appropriate research methods. Its approach utilises on-farm research, participation of farmers, biological solutions and conventional and Goethean-science methods.

* Correspondence address: Zur Insel 1, D 35066, Frankenberg, Germany. Tel.: +49 6455 8782.

PII S0167-8809(97)00013-3

1.1. On-farm research

The research is mostly done on the farm itself, where the experimental fields are located. These are managed together with the farmer and produce results under practical circumstances. The farmer can use the result directly. The researcher's task is then to help provide insight into the rationale of the solution (understanding) and the way in which this solution was found (research procedure). This is to allow appropriate generalisation of the procedure and the results, for the benefit of other organic and biodynamic farmers.

1.2. Farmer participation

The farmer(s) in charge of farm management are invited to participate in observations of the experiments. We listen carefully to their opinions, as they are the people with experience and knowledge about the specific features of their farm(s). Without their opinions it would be difficult to reach a valid interpretation of the results and to decide on relevant implementation measures for the farm. By following this procedure on many farms we obtain an idea of the extent to which the specific results are of general use and how the results of such generalisations can be adapted to comply with the individual situation of each farm (see also Bosshard, this volume).

1.3. Biological solutions

The Institute strives to reach solutions that are adjusted to the ecological and social situation of each farm. Inherent in the concept of biological solutions is the idea that the prevention of problems is better than cure.

1.4. Use of conventional and Goethean-science methods

We apply a Goethean-science method (Colquhoun, 1993; see also Colquhoun, this volume) in addition to conventional methods, depending on the problem presented to us by the farmer(s) and the kind of answer demanded.

All these aspects will be presented in the example presented. As an introduction, a case history of grasslands and organic farming is given.

2. Theory

2.1. Defining the problem: grassland on organic farms

Differences in appearance between conventional and organic grasslands on Terschelling have been surveyed (Vereijken, 1988). At this time, Terschelling was one of the few places in the Netherlands where several organic (biodynamic, Bd) farmers worked in a small, relatively homogeneous area. Differences in the number of plant species in the grasslands were found. In grasslands under Bd management we found:

- more species;
- species belonging to different types of vegetation;
- more flowers, visited by more flying insects.

The diversity in colours, flowers and insects made the biodynamic grassland biologically and visually more interesting than the monotonous conventional grassland. This is because the biodynamic grasslands showed the influence of different soils (clay, sand, wet, dry), the seasons (spring, summer, autumn), previous use (e.g. as arable land) and differences in management. Each grassland had its own appearance, which made it difficult to group the biodynamic grasslands into a few 'types'. The conventional grasslands studied were situated next to the biodynamic grasslands and were also managed by different farmers. However, they all looked more or less the same and it was easy to group them into only three types.

The visual appearance of the conventional grasslands reflected an industrial farming system, wherein all diversifying (disturbing) factors, including the farmer, had been eliminated. On the other hand, each of the biodynamic grasslands reflected an individual farmer's management in 'cooperation' with nature. Perceived in this way, the visual appearance of the grassland shows us very clearly the impact of two different ways of handling nature with the objective of producing food.

This leads us to questions about the wishes and views of the farmers. If nature and landscape have to be developed on farms in general, two questions emerge: (i) how does the farmer perceive the natural environment and the landscape on his farm? (ii) what are the criteria by which, out of many options, the

measures to be applied are chosen? The type of management that the farmer applies, conventional, organic, biodynamic or whatever, is secondary. In this paper, both questions are discussed, using the Noorderhoeve as a case study.

2.2. Biodynamic concepts: a farmer's view

As the Noorderhoeve is managed by a biodynamic farmer, we have to understand the views of a biodynamic farmer on nature and landscape at his farm.

The primary concept of biodynamic farming is that of 'farm individuality' (''Der Hof als eine Art landwirtschaftliche Individualität''; Steiner, 1924). From an ecological point of view, 'farm individuality' can be rephrased as 'the farm as an organism' (Betriebsorganismus; Steiner, 1924). In both cases the farm is perceived as an '(individual) living being', or, in terms of later date, as a specific (agro-)ecosystem. These perceptions can be applied to landscapes as ecosystems as well as to farms, as in phrases such as 'the landscape as an organism', the 'genius loci' (landscape identity) and the 'biography of a landscape' (Bockemühl, 1992). It should be emphasised that the concept of 'farm individuality' is understood as referring to a spiritual entity (being, genius), which underlies the phenomena we observe. Farm individuality should not be confused with the individuality of the farmer, which is undoubtedly also clearly visible in all aspects of his farm. Both have their own lives, characteristics and biographies, although these are clearly interacting.

2.2.1. Farm individuality

The term 'farm individuality' is used to indicate that each farm has its specific combination of natural environment (e.g. soil, geomorphology, hydrology, climate, plants and animals) as well as its specific management system and style of farming (Bockemühl, 1994). This means that each farm needs specific solutions for general problems. For the biodynamic farmer this means, for example, that he has to choose his own rotation, his own type of livestock, his own way of manuring, his own breeds of plants and animals (Kunz and Karutz, 1992). Everything has to be adapted to the circumstances of his farm and the region.

At the landscape level this means that a biodynamic farmer wants to develop an agro-landscape that fits his farm. What such a farm-specific agro-landscape could look like is an actual theme in the biodynamic movement. The discussion oscillates between re-establishing good (characteristic) elements of the traditional agro-landscape and developing a new one for the 21st century. In the latter it is left open what such a new biodynamic landscape will look like.

2.2.2. Farm organism

This term usually indicates that farm management should minimise nutrient and energy inputs to make the farm self-supporting (ecologically autonomous). Much emphasis is placed on nutrient cycles (Koepf et al., 1989; Van der Werf et al., 1995). The farm organism should maintain a balance, an 'eco-rational' relationship, between its 'organs' or subsystems: the arable crops, pastures, grass/cloverlands, livestock, horticulture, etc. It should also maintain a similar balance between the latter and its elements of nature, such as forest, heath, moor and watercourses under the farmer's management. Their management should be adjusted to the possibilities of local soil/climate conditions, in order to warrant the farm organism's site adapted functioning. Moreover, from this perspective, the various livestock species should be managed to fulfil their ecology-based role (Klett, 1992).

Thus, the management concept of the 'farm as an organism' ideally refers to a self-supporting, mixed farming system, complying with the natural conditions of the site. It is therefore not surprising that (well established) biodynamic farms are characterised by a high diversity in agro-production and nature elements (Hendriks and Stroeken, 1992; Braat and Vereijken, 1993).

The farm itself can be seen as an organ within the greater organism of the landscape. From this point of view, a biodynamic farmer is interested to fit his farm into the surrounding landscape. That this point of view seems to be in contradiction with the results of Hendriks and Stroeken (1992), as criticised by Kuiper (1993), has to do with the fact that most biodynamic farms in the Netherlands are surrounded by conventional farms. The landscapes resulting from conventional farming are often seen as unsustainable

(overstressed), and therefore differ from those that biodynamic farmers would strive to fit in. It would be interesting to imagine a landscape with only biodynamic farmers and then discuss the criticism of Kuiper.

2.3. Criteria for a good landscape, in the view of a biodynamic farmer

At the meeting to which this paper was presented, the key question was: what do we see as a good landscape? Here, we attempt to answer this question from the viewpoint of a biodynamic farmer. In general terms his answer would be: a healthy farm organism which supports the individuality of the farm.

Translating this biodynamic language into scientific language, the answer could be rephrased as: a landscape with a strong identity and with an optimal balance between agricultural, ecological and economical qualities, in which it is humanely rewarding to work. Improvements of the farm landscape should comply with the farm's 'health and identity'.

2.4. How can a healthy landscape with a strong identity be developed?

Having set the definition of a 'biodynamic' landscape, plans and proposals for 'biodynamic landscape development' at farm level can be made. Roughly there are three ways of designing a landscape.

We can make a theoretical design of the optimal biodynamic agro-ecosystem. It is then important to avoid the mistake of dealing with this scientific result as a general solution for all farms wherever situated. One should not want to realise one optimal system everywhere, as has to some extent been done in conventional farming and to a lesser extent in organic agriculture as well.

For example, in the Netherlands the old permanent pastures are currently disappearing from organic farms as they did from conventional ones. In both cases, they are changed into more productive grass–clover meadows, the biodiversity of which is low in comparison with permanent pastures. Many, now common, species will have to find other places to survive, e.g. the field margins. If no new approaches to agro-landscaping are developed, organic farms are likely to cause similar problems in the future as conventional agriculture does now (pushing out nature of the farmland). The potential for nature and landscape development, present in the basic approach of organic agriculture, will then not be used.

A second approach to solving this problem is the development of a set of types of farming, each adapted to a different social and natural environment. In biodynamic terms we could call such an approach 'to design a set of healthy types of farm organisms', on a regional scale.

A sociological example of this approach, not focused on organic agriculture, can be found in the work of Van der Ploeg and Roep (1990) and Van der Ploeg (1991). Van der Ploeg and Roep classified farms by farming style, discriminating between the ways in which the farmers organise their labour, and their farms, in respect of market, financial and technological features. They showed that several feasible strategies exist on a regional scale, whereas the proponents of conventional agronomy argue that survival depends on growth and intensification.

For organic and biodynamic farms, Van der Ploeg's approach can be completed by feasible ideas on ecological management. This is because organic farming needs to develop different strategies to handle possibilities and restrictions of the natural environment. For example, Bokhorst (1991) developed different strategies for manuring, based on the coherence between pedological processes and landscape development, in a range from young clay soils to old sandy ones. His approach can be extended with other agricultural measurements. In the field of landscape management, a possibility could be to elaborate Vahle's general vegetation model of the cultural landscape (Vahle, 1993) for different landscapes in Europe. We believe that in future this concept of 'designing a set of healthy types of farm organisms' will play an increasingly important role in organic agriculture research.

A third approach is to take the actual situation on a farm as a starting point and to optimise the situation, solving all or at least a few of the agricultural and landscape problems. The aim is to design a landscape which is optimal for this farm and the farmer(s) who work there. In biodynamic terms we could call this approach the 'development of farm

individuality'. This is the actual approach that our institute applied in the landscape plans for two biodynamic farms in the Netherlands: Noorderhoeve (Baars and van Gelder, 1994) and Warmonderhof (Vereijken and van Gelder, 1995).

2.5. Conditions for improvement: the concept of farm individuality as a tool

Now the question is: How can we use the concept of farm individuality (or farm identity) in landscape planning? To answer this question at least three problems must be faced.

1. We must have a method to describe farm individuality.
2. The people who live and work on the farm are part of the farm individuality, so the planning should involve all those involved (Vereijken, 1995). "Identity has to do with appreciation by the people who live there. Historically they gave the landscape its present identity and they have to accept the new identity" (Boerwinkel, 1994).
3. A landscape is not a static object like a house, but a dynamic system, which develops constantly (trees develop, soils change, vegetations show succession). Thus, a dynamic or evolutionary approach with regard to farm identity or farm individuality is demanded (Bockemühl, 1993). We believe our method fulfils this criterion.

Since identity is a new main goal for landscape management as formulated by the Dutch government (LNV, 1992), the method is not only of importance for biodynamic farmers but possibly for conventional ones as well.

3. The method applied in this study

3.1. History and theoretical background of the method

Development of the method began when farmers of the biodynamic farm Noorderhoeve asked the Louis Bolk Institute for help in making a landscape plan to support the development of the agricultural individuality of Noorderhoeve. The farmers wanted to elaborate this question following a Goethean-phenomenological approach.

The fact that the farmers asked the institute is important for the project, as cooperation between farmers and scientists is the basis of our approach (see Section 1). With a Goethean-phenomenological approach it is possible to obtain an idea of farm individuality, as it includes conventional scientific methods together with additional ways of studying a place or farm. One way in which the Goethean approach can be applied is presented by Margaret Colquhoun (this volume). In our method we follow more or less the same steps as she describes. She was searching for the 'genius loci'; we are searching for the farm individuality, which is the genius loci of the farm. Both methods are inspired by the work of Bockemühl (1977, 1992, 1993, 1994).

A crucial point of our method is that we try to find the farm individuality's 'developmental trend' or 'direction for future development' ("Impuls zum Keimen"; Bockemühl, 1977). They should 'logically' come forward out of the present situation, taking into account the history (biography) of the farm's identity, including its previous and momentary ecological and agricultural problems. If we are able to find these 'developmental trends' and appreciate their benefits and flaws, we have gained a set of criteria to develop appropriate proposals for improving the landscape on the farm. If we then study the 'landscape' surrounding the farm in a similar way as we studied the farm—in search of the next scale's genius loci—we are able to add another set of criteria. Together they enable us to formulate concrete proposals. What does this mean in practice?

3.2. Methodology

3.2.1. Finding the directions for change

To find the 'direction for future development', three steps must be made, in close cooperation with the farmers and other people involved.

1. The first impression of the farm as a whole is described. This involves a naive description of what one sees, smells, hears (sensory perceptions) or otherwise experiences when visiting the farm. This first description of 'the farm as a whole' gives the necessary base, before going into detail with the following steps.

2. All available data are collected, divided and described in three main and several sub-categories:
   2.1. The present: soil, water, geology, vegetation, fauna, farm production, agricultural problems, people who work at the farm, etc. Both quantitative and qualitative data are required for this description.
   2.2. The past: the history of the farm's soils, vegetations, etc., as available. This description is made to reveal the 'lines of development', crucial for our Goethean-phenomenological approach.
   2.3. The characteristics: the characteristic features of the farm, emerging from the integration of those descriptions of the farm, in facts and lines of development.
3. In a set of special meetings all this information is taken together by all participants in symbolic pictures or images of the farm to be made by each of them. Symbolic images which, according to their creators, characterise the farm and show aspects of the farm individuality. We found that the participants often used fairy-tale figures, plants or animals as symbolic images to express a farm's

Fig. 1. Map of the Noorderhoeve (shaded area) and surroundings: there are dunes in the west, and an open polder in the east.

characteristics. Subsequently, the participants discuss the meaning and importance of the symbolic images they came upon. This is done to find directions for future development which can solve the actual problems.

In this phase of the method, cooperation with the farmers and people involved is of utmost importance. They know the farm best and are therefore most familiar with the farm individuality. However, because of that familiarity they need the 'mirror' offered by the researchers, to gain a fresh look at the farm individuality. This will reveal what the farm individuality 'really wants', which may not necessarily be the same as what the farmer(s) want(s) (see Section 2.2).

As meetings with the farmers are central in our methodology, they are described here in more detail. After an introduction, the meetings start with a walk around the farm. Then we go inside and ask the people to describe what they have seen and experienced. At the end we ask everyone to create a mental picture of the farm. Afterwards, preferably at the next meeting, everyone describes what came up in his/her mind. This is repeated in three or four meetings, held at different times of the year, to collect impressions of the farm and the landscape in all seasons. We also ask the farmer(s) to describe the history of the farm that have led to the actual situation. The meetings are instrumental in enabling the participants to characterise the actual situation of the farm in a symbolic image.

The more successful the participants are in observing the farm objectively in the preliminary meetings, the more reliably the symbolic images reflect crucial aspects of the farm's agricultural individuality, although each image does have much of the participant's personal colour as well. Each of the images describes a part or the whole of the farm's situation, from a different point of view. Often they give indications of some problems and, when care-

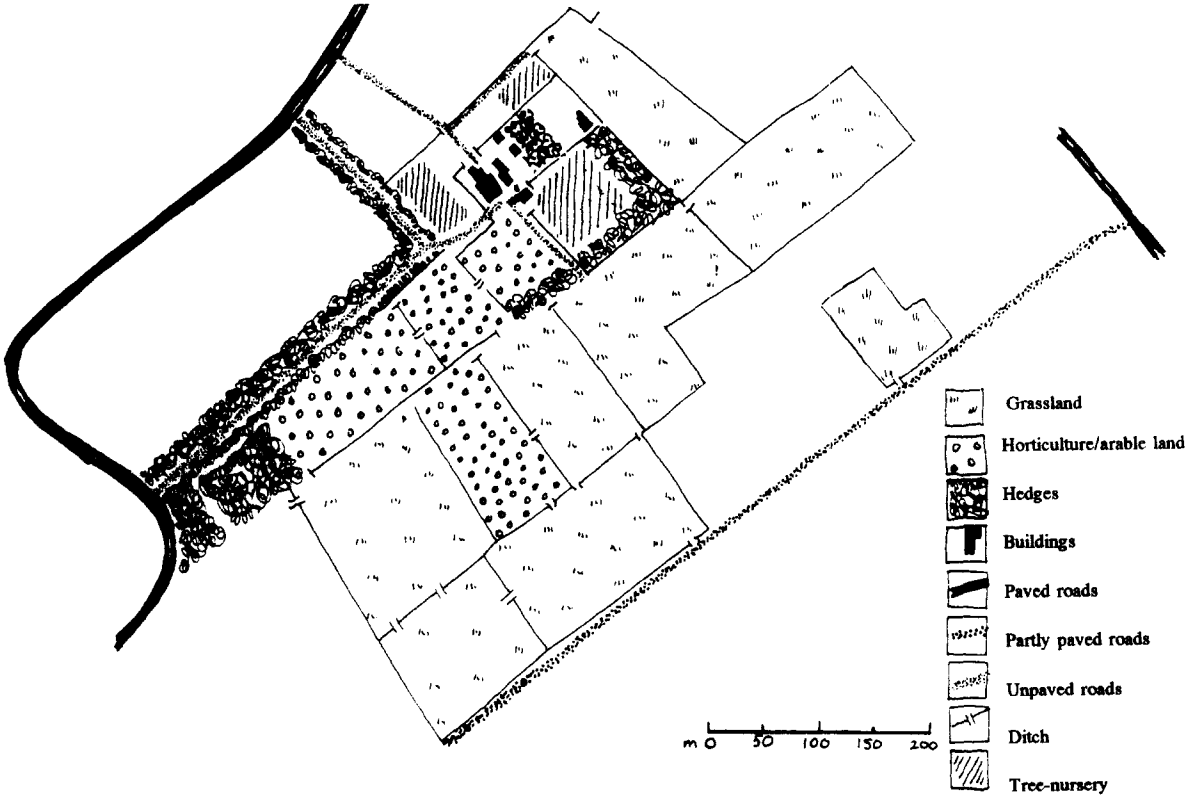

Fig. 2. Lots and their use, farmyard, hedges and forest.

fully scrutinised, some solutions also. Examples of these images are given later.

3.2.2. From directions for development to concrete proposals

To proceed from the directions for development to concrete proposals for action, the farm landscape in the surrounding landscape is studied, in cooperation with the farmers. We use three levels of description:

- the present landscape;
- the processes and trends in the history/biography of the landscape;
- characteristics emerging from the descriptions.

In the present landscape we look for polar (opposed) qualities. This offers us the possibility of formulating directions for change more clearly. For example, the landscape surrounding the farm is seen as too wet and cold (the qualities of the polder), lacking light and warmth (the qualities of the dunes). Based on such statements it can be seen whether elements inherent to the dunes can be introduced, to improve the quality of the farm as a whole.

When we describe and characterise the processes in the landscape in this qualitative way, within its biography (agricultural, cultural and geomorphological development), we enable ourselves to imagine the direction in which these processes will possibly go. Thus, we can become aware of options on how they can be stimulated, changed or inhibited.

In this way, directions for development are translated step by step into concrete proposals that follow 'logically' from both the farm individuality and the landscape and support the identity of the farm landscape.

Proposals for improvements, formulated by the researchers, are discussed with the farmers/participants and accepted or changed accordingly. This procedure is repeated until the farmers, as the relevant experts in charge, accept the proposals for implementation.

4. An example: the Noorderhoeve farm

The Noorderhoeve farm is used as an example to elaborate on some aspects of our approach.

Noorderhoeve is a mixed, biodynamic farm, where five people work on 18 ha. The farm is situated between the villages of Schoorl and Bergen in the northwest of the Netherlands, close to the North Sea on a transitional area between dunes (elevated, dry and sandy) and polders (low, wet and acid, clayish) (see Fig. 1). It is a rather extensive, mixed farm, with very low nutrient and energy inputs. For both phosphate and potassium, output is higher than input. Nitrogen is mainly supplied by the farm's own manure and nitrogen fixation by leguminous crops, making the farm highly self-sufficient.

The farm has been in existence since 1981, when it was 8 ha in size. After gradual growth, it attained its present size of 18 ha in 1988. There are plans for further growth. A wide variety in farm and non-farm activities characterise the farm throughout the year (e.g. Waldorf-school classes, therapeutic work). In 1992 the farm (see Fig. 2) had 12.5 ha of grassland (mostly in the polder), 3.5 ha of arable land and horticulture (near the farmyard on the sandy soil), an orchard and tree nursery (50 ha) and gardens for medicinal plants and flowers. In addition there were

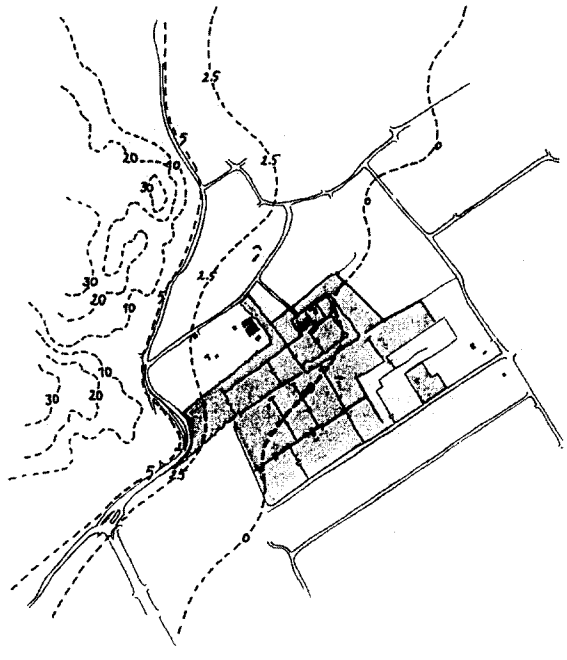

Fig. 3. Land relief around the Noorderhoeve. The 0 m NAP line runs through the farm. This line also reflects the limits between more sandy and more clayish lots (from Hendriks and Stroeken, 1992).

2 ha of woodland and hedges. Livestock comprise 12 hand-milked dairy cows plus young stock, about 20 sheep and some chickens. Bulls were kept for breeding and nearly all calves for meat production. At one time, bees were kept, but without success. The farmers' care for nature on the farm is demonstrated by the fact that they bought 2 ha of woodland in 1988. They felt that such an element was lacking in the farm's 'organism'.

As indicated above, the landscape of the Noorderhoeve has some polar characteristics. On the farmland a gradient exists between high, dry, poor sand (original dune) in the west and low, wet and acid clay (original sea) in the east (see Figs. 3 and 4). Between these areas, the transition zone is characterised by elements such as small woods, hedges, many ditches and the ecological specialty of this area, the so-called 'duinrellen' (dunebrooks; little streams of clear seepage water from the dunes).

The transition zone was very wet until the last century (see Fig. 4). Because the groundwater level has been lowered (due to the extraction of drinking water), the amount of seepage water from the dunes has diminished. Nowadays, most duinrellen have little or no water at all. The government has developed plans to renew some of these duinrellen. One

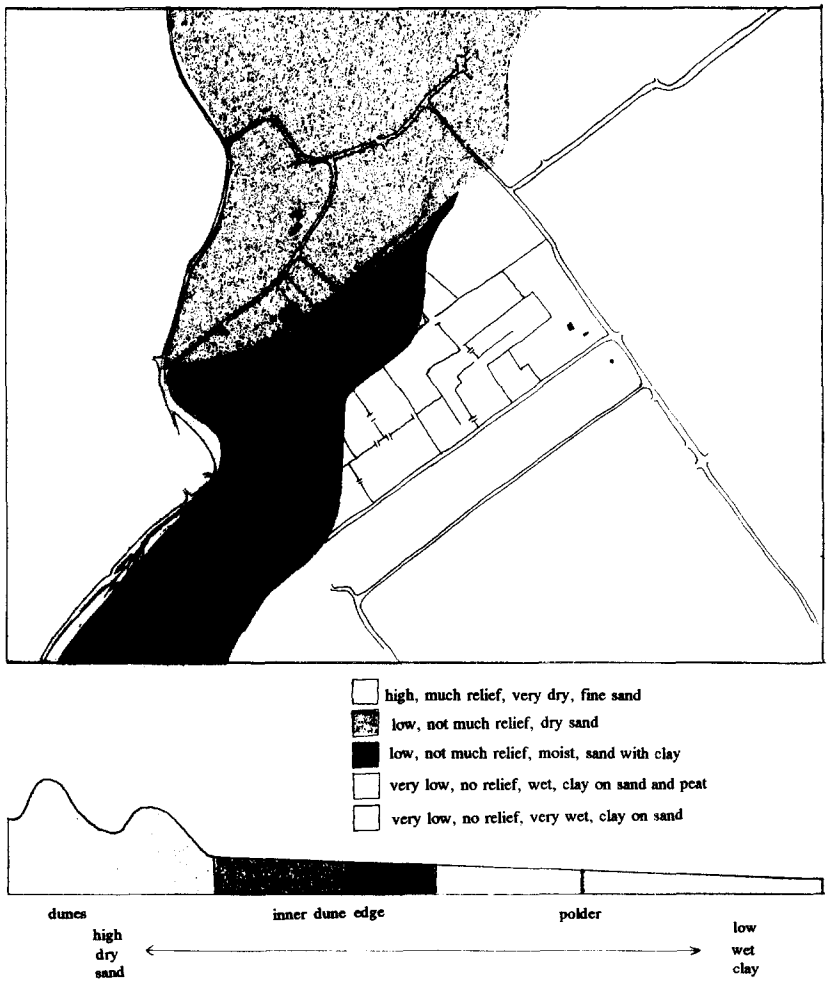

Fig. 4. Soil conditions around the Noorderhoeve (from Hendriks and Stroeken, 1992).

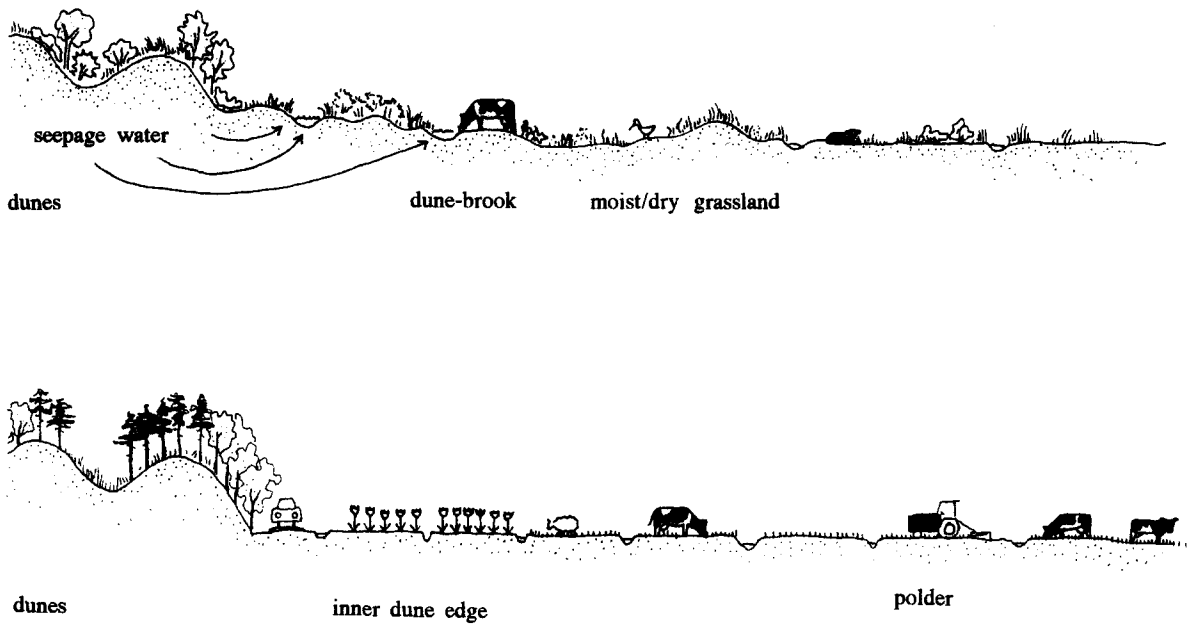

Fig. 5. The original and present situation of the dune edge.

small, continuous flow of water from the dunes into the polder still flows through the farm (see Fig. 5).

The inventory revealed that the farmers faced problems with the soil (acidity and structure, stagnant water on the soil surface), the water (quality) and livestock health (cattle and bees). Sources of the

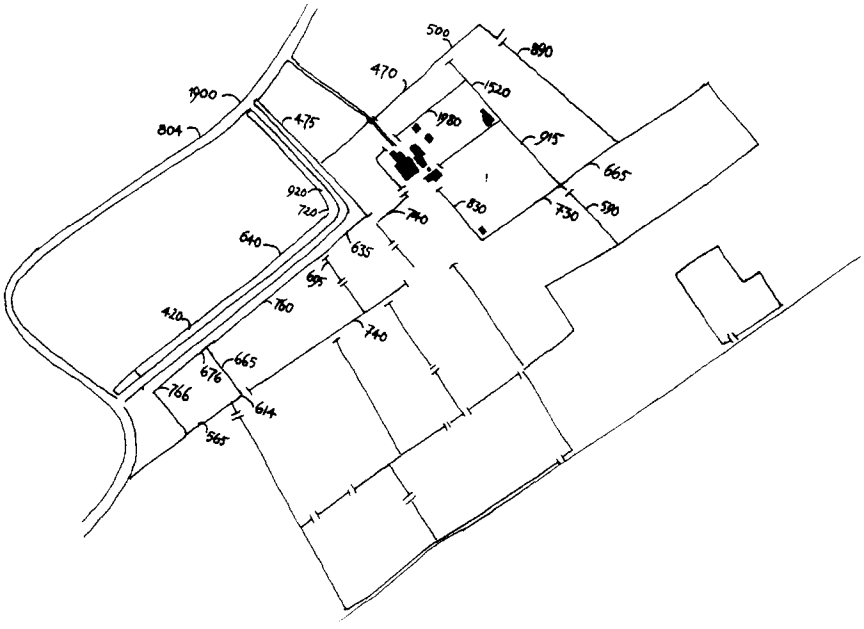

Fig. 6. The electrical conductivity of the water (in μS) around the Noorderhoeve. High values indicate high concentrations of ions.

water problem were waste water from the conventional neighbouring farm (I), the riding school (II) and the farms' own manure store (III) (see Figs. 6 and 7).

4.1. First impression, present, past and characteristics

Here only a summarised version of the full first impression is given, focusing on some main characteristics. However, some examples of full descriptions are included, so as to give an impression of the method in full, not only of the results.

In the first impression, the observer is explicitly present and part of the observed. For example: "On a cold, sunny day in spring, we made a stroll around the farm. While walking on the grassland we notice that the soil is hard and tough, it does not feel 'elastic'. All plots show different shades of green, however bluish-green is lacking". Further on: "On the sandy parcels for the horticulture we notice that the atmosphere feels different, warmer. We are struck by the difference we experience between walking on the loose sand and the sturdy clay".

In the description of the present situation facts are given: such and such plants, soil types, number of cows, minerals in the soil and the water, the water level, etc. Maps of land-use, soil types and profiles, etc. are placed on the table. In the description of those facts the observer is not included, but takes the position of an outsider.

In the description of the past and of lines of development, the development of the farm, the soil, water and vegetation is presented. The farm originated in 1978 from a therapeutic initiative, and part of the farm was bought in 1981. Of the time before this, little was known among those present. However, some were aware of the fact that the soil development could be traced as far back as 3000 B.C. According to geomorphological information, the clay was deposited around that time.

Also, to characterise the farm (low external inputs, nitrogen fixation and recycling, making the farm highly self-supporting, see above), appropriate data had to be collected. In this case, for example, a mineral balance has been made.

While evaluating these 'ways of looking', one can see that at first the observer is part of the description,

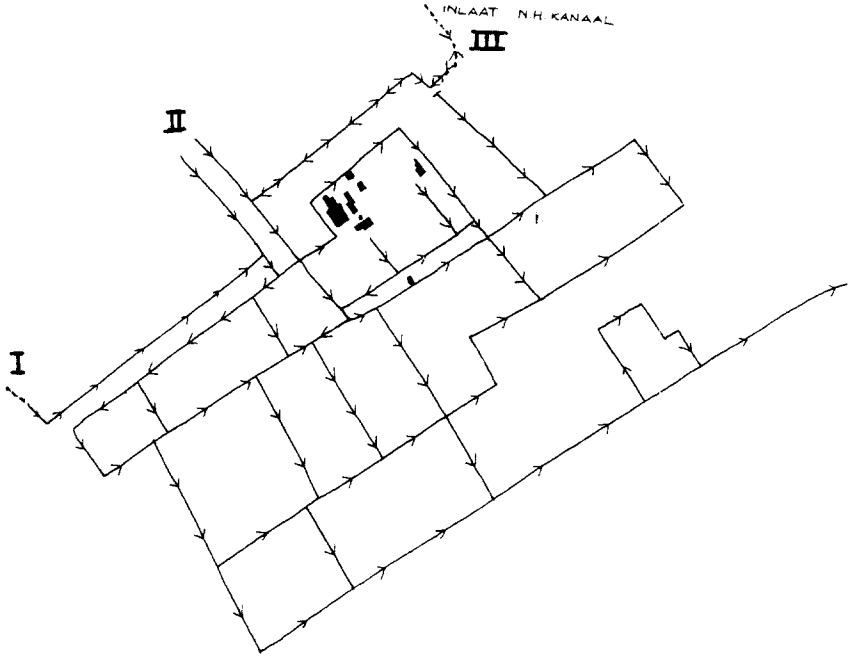

Fig. 7. Direction of the course of the water around Noorderhoeve. Three waterflows exist. One is fed by dune water, a second comes from the west and the third is in contact with the inlet from the Noordhollands canal.

then he stands apart from what he observes. In the description of the history, the lines of development emerge as being brought about by his actions on the farm (they reflect his previous actions, now observed as facts outside the observer, in a self-refection). The characterisations of the farm are a product of further 'reflective externalisation' by the observer, now regarding his personal appreciations and motivations interacting with the local situation, as expressed in the farm's character. Thus, in the course of these steps, the farmer as observer, gets more and more consciously involved in the picture of the farm as perceived, but here increasingly so on the basis of clear facts and figures, and after gradually abstracting himself as observer (farmer) from the observed (the farm) into an outsider position.

Much of the information brought together in this study was provided by the farmers from the begin-

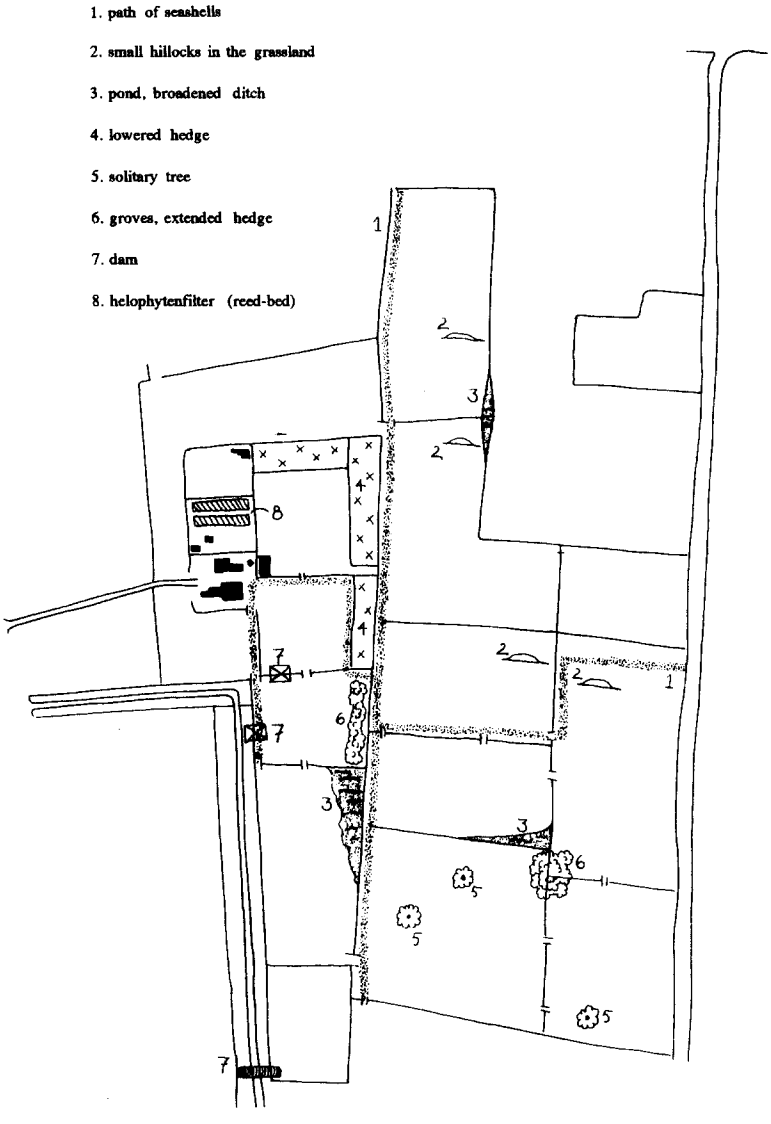

Fig. 8. Summary of proposed changes.

ning. During the first farm walk with them, they showed us many things and told us about the past and present, about problems and successes, indicating future options, etc. Our job as scientists was mainly to support the farmer(s) in ordering the information, to obtain a clearer view of the whole.

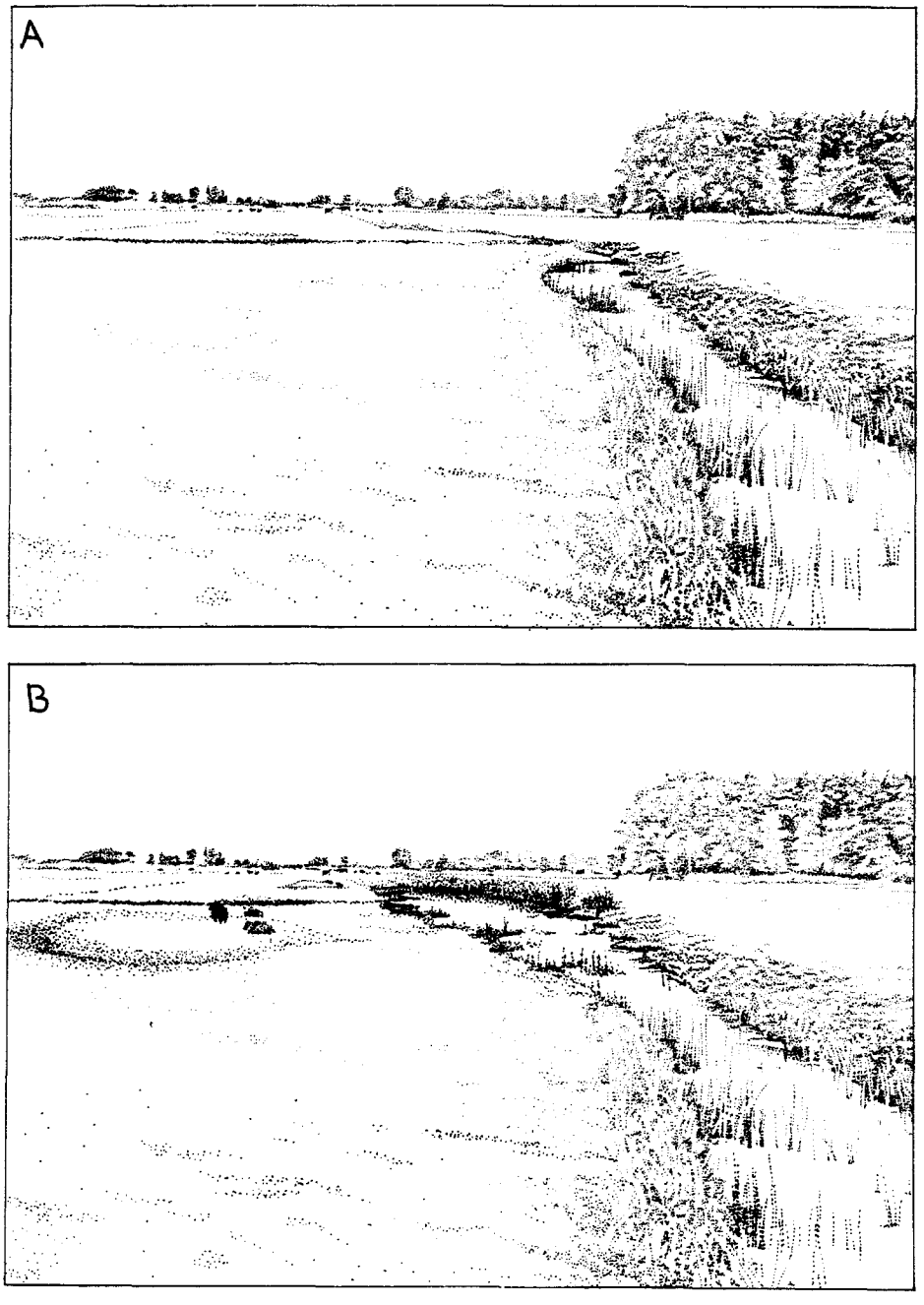

Fig. 9. Small hillocks in some pastures and a broadened ditch: (A) present situation; (B) new situation.

4.2. Searching for direction for development: examples from working sessions

As a preparation for the last working session in this participative research process, everyone was asked to make as complete a mental image as possible of the farm. Subsequently, they were asked to clear their minds (to let the image fade away) and to wait for whatever symbolic image might emerge instead. These images were then mutually reported on and considered. Here, some examples of such 'symbolic images' are presented.

Some saw the farm's symbolic image as a little ship, 'a nut-shell'. To them the image reflected the farm floating on the water flows underneath, as well as the livestock's 'liver rot' and hoof diseases, caused by excessive wetness.

Someone else saw the farm as a sleeping giant, his head in the grassland and his belly (stomach) in the farmyard/house. The high and overgrown hedge between grassland and horticultural area made the giant appear as absent/asleep, as head and stomach were separated areas, not communicating with one another. To that person this image indicated that the farm feels incomplete, failing to be a whole, and therefore in need of waking up to come together, to unite again. Thus, the symbolic image provided a 'direction for change'.

Another symbolic image of the farm was that of a cow suffering diarrhoea: the matter in its intestine streaming too fast and the cow standing poorly on its feet (hooves). This image was found to express an awareness that the ratio between growth and quality is out of balance, with growth dominating. In other terms, this was expressed as the elements of light and warmth being subordinated to water and cold. This was specified as an excessive prevalence of polder qualities (wet and cold) on the farm and too few dune qualities (warm and dry). The same imbalance was seen to be reflected in the unsuccessful beekeeping, as in biodynamic literature bees are perceived as strongly connected to the element of

Fig. 10. Reduction of the overgrown hedge to a lower hedge: (A) present situation; (B) new situation.

warmth. These images were understood as clearly indicating the need for development towards 'strengthening the farm's dune character'.

Finally, when reflecting on the farm, the participants concluded that it was growing slowly but steadily, thereby becoming increasingly diverse, but nevertheless retaining its self-sufficiency, and without surpassing the 'measure of man'. This was un-

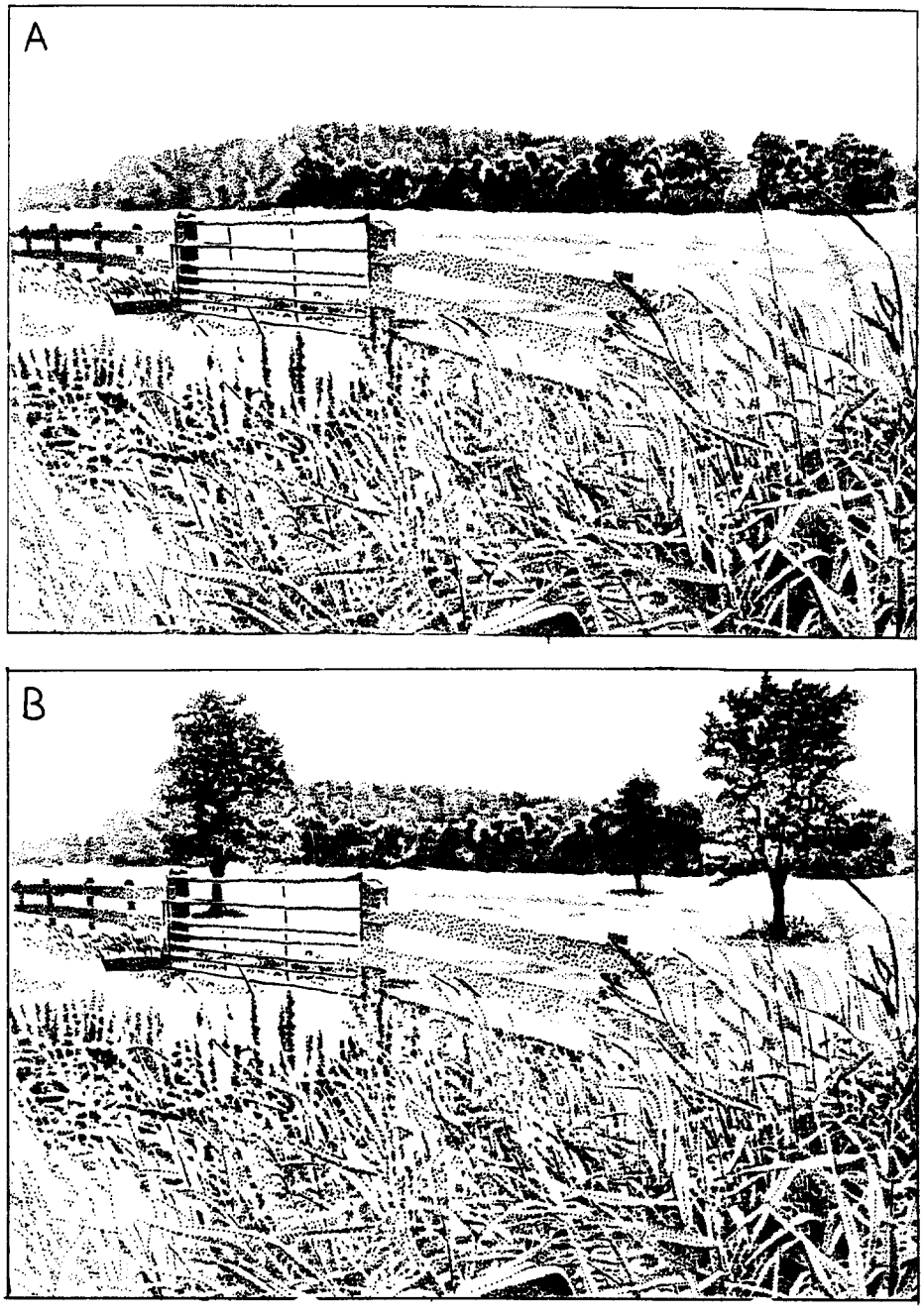

Fig. 11. Solitary trees in some lots: (A) present situation; (B) new situation.

derstood by the participants to mean that the farm individuality of Noorderhoeve develops itself little by little, with steps that can be incorporated without losing control. They perceived the biography's image as meaning that changes should not be too large or rapid.

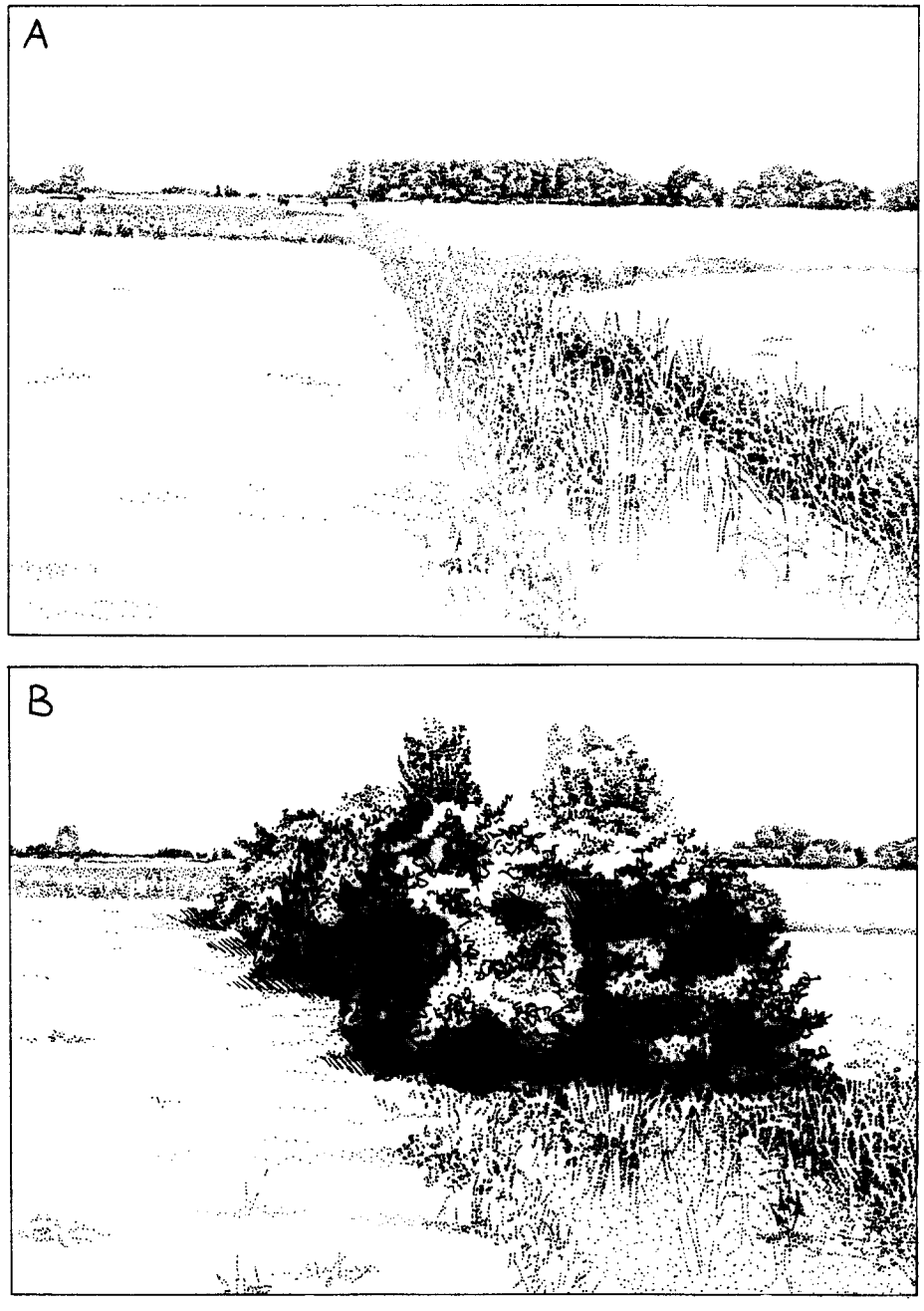

Fig. 12. The planting of a group of shrubs on the intersection of some fields: (A) present situation; (B) new situation.

4.3. Steps from the directions for development to concrete proposals: problems as an opportunity to develop the farm individuality

From a biodynamic point of view, agricultural problems are seen as dysfunctions of the farm organism. In this perception, these dysfunctions represent challenges and opportunities for the ongoing development of the farm individuality. In finding appropriate solutions to the problems, we help the farm individuality to develop, thereby strengthening the identity of the landscape. Thus, both farm and landscape are improved at the same time! This overall effect is rather different from that of many measurements applied in the last decades, where farm improvements often proved unsustainable and were accompanied by considerable landscape degradation.

To summarise, we list the problems of the Noorderhoeve and describe the solutions developed in cooperation with the farmers.

4.4. Problems identified

The following problems were identified:

1. soil quality: acidity was too high and there was poor soil structure on the clay;
2. water quality: excessive nutrient content;
3. livestock health: problems because of the high level of moisture in the polder grassland;
4. grassland quality: trampling hampers the cattle's access to the grassland in the shadow of the hedgerow;
5. farm structure: a too high, overgrown hedgerow disturbs the farm's 'unity';
6. farm micro-climate: beekeeping hampered by cold and moisture.

4.5. Solutions developed (see Fig. 8)

The path from the farm into the fields will be improved with a mixture of seashells and clay. This

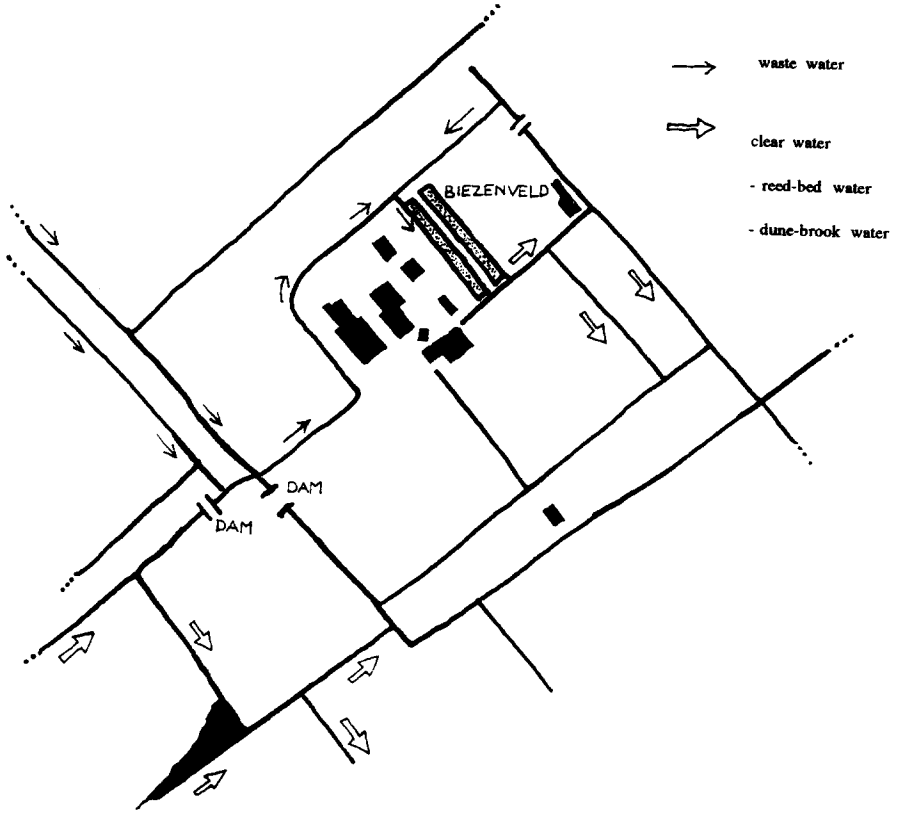

Fig. 13. The course direction of the waste-water and the purified water.

will solve the problem of trampling (4) and, as the seashells will be spread by the cows over the land, improve (decrease) the acidity of the soil (1). In this way also an acidity gradient will be established by the cattle, from the path to the surrounding land. This is of ecological interest (increased biodiversity). In this way, an element inherent to the dunes is used to solve problems in the polder.

The grassland will be raised a little by making hillocks about 3 m high (see Fig. 9). This will be done by using the soil made available from deepening and broadening some of the ditches. Thus, drier places are created, where the sheep and cattle can lie down. This may solve health problems related to the grassland's wetness (3). Excavating the ditches gives the water more of its own place in the farm organism, strengthening the soil–water gradient. This is also of ecological interest (increased biodiversity).

The high hedgerow growing across the farm will be cut back, emphasising the growth of flowering shrubs for the bees (6) and a few outgrown trees (see Fig. 10). Some solitary trees will be planted in the meadows and on the outskirts of the neighbouring village, Bergen (see Fig. 11). These trees will improve the transitional character (identity) of this area. At the intersections of some fields, groups of shrubs will be planted (see Fig. 12). These measurements will help to strengthen the farm's unity (5).

A new water flow system and a helophyte filter (reed bed) will be constructed (2). By building new dams in some ditches and digging some culverts, the course of the water will be changed. Clean water from the dunes, poor in minerals, will no longer be mixed on the farm with eutrophic (nutrient polluted) water. The clean water is to feed directly into the ditches on the farmland (see Figs. 13 and 14). A helophyte filter system will be built to clean the polluted water coming from the neighbouring farm as well as the waste-water from the farm itself. The clean effluent will flow through the farmland. These measurements solve the waste water problem and improve the diversity of natural elements on the farm's water quality gradient. They will strengthen the landscape's identity, as the (water)plants in the ditches form the main nature element in the polder.

5. Discussion

The example of Noorderhoeve shows how conventional science and Goethean-phenomenological approaches, as used by the Louis Bolk Institute, can complement each other, when used in cooperation with participating farmers. The conventional inventory helped to identify the soil, water and animal health problems on the Noorderhoeve. The typical Goethean contribution provided the symbolic images and the characterisations of the farm and the landscape, which gave direction to the search for improvements. These images expressed the feelings and ideas of the people working on the farm and in the landscape. The 'directions for development' in the symbolic images are the 'answer' to the problems of the farm Noorderhoeve, as perceived by those in-

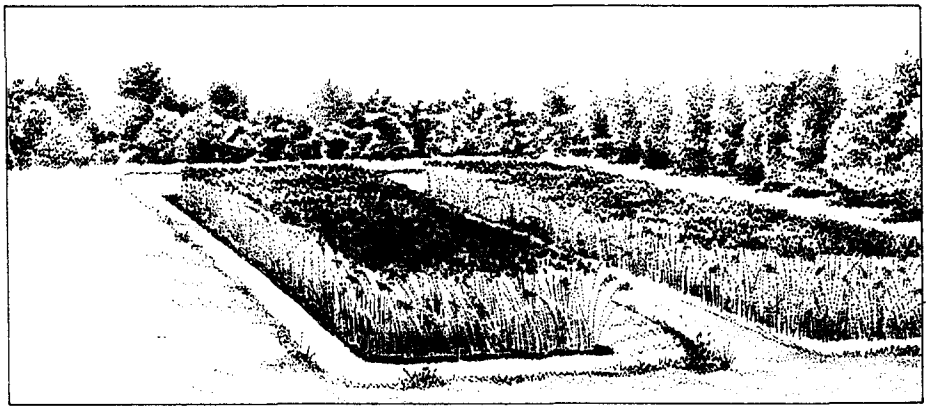

Fig. 14. The helophyte filter (reed bed).

volved. At the same time, such images apparently provide criteria for choosing appropriate improvements.

Characterising the landscape revealed opportunities to implement the directions for change into concrete proposals, that can support the identity of the farm and the landscape of this area (genius loci).

The solutions found in this way provide agricultural benefits together with ecological improvements.

6. Implications of our method for finding criteria and setting standards

The goal of the concerted action referred to in this volume is to formulate a set of criteria for developing sustainable agro-landscapes.

From the different ways available of making landscape plans, our institute has chosen to optimise the situation of an existing farm. The concept of farm identity or farm individuality, ideally based on a healthy farm organism, has been used as the main criterion.

Using the concept of farm identity means that we have to cooperate with the farmers. They are part of the old identity of the farm landscape which they have helped to generate and they have to identify, design and accept the new one. Therefore, farmer participation, cooperation between farmers and nature-organisation, for example in so-called 'environmental cooperations' should be stimulated by EU regulations.

For the second criterion, the healthy farm organism, we think that we have to specify 'a manyfold of healthy farm organisms'. This means that not just one, but many styles of farming can be sustainable and can contribute to nature and landscape diversity and identity on a farm and in the region.

In this study it was found that the biodynamic terms 'farm individuality' and 'healthy farm organism' can be translated into common scientific terms. Looking at the example of the Noorderhoeve, a list of the criteria used can be made:

- strong identity;
- positive agricultural, aesthetically and ecological qualities;
- a place where it is pleasant to work and livelihood is appreciated;
- positive soil and water quality;
- positive animal health and welfare.

This list does not deviate greatly from the list of criteria for good landscape quality established by the Dutch national government (LNV, 1992). Looking at those requirements for a high landscape quality and comparing them with those found on biodynamic farms (Hendriks and Stroeken, 1992), biodynamic farms perform quite well. They fulfil the main criteria, showing:

- a sustainable use of land and other resources;
- a strong relation between abiotic conditions and vegetation (including crops);
- a high diversity in land uses (crops and husbandry) and in elements of nature on the farm;
- a strong (own) identity of the farm.

Criteria of this kind have already been formulated by landscape architects of different countries and it should be easy to draw up a list to be agreed on. The real problem is how to implement these criteria at farm level and how to stimulate implementation by EU regulations. A subsequent, difficult problem is to find the key factors influencing the amount and quality of nature and landscape desired and required on farms in general, and on organic and biodynamic farms in particular. They can be partly formulated as agro-landscape standards extending the agricultural ones. However, the main issue will be socio-economic criteria and regulations, as landscape is a mirror of society, made by its farmers (Bockemühl, 1992; Hazendonk, 1994). Therefore, process criteria such as farmers' participation in the landscape planning process will be important. Our method is an example of how one can work at farm level, in cooperation with the farmers, to create new landscape identity, in accord with the surrounding landscape. It would be interesting to develop similar approaches at a larger scale: to create a new regional landscape identity in cooperation with the people involved. Here, as in our farm-level example of the Noorderhoeve, landscape identity of landscape does not only exist as an 'object identity' but also as a 'subject identity', being the identity as experienced by the people involved (Boerwinkel, 1994). In our view, EU regulations should stimulate this kind of landscape planning methods, and not so much single issues as for example a certain number of birds, trees or hedges.

References

Baars, T. and van Gelder, T., 1994. Noorderhoeve: plan voor landschappelijke inrichting. Louis Bolk Instituut, Driebergen, 117 pp.

Bockemühl, J., 1977. Elemente und Aether-Betrachtungsweise der Welt. In: J. Bockemühl et al. (Editors), Erscheinungsformen des Aetherischen. Freies Geistesleben, Stuttgart, 197 pp.

Bockemühl, J., 1992. Erwachen an der landschaft. Freie Hochschule für Geisteswissenschaft am Goetheanum, Dornach, 320 pp.

Bockemühl, J., 1993. Kann ein holistischer Ansatz im Umgang mit Landschaft formuliert werden? In: J.D. van Mansvelt and J.F.H.M. Vereijken (Editors), Proc. of the Try-out Workshop: Values Assessment in Environment and Landscape Research. A Meeting with the Goethean Approach. RIVM Rep. 607042001, Bilthoven, pp. 16–25.

Bockemühl, J., 1994. Die Landschaft als Ganzes; Ansätze für zukünftiges Handeln. In: N.F.C. Hazendonk (Editor), Landschap, Spiegel of werkelijkheid. Verslag van een Symposium over Landschapsfenomenologie. Werkdocument IKC-N nr 67, IKC-Natuurbeheer, Wageningen, 86 pp.

Boerwinkel, H., 1994. Identiteit in de landschapsplanning. Een begrip in identiteitscrisis. Landschap 94, 11/4, Den Haag, pp. 33–42.

Bokhorst, J.G., 1991. Het sturen van levensprocessen in de bodem. Internal paper, Louis Bolk Instituut, Driebergen.

Braat, R.H. and Vereijken, J.F.H.M., 1993. Het effect van de biologische landbouw op natuur en landschap. Een literatuuroverzicht. RIVM-rapp. nr 77300001, Bilthoven, 43 pp.

Colquhoun, M., 1993. Studying place. An exploration into the use of Goethean science as a methodology for landscape assessment. In: D.J. Stobbelaar and J.D. van Mansvelt (Editors), Proc. of the 1st Plenary Meeting of the EU-Concerted Action: The Landscape and Nature Production Capacity of Organic/Sustainable Types of Agriculture. Agricultural University, Wageningen, pp. 152–172.

Hazendonk, N.F.C. (Editor), 1994. Landschap, Spiegel of werkelijkheid. Verslag van een Symposium over landschapsfenomenologie. Werkdocument IKC-N nr 67, IKC-Natuurbeheer, Wageningen, 86 pp.

Hendriks, K. and Stroeken, F., 1992. Verschil in verschijning. Een vergelijkende studie naar biologische en niet biologische landbouwbedrijven. Agricultural University, Wageningen, 109 pp.

Koepf, H.H., Kaffka, S. and Sattler, F., 1989. Nährstoffbilanz und Energiebedarf im landwirtschaftlichen Betriebsorganismus. Forschungring für BD-wirtschaftsweise, Darmstad.

Klett, M., 1992. Het landbouwbedrijf als organisme. BD-vereniging, Driebergen, 29 pp.

Kuiper, J., 1993. Two strategies of landscape planning in a stream valley. In: J.D. Stobbelaar and J.D. van Mansvelt (Editors), Proc. of the 1st Plenary Meeting of the EU-Concerted Action: The Landscape and Nature Production Capacity of Organic/Sustainable Types of Agriculture, Agricultural University, Wageningen, pp. 101–112.

Kunz, P. and Karutz, C., 1992. Pflanzenzüchtung dynamisch. Die Züchtung standortangepasster Weizen- und Dinkelsorten. A.G.F., Dornach, 164 pp.

LNV, 1992. Nota Landschap. Regeringsbeslissing Visie Landschap. Ministerie LNV, 's Gravenhage, 161 pp.

Steiner, R., 1924. Geisteswissenschaftliche Grundlagen zum Gedeihen der Landwirtschaft. R.S.V, Dornach, 256 pp.

Vahle, H.C., 1993. Die Idee der Kulturlandschaft. In: J.D. van Mansvelt and J.F.H.M. Vereijken (Editors), Proc. of the Try-out Workshop: Values Assessment in Environment and Landscape Research. A Meeting with the Goethean Approach. RIVM Rep. No. 607042001, RIVM, Bilthoven, pp. 26–34.

Van der Ploeg, J.D., 1991. Landbouw als mensenwerk. Coutinho, Muiderberg, 328 pp.

Van der Ploeg, J.D. and Roep, D., 1990. Bedrijfstijlen in het Zuidhollandse Veenweidegebied, nieuwe perspectieven voor beleid en belangenbehartiging, KLTB, Haarlem, 98 pp.

Van der Werf, P.A., Baars, T. and Oomen, G.J.M., 1995. Nutrient balances and measurement of nitrogen on mixed ecological farms on sandy soil in the Netherlands. Biological Agriculture and Horticulture, Vol. II. AB Academic, Bicester, UK, pp. 41–50.

Vereijken, J.F.H.M., 1988. Het hoofdstuk graslandonderzoek in: Wat kan een vlinder zeggen over het landschap. Doctoraalverslag alternatieve landbouw LUW, pp. 26–47.

Vereijken, J.F.H.M., 1995. Indentiteit, een uitdaging voor het landschapsbeheer. De mogelijkheden van de fenomenologie. Article in annual report 94/95 of the Louis Bolk Instituut, LBI, Driebergen.

Vereijken, J.F.H.M. and van Gelder, T., 1995. Warmonderhof, plan voor de landschappelijke inrichting. Louis Bolk Instituut, Driebergen.