

Some criteria for landscape quality applied on an organic goat farm in Gelderland, the Netherlands

K. Hendriks ^{*}, D.J. Stobbelaar, J.D. van Mansvelt

Department of Ecological Agriculture, Wageningen Agricultural University, Haarweg 333, 6709 RZ Wageningen, Netherlands

Abstract

In the framework of the Concerted Action 'The Landscape and Nature Production Capacity of Organic \ Sustainable Types of Agriculture', the authors visited the organic goat farm Capricas to test some criteria on farm level. Ten, mainly cultural, criteria had been selected because they were related to the field of work of the authors. The aim was to test the usability of the criteria in order to assess the farm's contribution to landscape quality. Data were gained during a day of fieldwork by direct observations, an interview and survey of the literature.

The ten criteria appeared to be useful for describing the features which influence landscape quality. However, for measuring these criteria a clear reference is needed, which was not available in this exercise. Therefore, only a global valuation of the farm's contribution to the landscape quality can be given so far. © 1997 Elsevier Science B.V.

Keywords: Rural landscapes; Landscape quality; Methodology; Organic farming; Goat farm; The Netherlands

1. Introduction

With respect to the quality of rural landscapes, we consider agriculture to be an important force behind the appearance and features of those landscapes. Over past centuries, farmers occupied and created rural landscapes which we now think are very valuable. However, agricultural activities of the last decades have rarely created landscapes we are proud of. So the question is: how can farmers again create landscapes which are of more than economic value and which produce more than food and fibres?

From a Concerted Action in 1993 (Stobbelaar and van Mansvelt, 1994), a set of criteria for landscape quality of rural landscapes and farms was produced.

In the framework of this Concerted Action the authors visited the organic goat farm Capricas, in the province of Gelderland, to test the usability of these criteria on farm level. The method used to test them was improvised and is therefore under discussion. There was one farm visit in November 1994, consisting of an interview with the farmer, a walk around the farm and a tour through the area. Information was gained by direct visual observations. No quantitative features were measured. In this exercise we could only highlight one farm, so comparative results could not be reached.

2. Method

To test the usability of criteria for landscape quality, we started to study the criteria mentioned by

^{*} Corresponding author. Tel.: +31 317 485064; telefax: +31 317 484995; e-mail: derk.janstobbelaar@users.eco.wau.nl.

the participants of the first meeting of the Concerted Action in 1993 (Stobbelaar and van Mansvelt, 1994). Out of these criteria we selected ten which related to our field of work. Most of these criteria have a cultural meaning. During the course of 1 day's fieldwork, an inventory of the farm and its surroundings was made. An interview with the farmer gave the most necessary information about the farm management and its history. During a walk around the farm, information about the appearance of the farm and its surroundings was gathered by direct visual observations. No quantitative features were measured. After this fieldwork the ten criteria were applied to see how they responded to the information gathered. Finally, a survey of the literature was carried out.

For the results on landscape quality to have validity, one needs a reference with which to compare the results. This reference can be formed in three different ways:

1. by other farms in the area;
2. by knowledge of the (history of the) particular landscape type, based on the literature;
3. by policy concerning the (agricultural) use of the area.

The reference used in this exercise is a mixture of these three, as far as information could be gathered in the short period of fieldwork.

The ten criteria are:

1. diversity in landscape components;
2. site related character;
3. coherence among landscape components;
4. historical continuity;
5. seasonal aspects;
6. personal participation;
7. particularities;
8. beauty;
9. environmental quality;
10. ecological quality.

2.1. Diversity in landscape components

On the basis of a study on visual differences between organic and conventional farms there is reason to distinguish diversity on several scale levels and in several aspects of a farm (Stroeken et al., 1993): types of land use, crops, species in pastures and field margins, husbandry, planting, sensorial im-

pressions (colours, sounds, smells), labour, age of elements.

2.2. Site related character

We propose that site related character is understood as the coherence between land use and the sustainable abiotic and biotic features of the area. The main question is: what information does the object (a landscape, an area, a farm or a parcel) give about the characteristics of geomorphology, relief, soil, water, climate, vegetation and fauna of the site?

2.3. Coherence among landscape components

Visual or functional coherence among landscape components (elements, patterns, structures) offers the possibility for 'orientation in space'. This is one of the qualities a landscape should have (Ministerie van Landbouw, Natuurbeheer en Visserij, 1992). The whole question of coherence in a landscape is a difficult one. Everybody has these pre-scientific impressions of coherence, but it is a quite complicated matter to encapsulate them by a scientific method (Van Zoest, 1994). We have to search for new ways to deal with this. For example, a distinction can be made between internal and external coherence. The first describes the relationship among the landscape components within the farm. This is, for example, the coherence between the function and the geographic situation on the farm (soil bound production). The latter describes the relationship between the landscape components on the farm and those of the surrounding area.

2.4. Historical continuity

Besides orientation in space one can consider 'orientation in time' as a quality of the landscape (Ministerie van Landbouw, Natuurbeheer en Visserij, 1992). This means that features of the past can be found in the landscape of today, in specific elements and patterns. Not only the presence of separate features but also their mutual coherence or coherence with present features is important to offer orientation in time (Dijkstra and Klijn, 1992).

2.5. Seasonal aspects

Seasonal aspects play a part in the perception and valuation of landscapes of people (Coeterier, 1987). Features such as the colours of leaves, flowering of plant species and agricultural actions on the land all impart some information about the season. Stobbe-laar (1992) found a negative relationship between the external input in land use and the landscape's manifestation of the course of the year. This course of the year is a part of 'orientation in time' as well.

2.6. Personal participation

Development of the site as a result of personal participation of farmers and residents (including consumers) in the process towards a sustainable rural landscape, is considered to be a quality of a landscape. Where the local people demonstrate an engaged commitment with the landscape, this is visible in the landscape, as is its absence—in the case of the inhabitants' disinterest and alienation.

2.7. Particularities

These are those features which strike the observer when looking at the object: features which are not very common in the area and give the object a special character. They enrich the image, without destroying its contribution to the general landscape type. This is a case of 'diversity in coherence'. Particularities are crucial aspects of the farm identity.

2.8. Beauty

This criterion comprises personal appreciation of the positive impressions of the object, obtained mostly by sight and to a lesser extent also by hearing, feeling or smelling.

2.9. Environmental quality

This issue encompasses three sub-criteria necessary for a clean environment: clean air, clean water and soil conservation.

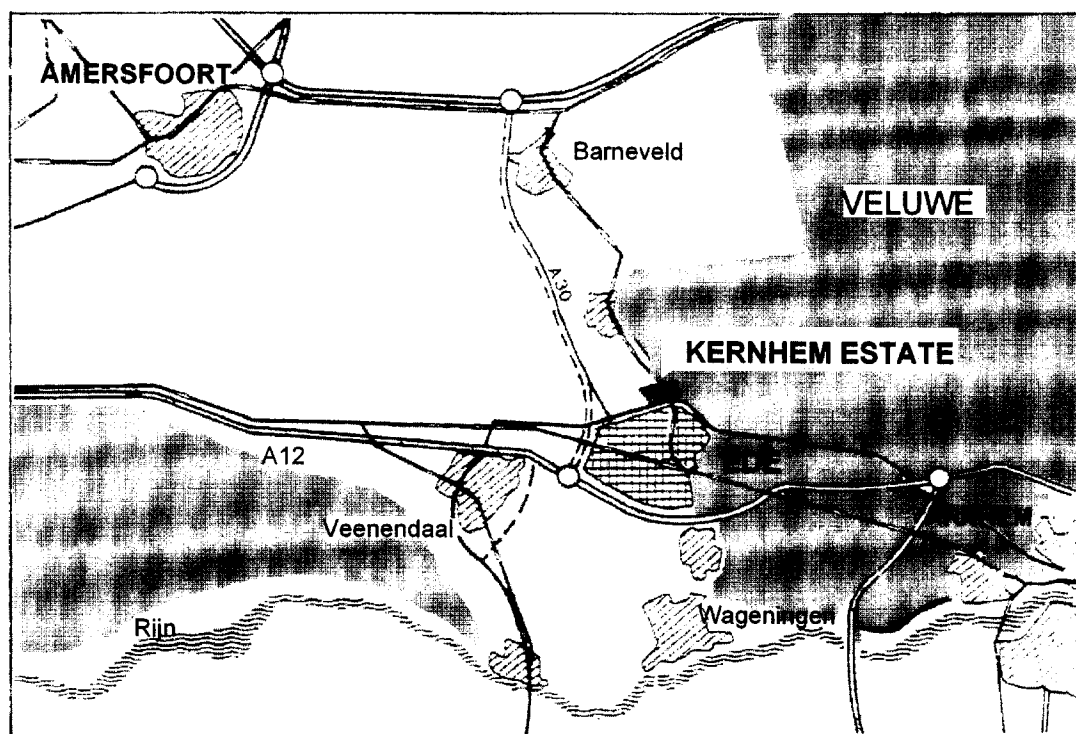


Fig. 1. Location of the farm in the region.

2.10. Ecological quality

Ecological quality refers to biodiversity in species, biotopes and ecosystems; ecological processes such as decomposition, life cycles and succession; eco-regulation of pests, e.g. by predator food chains; the application of animal welfare rules in husbandry.

3. Situation of the farm in the landscape

3.1. Geomorphology and occupation of the area

Capricas is an organic goat farm which is part of an old estate named Kernhem, property of the Municipality of Ede. The Kernhem estate is situated on the edge of the Veluwe-massive and, since the middle of this century, on the outskirts of Ede as well (Fig. 1). Understanding the landscape structure of the area can be achieved by studying the geomorphology and the occupation process. Literature used for this section is Gemeente Ede (1990) and Hendriks (1989).

3.1.1. Geomorphology

Abiotic processes had their largest influence in the glacial periods of the Pleistocene (2.5 million years to 0.01 million years ago). In the Saalien period (200 000–130 000 years ago) the ice came from the north into Holland and pushed itself through the valley of Gelderland. This mass of ice pushed up the sides, and on the east side the Veluwe-massive arose. In the later periglacial periods, thick layers of sand were blown over the area, causing gently undulating terrain, called coversand-ridges (Fig. 2).

At this transition from ice-pushed ridge to valley there is a very strong contrast in abiotic circum-

stances. On the ice-pushed ridge there are dark wood soils, on the slope and on the coversand-ridges there are 'enkeerd' soils, changing to peat in the valley (Fig. 2). Water flows both through the ground and through ditches and brooks into a canal in the middle of the valley.

3.1.2. History of occupation

The oldest form of agriculture that took place in the area was shifting cultivation. People wandered through the region, cut down part of the wood (which covered large parts of the Netherlands at the time) and grew crops. When the soil was exhausted they moved on to a new place, in a kind of slash and burn strategy.

The oldest villages and other permanent occupation of the area date from the 5th and 6th centuries B.C. and are located on the slopes of the ice-pushed ridges at the transition between the wet and dry zones. The Kernhem estate is situated here as well. The diversity in abiotic conditions offers the possibility of different types of land use and therefore it was a very attractive location for farming.

At first, people worked on a complex of small arable fields with a rotation system of 3 years. From about 1000 they started to use sods of heath or grass to enrich the poor sandy soils. They used the sods directly on the fields or they laid them first in the deep-pit stable where they were mixed with the manure from cows or sheep. In spring this manure was applied to the land. Thus, the arable fields became enriched but the surrounding land became very poor. Low-lying land was used as haylands and grasslands, and the high lands became heaths. Pressure on woodlands was very high. A more intensive farming system developed and a lot of woodland was

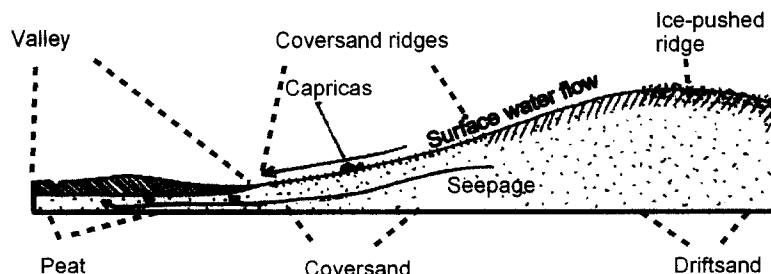


Fig. 2. Section of the area with abiotic features.

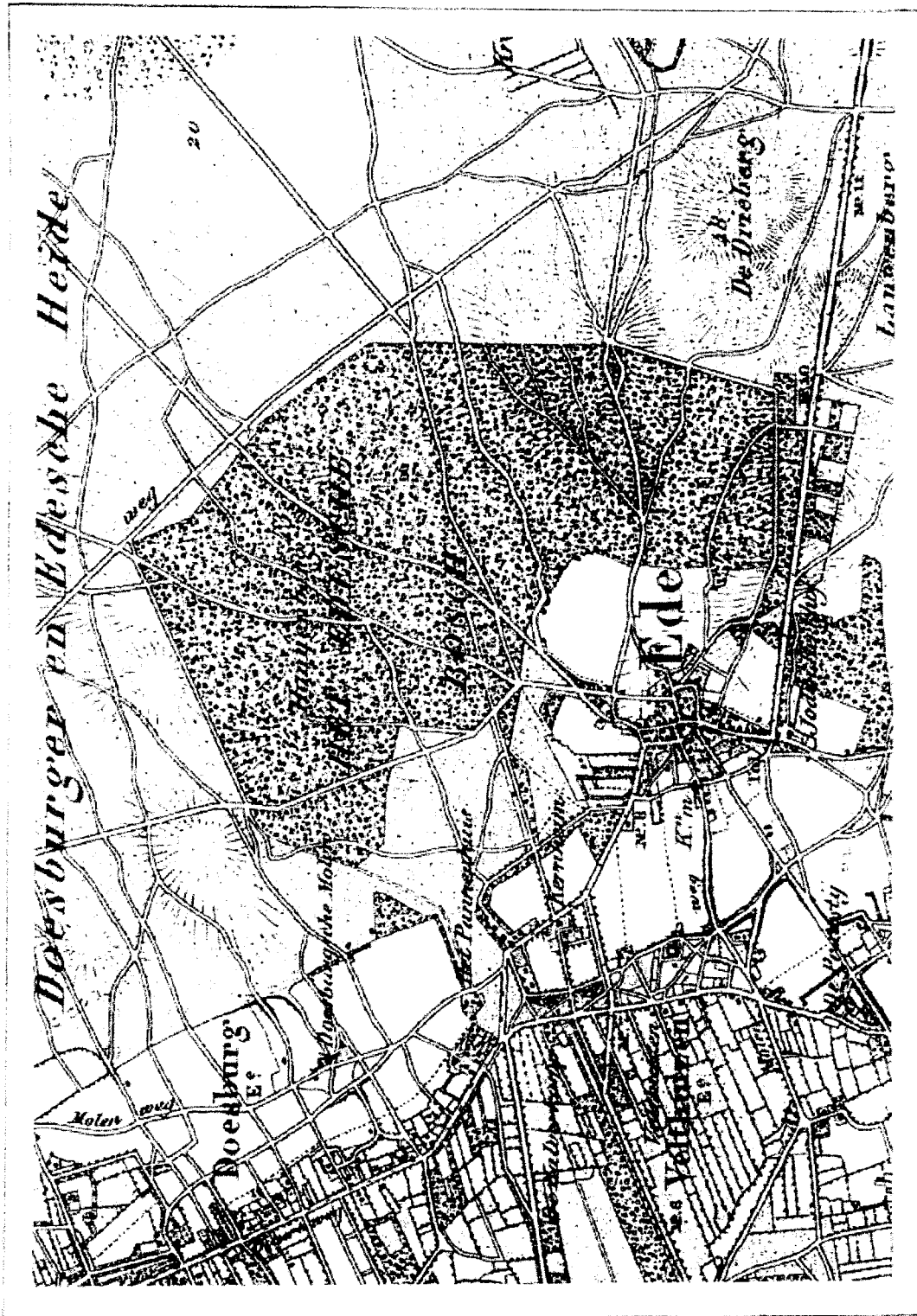


Fig. 3. Topographic map, dated 1850.

cleared for the extension of fields. It was no longer necessary to leave land fallow: an everlasting rye cultivation became possible. In the 13th and 14th century the marsh land in the valley was reclaimed.

In this landscape, which developed during this long, relative steady agricultural period, four different landscape types can be distinguished (Figs. 3 and 4).

1. Wet marsh reclamation landscape: long stretched parcels of land square at the Veluwe massive, with tree planting along fields and roads.
2. 'Enclosed fields' landscape: spread occupation, farms with little enclosed fields, winding paths and lots of planting (rows of trees, shrubs, etc).
3. 'Essen' landscape: small farmer villages on the edge or in the middle of large arable fields surrounded by closed strips of planting to keep animals away. Deciduous forest at the coversand-ridges.
4. Woodland landscape: woodland as part of the largest Dutch forest/nature area (the Veluwe).

3.2. History and present state of the Kernhem estate

3.2.1. History of the estate in the period 1400–1900

The Kernhem estate is mentioned in 1421. It has passed through different periods of garden architecture and owners. In the Middle Ages, the estate was already one of the oldest Dutch estates, consisting of a fortress with a castle and a moat. In the Renaissance (1600–1700), vegetable gardens and a tree nursery were laid out on the outside of the moat.

After that the estate was influenced by the baroque style with a system of avenues of beeches (1732–1735). A labyrinth was laid out at the end of an avenue in the wood. A house replaced the old castle (1800). During the period 1800–1900, gardens were

laid out south and north of the house in the landscape style. Thickets were planted in the west. A pond and a tea house were constructed in these small woods and winding paths led from the house to these places.

Every period in history has added something new to the structure of the estate, without destroying the main structure of the former period. There is a strong historical continuity, an increasing diversity of landscape components and still a large coherence among landscape components.

3.2.2. History of the estate from 1900 to the present

Until 1900, different landscape types were relatively clear and visible in the area (Figs. 3 and 4). The house of the Kernhem estate had a central position in open, arable fields and was surrounded by avenues and strips of wood. Between the estate and the wood there was heath. Social and economic developments were slow. After 1900, however, rapid changes took place. The readability of the landscape, caused by a clear relation between natural circumstances and human activities, faded away. The most important spatial influences on the estate are the following (see Fig. 5):

- | | |
|-----------|---|
| 1885–1921 | Planting of wood in north and east
A railway isolates the estate from the wood |
| 1921–1960 | Expansion of the village of Ede upon the 'enkeerd' soils
The alleys are crossed by new roads
The enclosed field landscape becomes much more open owing to the disappearance of planting |
| 1960–1985 | Reduction of land and loss of structure of avenues caused by the building of new industry and houses |

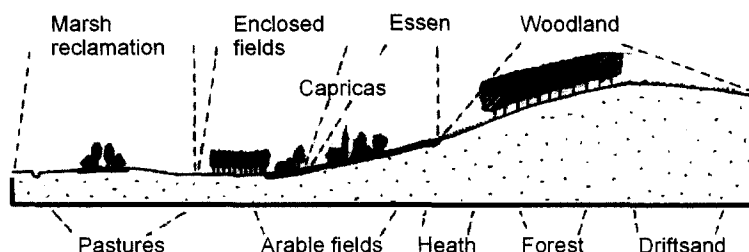


Fig. 4. Section of the area with landscape types.

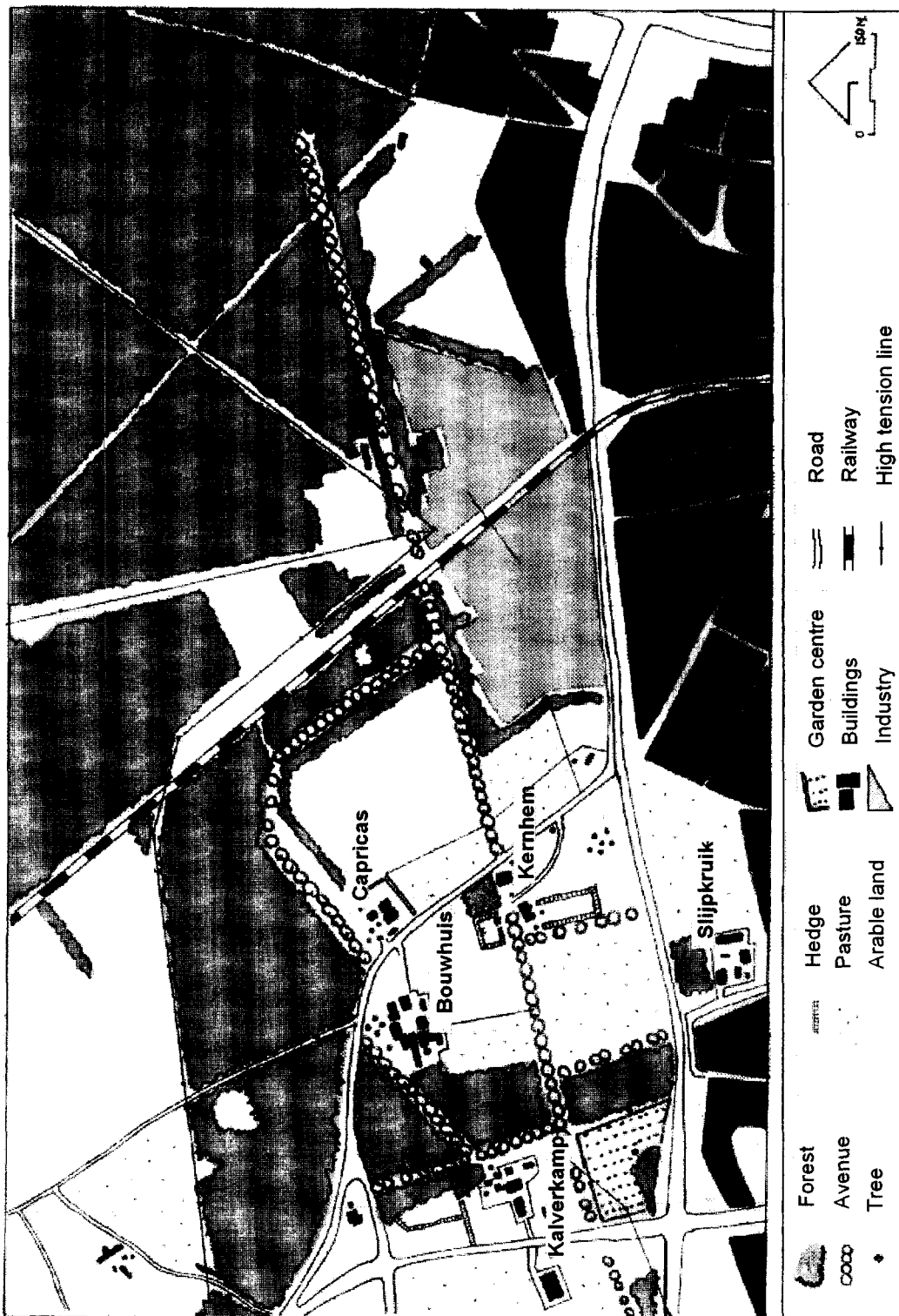


Fig. 5. Situation of the Kernhem estate and the Capricas farm.

High tension lines cross the estate
 Isolation of the estate from the centre
 of Ede by closure of a road
 Isolation of the farm Kalverkamp by
 the building of a new road
 A loss of view over the fields in sum-
 mer because pastures were changed into
 maize fields
 City related activities like a garden
 centre, scouts and a dog-training club
 split up the estate.

At present, the estate, owned by the municipality of Ede, covers an area of about 70 ha: 30 ha is forest and 40 ha are arable lands, buildings, roads and gardens (Fig. 5).

In the middle of the Kernhem estate, the house is surrounded by gardens, a restaurant and four farms. A garden centre, a scouts club and a dog-training club are situated in the corners of the estate.

Municipal policy in relation to the estate and its future is described in Table 1 (Gemeente Ede, 1990). The most relevant information in relation to the Capricas farm concerns land use, historical values,

recreational values and the steering of agricultural activities.

Every period has resulted in loss of parts of the estate or its structure. Although the amount of landscape components increases, the coherence among landscape components decreases. Historical continuity becomes vaguer because area and functions of elements for the estate are not clear any more and some historical features are destroyed.

3.3. The farm management and appearance

3.3.1. Farm management

This section is based on literature (Van Veluw, 1994), an interview with the farmer of Capricas and a farm visit in November 1994.

The organic farm Capricas is 9 ha in size and is a property of the municipality of Ede. It has been rented by the present farmer since 1991. The main products of the farm are cheese products, made from the milk of 60 milking goats. The cheese is sold to shops and can be bought on the farm itself. There are five suckler cows with calves and four boarded

Table 1

Policy objectives from the Municipality of Ede for the development of the Kernhem estate

OBJECTIVE	STARTING-POINTS AND MEANS FOR DESIGN
1. The destination of the estate has to be recorded in policy as an estate with joint use of agriculture, recreation and nature not influencing the character of the estate negatively	—In local policy like "Plan for spatial destination Ede", "Structure Plan Ede" or "Landscape policy plan Ede" —In treaty with tenants
2. The cultural–historical values have to be saved and intensified, particularly: — origin of Middle Ages — layout of Baroque period — influences of Landscape Style A general feature of estates is: the coherence among the complex.	—layout of herb garden and orchard —restoration of structure of avenues —restoration of gardens around the house —avenues must have a function of connection —similar treatment of similar elements, like the farms —removal of undesirable elements or adaption to the surroundings
3. The estate has to be suitable for recreative joint use for people living nearby	—making good infrastructure for "slow traffic" —making attractive places for recreants
4. Steering of agricultural activities, so they do not influence the cultural–historical, nature and recreative values negatively	—minimize infrastructure for agricultural traffic —reduce undesirable agricultural activities by taking parts of the land out of lease or making conditions regarding use in the lease act —removal of barns

horses. The farm has an educational value by hosting school classes. The school children get the opportunity to learn more about the farm and to gain some experience of practical farm work. The most important reason for the farmer to work in an organic way is his ideal to create coherence between the number of animals, the manure and the available soil surface. In this system he can grow fodder and a large part of the concentrates needed on the farm, without using chemical fertilizers and pesticides. The most important farm features are given in Table 2.

The soil is very sandy, because the farm is situated near the Veluwe Massive. The previous tenant farmed conventionally and kept 110 fattening bulls, 25 horses and 40 sheep on the same land area. This caused high concentrations of minerals in the soil. Nitrogen leaks immediately through the sandy soil, but phosphate is fixed in the soil and is thus prevented from leaching, but is then also more difficult to obtain for crops. This former management now requires very careful land use in order to restore the balance in the soil. The present farmer only uses

straw rich organic manure which is gathered in a deep pit stable. Twice a year the manure is taken out of the stable. After composting this manure on a concrete floor, it is used to fertilize the sandy soil. About 7 tons of goat manure are available per hectare. Lack of phosphate in the manure has to be compensated by uptake from the soil, which is possible with a soil rich in, among others, mycorrhiza (Harley and Smith, 1983). To achieve this, arable crops are grown in a 6 year rotation: 4 years of grass clover and 2 years of cereals, which at the moment comes down to 6 ha of grass-clover or lucerne pasture and 3 ha of cereals.

The goats are housed in a deep pit stable. This stable has three parts; one part for milk goats, one for lambs and one for he-goats (2 m² are available per goat). During summer days and warm days in spring and autumn the goats graze in the pastures. When they are inside they receive the farm's hay and concentrates made out of the farm's cereals in combination with bought-in linseed and beetpulp. Every goat gets 150 kg of straw per year. To have enough

Table 2
Farm features

Name	Capricas (old name: Engelenhove 1756)
Owner	Municipality of Ede (rented by farmer)
Start	1991
Surface	9.0 ha
Soil type	Sand
Activities	Milking goats, breeding cows, horse board, cheese production
Labour	1 person
Parcelling	7 ha around the farm, 2 ha at some kilometres distance
Crops	6.0 ha grass-clover and lucerne, 3.0 ha corn
Rotation	2 years corn, 4 years grass-clover
Husbandry	60 milking goats, 3 he-goats, 20 lambs; 5 breeding cows with 5 calves; 6 boarded horses
Feeding	Ad lib. grass-clover/ensilage plus 1.0 kg day ⁻¹ dry matter concentrates
Concentrate	0.8 kg barley, 0.1 kg linseed and 0.1 kg dried beetpulp
Production	900 kg per goat year ⁻¹
Contents	3.1% protein and 3.5% fat
Products	Hard cheese (80% of the milk) and soft (herb)cheese (20% of the milk)
Grass-clover	About 8–9 tons DM year ⁻¹ (estimated)
Cereals	About 4 tons DM year ⁻¹
Straw prod.	3.6 tons ha ⁻¹
Straw use	Goats: 0.5 kg day ⁻¹ in winter, 0.25 kg day ⁻¹ in summer Breeding cows: 8.0 kg day ⁻¹ on 150 days year ⁻¹ Horses: 2.7 ton per horse year ⁻¹
Manure	13 tons DM year ⁻¹ from milking goats and 5.2 tons DM year ⁻¹ from breeding cows



Fig. 6



Fig. 7



Fig. 8. Boundary between fields and forest.

straw for the goats, the breeding cows with calves and the horses, the farmer has to buy straw from other farmers.

Some plans for the future are to expand the farm

to extend the breeding cow holding and the planting of hedgerows along the fields to cater for the needs of the goats to nibble at leaves and young twigs and to offer some protection against wind, rain and sun.

Fig. 6. View across the goat farm.

Fig. 7. An avenue of beeches between the two parcels from the goat farm.



Fig. 9. The farm yard.

There is also a plan to rebuild part of the farm to lodge groups of people. In this way the educational function of the farm can be extended.

3.3.2. Farm appearance

The appearance of the farm is heavily influenced by the estate's forest edges and avenues, outside the farm as such. Except for these elements the image of the fields is defined by the crops and the animals grazing in the pastures. There are no lofty elements on these fields. The farm yard is more diverse than the fields because of its multifunctionality. Several buildings and plantings create different spaces with a more closed and intimate character. The historical character of the farm is still clearly visible. The old farmhouse, the new haystack built using traditional design and techniques and the restored sheepfold, are the most important manmade features in the farm yard. A few old trees are accompanied by recently planted trees and hedges.

The most important aspects of the appearance of the farm are shown in Figs. 6–9.

4. Results and discussion

In Section 4.1 the ten criteria are applied to the Capricas farm and then discussed in relation to other (non-organic) farms in the area and to knowledge about this typical landscape and its history. In Section 4.2, the criteria are matched with the policy objectives for the estate.

4.1. Applying the criteria

4.1.1. Diversity in landscape components

- Land use: around the yard there is a vegetable garden and a horse pasture. In November 1994 all

the land looked like grassland from a layman's view, although there was actually a rotation with grass–clover and corn.

- Crops: not many different crops (grass–clover, lucerne and corn).
- Husbandry: goats, cows with calves, horses (quite a few species for this area).
- Planting: on the yard there is relatively a lot of planting (hedges, trees, shrubs); in the fields there is no planting at all.
- Animal and plant species in pastures and field margins: there seem to be not so many species. The pastures are under rotation and field margins are too narrow to be ecologically interesting.
- Sensorial impressions: many impressions on the farm yard, caused by the intensity of use, the small scale and the number of elements. Few impressions in the fields. The fields are in appearance very much influenced by the surrounding forest, avenues and the estate house.
- Humans: one family (three people) lives on the farm. Three other people keep their horses at this farm and there are a lot of visitors like school children, students and consumers for the cheese shop.
- Age of elements: there are many young elements on the farm. Crops are of course not older than 1 year and a rotating pasture does not show old aspects very easily. There are hardly any wooden elements on the farm that show an old age.

The not too large diversity in land use is due to the small area we are dealing with and the young age of the farm, but at the same time it still is quite an interesting one, compared with other farms in the region.

4.1.2. Site related character

There is little to say about the relationship between the abiotic features of the area and the agricultural use of Capricas. There are no geomorphological transitions, special geological objects or soil gradients on the farm land. Therefore, a specific farm layout from this perspective cannot be expected. What can be said is:

1. The agricultural use of the land as pastures is not related to the 'enkeerd' character of the soil. This soil is formed by people to be used as arable land and, in former days, mainly used for growing

food crops (rye). The present use of pastures does not completely show this. However, the pastures are part of the rotation scheme and could therefore be considered as a crop. At other times of the year one can see corn and lucerne. This land use shows more coherence with the site.

2. The trees at the farm (e.g. oaks and beeches) are native types and belong to this sandy landscape. By growing there, they show the abiotic circumstances.

We consider site related character to be a very important criterion because it is the source of a diverse landscape. Especially when there are abiotic gradients in the area, the potential diversity of species, biotopes and land use is very high. Consequently, a homogeneous plot of land has less potential. The diversity on such a plot of land, if any, is more a creation of the land users. In the case of Capricas, we can speak of a land use which is compatible with the site.

4.1.3. Coherence among landscape components

- Functional coherence: there is a range in land use from nearby to far away—farmhouse, yard, horse pastures, pastures for goats, pastures for cows (wood). A functional relationship exists between these forms of land use and the intensity of work and presence of people in these different units.
- Spatial coherence: a contrast between yard and fields can be seen—a variety of smaller spaces on and near the yard and two large spaces which are the fields. There is no real transition in between. This structure seems to fit the spatial structure of the estate. The structure of the farm is a copy of the estate house and it has the same structure as the other four farms (house, garden, hedges, open space). Moreover, all these farms are situated in a corner of an open space of the estate (see Fig. 5). The hawthorn hedges that the farmer of Capricas has planted surround the farm yard and the vegetable garden. They do not cut the open area in pieces; they just mark the differences between the more closed part of the farm and the open area. The fields must be open to show the structure of the estate's avenues (Gemeente Ede, 1990). The boundaries of the farm are quite clear, but from farm-external origin. They are, however, estate-internal boundaries. The woods, avenues and roads

form a strong spatial framework that determines the farm's appearance.

- The cultural–historical coherence: the appearance of the farm house and yard shows a historical and visual relationship with other farms on the estate. There are similarities in the monumental character, in colours, age and landscape elements (sheepfold, thicket, hedges) on or around the farm yard (Gemeente Ede, 1990). These relationships underpin the identity of the estate, wherein Capricas has its special place.
- Social coherence: the cheese-shop and the educational function of the farm show a functional social relationship with the location of the farm, near the growing city of Ede.

It is clear that coherence is an essential criterion in relation to landscape quality (Van Zoest, 1994). It studies the relations which are essential in landscapes. The meaning and the different parameters for coherence are still vague and need to be worked out.

4.1.4. Historical continuity

- The farm house has monumental features showing the style of farm houses in the region.
- The fact that the haystack and the sheepfold were rebuilt in the 19th century style, shows the importance for people of continuity in the landscape, the need for sustainable elements which offer people a view of the past. (This also applies to the reconstruction and replanting of the structure of the estate's avenues, which is done by the Municipality of Ede.)
- From a historical point of view, using the land as arable land (partly) fits in this area with old agricultural lands (see Fig. 3). Although the farm changed from cattle to keeping goats it still has elements of estate agriculture. For example, creating cycles in mineral flows was an aim of the old estates. With respect to this parameter, ecological agriculture fits very well into the ideology of the estate.
- The parcelling of the farm into two spatial units with relatively low-growing crops in some fields is an old feature of the estate. Some years ago the land was mainly used for maize production, which in summer deprived the spectator of a view through the avenues over the fields and the forest.

- The goat breed used on the farm is the Dutch milk goat. This breed historically suits the region (although the 'Veluwe landgoat' would give a stronger bond with the past).

By historical continuity we must stress that we do not aim at 'the older the better'. It is the continuous development of history that is important. Having only old trees is not good, because in a few years no trees will be left. Trees of all ages must be present. However, hardly any older plants are present on the farm. We recommend that the possibility of getting more species and younger trees on the farm be looked at (planting the nut-tree in the farm yard is a good start).

4.1.5. *Seasonal aspects*

We can only describe the situation we observed in November. The main impressions were: the pastures were green, as were the already sown arable fields. The tree in the farm yard (walnut) was bare, the trees surrounding the farm (mostly oak and beech), were colouring. A group of breeding cows was grazing in one of the pastures and in the afternoon the group of white goats came out of their stable to graze for a few hours.

After one visit we could only guess about the rest of the year. On the one hand, the growth of the crops will give an impression of the ongoing year. On the other hand, rotating pastures, which do not have many flowering species, will not show many differences during the year. As said before, the surroundings of the farm are more important in terms of image than the farm itself. The farmer told us, for instance, about the white band at the edge of the forest caused by the *amelanchiers* in spring.

After one visit we can assume, concerning seasonal aspects, that the several crops also show a diverse image throughout the year (especially corn and flowering lucerne). For a good matching of this criterion, the researcher needs to study the object at least four times a year. The seasonal aspects could also be improved by having more (flowering) species on the farm and by planting trees, which are masters in showing the seasons.

4.1.6. *Personal participation*

- Ecological and visual development by planting young trees and hedges in the farm yard.
- Preservation of the historical character of the

farm by building a haystack and rebuilding the sheepfold.

- Social-economic development of the site by creating involvement of schoolchildren and consumers.
- Ecological development by using the land as arable land and pastures, and keeping a limited amount of animals on the farm (and not, as the previous farmer did, having too many animals, causing an overproduction of manure). The farmer strives towards a clean environment and a broader rotation scheme.

Although the possibilities available to the farmer of demonstrating his personal participation are rather small (owing to the short time he runs the farm and the small area he has), it is surprisingly easy to see differences with the past. For example, a wider rotation scheme has direct influences on the landscape. The consequences of the predecessor's management and the deposition of $125 \text{ kg N ha}^{-1} \text{ year}^{-1}$ for current ecological possibilities are unknown.

4.1.7. *Particularities*

- Cheese sale at the farm.
- Many students, visitors and consumers.
- The most eye-catching element for a visitor is the flock of white goats, which contrasts with the green pastures.
- The historical monumental character of the farm.
- The contrast between the old farm yard and the young fields (see 'historical continuity' and 'ecological quality').

On Capricas a lot of things are happening which are not common to 'normal' farms in the area. Though the particularities are not common in the area, they do not disturb the view or the agricultural system of the area. This criterion is useful to reflect the specialities of the farm.

4.1.8. *Beauty*

- The beauty of the fields is mainly determined by the surrounding forest, which is not part of the farm.
- Nice, cosy farm yard owing to the small scale (a kind of square) and the old buildings.

Using beauty as a criterion does not make much sense. Beauty in general has a personal meaning. If we wish to use it as an expert criterion we have to talk about aesthetic values and describe which as-

pects we can value. Some of these aspects are described in this paper already, e.g. site related character and coherence among landscape elements (Ministerie van Landbouw, Natuurbeheer en Visserij, 1992; J. Kuiper, this volume). However, for a good description of aesthetic values there is a need for more theory.

4.1.9. Environmental quality

- Although management at the farm is directed towards a situation without nitrate leaching (Van Veluw, 1994), losses are still high (189 kg ha^{-1}). The main reason for the high N-losses is the high amount of N-deposition (125 kg ha^{-1}). This is something that cannot be controlled by the farmer, but he can still try to have lower losses. At the moment also a (very small) part of his own nitrate is leaching, presumably well within EU limits.

For matching environmental quality a mineral balance gives a good indication. A minimum of environmental quality is a prerequisite for landscape and nature quality.

4.1.10. Ecological quality

- What comes directly to mind is the small amount of permanent biological elements. The total area of agricultural lands is under rotation, there are neither permanent meadows (except for the horses), nor hedges, permanent field edges, etc. This makes it difficult for plant and animal species to find permanent residence at the farm.
- Plant species diversity in the rotating pastures is not high (according to expert judgement, in November). The field margins are permanent but very narrow and none had many species. However, bats use the area for hunting.
- The trees at the farm (e.g. oaks and beeches) are native types and belong to this sandy landscape.
- The farmer is encouraging the growth of an active soil life, which is necessary for ecological agriculture.

The ecological value must be measured more carefully than our brief expert judgement allowed for. Special attention should be paid to available herb species and potential trees/shrubs and plant species. The amount of plant species can be improved by having more extensively managed strips around the fields and more permanent grassland.

4.2. Reflection

4.2.1. Matching with municipality policy

The municipality policy is directed to the estate as a whole. As point 4 of Table 1 mentions, agriculture may not influence other functions negatively. This is not the case with regard to Capricas. However, when we use the policy criteria on a lower level, i.e. farm level, another type of valuation arises. Then we can see what the farm adds to the objectives for the estate.

The first objective of the municipality policy is the destination of joint use of agriculture, recreation and nature. We suggest that the agricultural use of Kernhem by Capricas can be extended to give a better economic base to the farm and to ensure the other two functions (recreation and nature) flourish. With more extensive farming, as the farmer wishes to do, the landscape can become more attractive and there can be more room for nature. The farmer could therefore either use more agricultural land or the edge of the forest where his goats could extensively browse.

The second objective is to save the cultural historical values. The rebuilding of the haystack and sheepfold, the planting of the thickets and hedges and the small-scale agriculture all add up to the conservation of the landscape style of the estate. In this objective special attention is given to the coherence. The farm adds remarkably to the coherence on the estate.

Recreative joint use is the third criterion addressed by the Capricas farm in the form of the letting of horse stables, selling of the cheese, managing the foot path through the farm. The farm's attractive type of agriculture offers a lot for the tourist to see.

4.2.2. The farm

Capricas is a small farm for this area. This implies that it is difficult to have a large diversity of animals, plants, patterns, etc. It is also well known that small farms are normally intensively farmed to create sufficient income. This also creates difficulties for the presence of undisturbed nature and old cultural heritage. On the other hand, the results of the 'landscaping' (as planting and restoration of build-ings) are a great achievement.

Another difficulty is the large influence of the

municipality of Ede on the farm management. One can raise the question about whose decisions are behind the management. The only thing that clearly can be said is that chances for landscape improvements are really used, whether this is the farmer's decision or that of the municipality.

The future of the farm in the framework of the estate can be secured when we learn of the old functions of the estate. An estate can be described as a social organization under the direction of one legal person on a complex of fields with an integrated, diverse use, which as a whole takes part of its surrounding. Once the plan concerning Kernhem is implemented the estate will have become more an aesthetic unity again, but not yet a complete social unit. Several problems could be solved and several links could be tightened, when the farm could be part of a larger agricultural estate management organisation (farmers' cooperative).

4.2.3. *Agricultural coherence within the estate*

It will be beneficial when the goats can (sustainably) use the woods that surround the farm (coherence between farm and wood). It will diminish pressure on the fields and improve the health of the goats. The same applies to fodder, which could be grown on other parts of the estate, to diminish the pressure on Capricas farm land.

4.2.4. *Social coherence, within and outside the estate*

It will also be a good thing when the agricultural products produced on the estate are sold more directly to the people of the city of Ede. To get people really interested, vegetables combined with cheese is a nice option. According to the farmer, it seemed to go in this direction because another ecological farmer was interested in starting (horticulture) farming on Kernhem. Changes in the city council had, however, delayed the implementation of these plans.

5. Conclusions

The ten criteria, except beauty, are useful for describing the features which influence landscape

quality. To measure these cultural criteria a clear reference is needed. In this exercise a clear reference is lacking. Therefore, only a global valuation of the farm's contribution to landscape quality could be given. On the Capricas farm, seasonal aspects and ecological quality are not very pronounced (although improved with regard to the previous farmer's management). On the other hand, coherence, historical continuity, personal participation and particularities seem to contribute very well to the landscape quality. With regard to municipality policy, the farm complies very well with the objectives for development of the estate.

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