9 Zeeuwse Vlegel: a Promising Niche for Sustainable Wheat Production

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Introduction

In 1966 the Dutch milling industry used approximately 40 per cent domestic wheat and 60 per cent 'third country wheat' (wheat from the United States, Canada and Argentina) as ingredients for flour *mélanges* for the preparation of bread and cookies. Since then the composition of the Dutch flour *mélanges* has changed considerably. The percentage of domestic wheat decreased to around 15 per cent, third country wheat almost completely disappeared and EU-wheat (first mainly French, later predominantly German) became the major ingredient (see Figure 1). This development raises, out of curiosity and not out of chauvinistic reasons, a fairly simple question: why is the percentage of domestic wheat used in the Dutch flour mixes so low? Is it because Dutch arable farmers produce insufficient amounts of wheat? Is Dutch baking wheat more expensive than that compared to wheat from other countries? Or, is Dutch wheat of poor baking quality? As Dutch farmers produce more than enough wheat to supply the needs of Dutch bakeries (Wiskerke 1997), and wheat prices do not differ between the Netherlands, France and Germany (*ibid.*), the answer must lie in the baking quality of Dutch wheat.

Table 1 The Dutch milling industry's classification system for baking wheat

Indicator[1]	High quality	Normal quality	Filling quality
Hagberg index	≥ 220 seconds	≥ 220 seconds	≥ 220 seconds
Protein content	≥ 13%	≥ 12%	≥ 11%
Zeleny sedimentation value	≥ 50	≥ 35	≥ 25
Milling efficiency	≥ 72%	≥ 72%	≥ 72%

(Source: Kauderer 1994)

The Dutch milling industry uses several indicators to determine the baking quality of wheat (see Table 1). In this classification system three quality classes for baking wheat can be distinguished: high quality, normal quality and filling quality. A fourth quality class is fodder wheat.

Wheat is classified as fodder wheat if one or more indicators for filling wheat are not met.

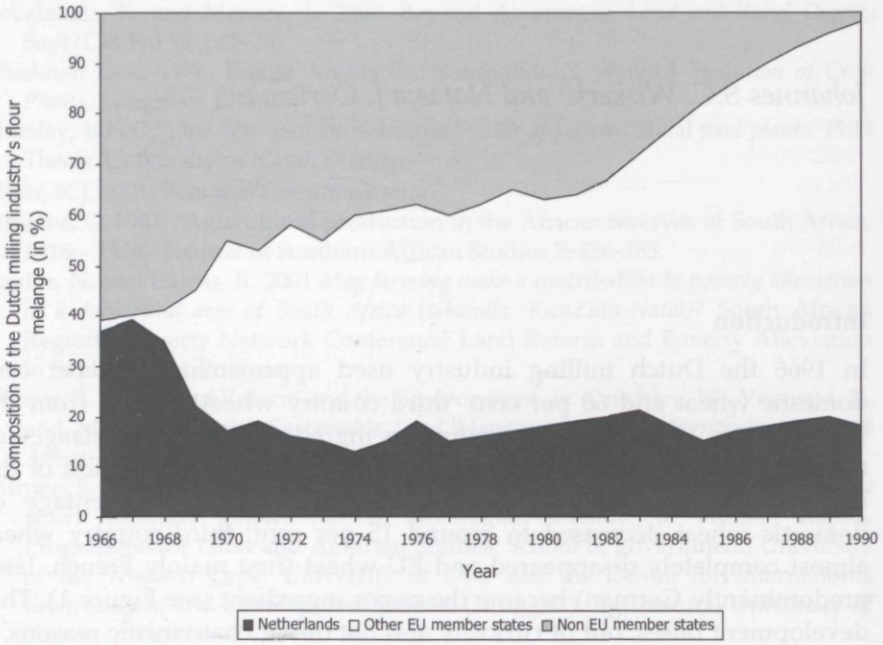

Figure 1 The composition of the flour mélange of the Dutch milling industry according to region of origin in the period 1966-1990 (Source: Kauderer 1993:63)

Quality analyses of the Dutch wheat harvest in 1992 and 1993 demonstrated that, on average, Dutch wheat did not meet the criteria for high quality or normal quality baking wheat. This was due to poor protein quality (expressed through the Zeleny sedimentation value) in both years and a low protein content in 1993 (see Table 2). In addition about half of the 1993 harvest had problems with early germination, expressed by the fact that 49 per cent of the harvest that year had a Hagberg Index of less than 220 seconds. The rather poor baking quality of Dutch wheat in 1992 and 1993 is considered to represent a normal situation, as many wheat experts are of the opinion that one can not produce good baking wheat in the Netherlands (Wiskerke 1995). However, a group of arable farmers in the province of Zeeland, who had organised themselves in an initiative called Zeeuwse Vlegel, succeeded at the same time in producing wheat that only just fell short of the requirements for high quality baking wheat (see Table 2).

Table 2 Results of the baking quality analysis of Dutch wheat and Zeeuwse Vlegel meal

Indicator	Netherlands Harvest 1992	Zeeuwse Vlegel Harvest 1992	Netherlands Harvest 1993	Zeeuwse Vlegel Harvest 1993
Hagberg index (HI)	303 seconds	306 seconds		297 seconds
% of harvest with HI >220s			51%	
Protein content	12.1%	12.9%	11.6%	13.6%
Zeleny sedimentation value	32	49	32	49

Source: Kelfkens 1993; Kelfkens and Angelino 1994; Stichting Zeeuwse Vlegel 1994

The results of the Zeeuwse Vlegel lead us to question the knowledgeability of the wheat experts and raise the question of why one particular opinion about baking wheat cultivation prevails within the 'expert system' (Van der Ploeg 1999). In this chapter we will demonstrate that the prevailing opinion regarding baking wheat cultivation in the Netherlands is embedded in, and the outcome of, a dominant productivist wheat regime. This dominant regime defines the ground rules for wheat breeding, cultivation, processing and marketing. It embodies a coherent complex of scientific knowledge, engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons and ways of defining problems. All of which are embedded in specific institutions and infrastructures (Rip and Kemp 1998). In the following section we will discuss the construction and consolidation of this prevailing wheat regime. We follow this with an in-depth description of the Zeeuwse Vlegel, which we consider to be a promising niche for sustainable baking wheat production as well as an attempt to question and change the foundations of the dominant wheat regime. In the final section of this chapter we will discuss the main barriers and driving forces for sustainable wheat cultivation in the Netherlands. This entails a discussion of both niche dynamics as well as the interactions between the niche and the dominant regime.

Construction, stabilisation and transformation of the Dutch wheat regime

Establishing a closed legal system for commercial plant breeding (1850-1945)

The foundation of the current prevailing wheat regime in the Netherlands can be traced back to developments that started in the middle of the 19th century. It entails the more or less simultaneous development of legal protection of breeders' labour, a binding national list of recommended varieties and a national inspection service. For the sake of transparency we will describe these three aspects separately.

Breeder's rights

The idea of financially rewarding plant breeders dates back to the late 19th century and was initiated by farmers themselves (Sneep 1976). The *Groningse Maatschappij van Landbouw en Nijverheid* (farmers' association of province of Groningen) took the initiative to organise plant breeding

contests (Gielen 1983). This way, plant breeders could obtain an, albeit small, reward for the development of new plant varieties. However, there were no legal restrictions in place at the time to prevent other breeders or farmers reproducing or selling plant varieties that had been bred by others.

Around 1920 the need for the (legal) protection of new plant breeds (and breeder's labour and skills) arose in the Netherlands, due to a set of mutual reinforcing developments and changes:

- An increase in the inter-provincial and international trade of seeds and planting material (Addens 1952);
- The need for higher yielding and other types of varieties as a result of changes in farming practices (mechanisation and the introduction of chemical fertilisers) and a domestic food shortage after World War I (Bouwman 1946; van Zanden 1986);
- The increased 'scientification' of plant breeding practices (Dorst 1957);
- An increase in the number of specialised plant breeders together with the modernisation of plant breeding enterprises.

These mutual reinforcing developments led farmer's associations, agricultural scientists and the Dutch government to the conclusion that they had arrived at a crossroads. If breeders were to continue developing new varieties, they had to be rewarded financially. Failing this, the only other alternative was to set up public plant breeding institutes, based on the premise that new plant varieties are a public good and plant breeding should therefore be financed out of public means (Sneep 1976). From this point onwards a commitment was made to '*rewarding and protecting commercial plant breeding.*' The reluctance of the Dutch government of the time to involve itself (or interfere) with agriculture was one of the key issues that defined how this choice was arrived at. Thus, between 1920 and 1930 a series of measures were taken, mainly by the farmer's associations, to protect and reward plant breeders. However, these measures provided insufficient protection (Wiskerke 1997), giving rise to the need for legal measures. Several existing laws and regulations (e.g. Patent Act, Author's rights) were explored during the 1930's, but these provided inadequate protection to plant breeders. As a result of this, the Dutch Minister of Agriculture appointed a committee in 1940 to prepare specific legislation for breeder's rights. The work of this committee resulted in the *Kwekersbesluit 1941* (Breeder's Decree). According to this breeders could obtain breeder's rights for a plant variety if 1) the variety was sufficiently distinguishable, 2) sufficiently uniform and 3) new. The Breeder's Decree not only regulated breeder's rights but also the role of the List of Varieties and trade in seeds and planting materials. We discuss these two related aspects below.

List of Varieties

The foundations of the List of Varieties can be traced back to the beginning of the 20th Century. At that time field inspections were the main source of information about plant varieties. One of the first attempts to create a list of varieties with accompanying descriptions, to be used as a source of information for the field inspections, was the *Leidraad*: an overview of 50 plant varieties with descriptions (Bouwman 1946). The *Leidraad* was an initiative of the *Zeeuwse Maatschappij van Landbouw* (the farmers association of the province of Zeeland) whose example was soon followed by farmer's associations in other provinces. Together with auction catalogues and field experiment reports these regional lists of varieties with descriptions formed the basis of the Descriptive List of Varieties of Agricultural Crops (hereafter referred to as List of Varieties).

The first List of Varieties was published in 1924. Although supported by developments described above, the List of Varieties was predominantly the initiative of Professor C. Broekema, director of the Institute of Plant Breeding (van Marrewijk *et al.* 1991). With the publication of the List of Varieties Professor Broekema aimed to realise two objectives:

1 To provide users of seeds and planting materials with a guideline for the choice of varieties;
2 To provide recognition of the seeds and planting materials of these varieties.

From its first publication in 1924 the List of Varieties merely served as a guideline for farmers to assist with their choice of plant varieties. The passage of the Breeder's Decree changed the status of the List of Varieties, which took on an obligatory and binding form: only seeds and planting materials of varieties that were on the List of Varieties were admitted for domestic trade. In other words, through legislation the List of Varieties became formalised as an 'obligatory passage point' (Callon 1986: 205). The Variety List Committee (VLC) decides annually on the placement of new varieties on, and removal of existing varieties from, the List of Varieties. The committee's decision is based upon the 'Value for Cultivation and Use' (VCU) tests, conducted under auspices of the Centre for Variety Research[2]. The committee uses two major criteria in the evaluation of submitted new varieties. First, a new variety has to be of demonstrable value to Dutch agriculture. Second, a new variety has to be better than existing varieties. Later on we will discuss how the committee translated these broad criteria into specific criteria for wheat varieties.

Inspection services

The foundations of inspection services for seeds and planting materials can be traced back to seed exhibitions, which were organised for the first time in the Netherlands around 1850 (Sneep 1976). On these exhibitions the quality of seeds and planting materials was assessed on the basis of external characteristics. In 1877 an experimental station was founded,

which also inspected the quality of seeds and planting materials. Several traders of seeds and planting materials were voluntarily supervised by this experimental station. To improve the quality of seeds and planting materials the *Zeeuwse Maatschappij van Landbouw* created a division for field inspections in 1911 (Bouwman 1946). During the same period other regional farmers' associations also established their own inspection services. Due to the growing number of regional inspection services and the increase in the inter-provincial trade of seeds and planting materials the need for national collaboration arose. This resulted in the foundation of the Central Committee for Crop Inspections (CCCI) in 1919 (Addens 1952). One of the tasks of the CCCI was to create inspection regulations, to be implemented by all regional inspection services (Oortwijn Botjes 1957). In 1932 this system of regional inspection services with a co-ordinating committee at national level was replaced by one national inspection service for seeds and planting materials, the *Nederlandse Algemene Keuringsdienst* (NAK). NAK decided to continue the policy of CCCI, which among others implied that only seeds and planting materials of varieties that were on the List of Varieties were eligible for inspection. With the passage of the Breeder's Decree 1941 the inspection of seeds and planting materials by NAK became obligatory: only seeds and planting materials certified by NAK could enter the trade circuit.

An indicator for agricultural modernisation: breeding the 10-ton-wheat-variety (1945-2000)

Taken together the introduction of breeder's rights, the binding List of Varieties and obligatory inspection of seeds and planting materials created a complete and closed system regulating the breeding of, and trade in seeds and planting materials in the Netherlands (Sneep 1976). The Breeder's Decree was subsequently replaced by the Seeds and Planting Materials Act (SPMA) in 1968. This regulated breeder's rights and the trade of seeds and planting materials in a similar way. This new legislation was based on international agreements made at the International Convention for the Protection of New Varieties of Plants (Wiskerke 1997).[3] Under this legislation a breeder can obtain breeder's rights if a plant variety meets the criteria of distinguishability, uniformity and stability (DUS criteria) and if the variety is new and has a name (Van Beukering 1992). Despite the fact that have been modified several modifications to the UPOV convention and the SPMA in the intervening period the fundamental basics of the closed legal system, established in 1941 have, remained unchanged.

In order to understand the type of wheat varieties produced by breeders and cultivated by farmers, we need to take a closer look at the role and position of the List of Varieties. It is important to emphasise that the List of Varieties is an obligatory passage point.[4] Within the range of permitted

seeds and pant materials the VLC categorises varieties to assist farmers with their selections (see Table 3).

Table 3 Overview of the main categories of the List of Varieties

Category	Meaning
A	General recommendation: variety for general use
B	Limited recommendation: variety for special circumstances or for limited use
O	Variety considered to be of limited value or for local use and which, as a rule, is incompletely described or not described at all
N	New, recommended variety
T	Newly admitted variety with sufficient value for cultivation

In the daily practice of wheat breeding and cultivation this categorisation has become an important determinant of the kind of varieties produced by wheat breeders and cultivated by arable farmers. For Dutch wheat breeders the criteria used by the VLC constitute the guiding principle in their breeding programmes:

> *'Placement of a new variety on the List of Varieties is extremely important to us. Especially if you succeed in breeding an A-variety, you can say that you have had a successful breeding programme. In the promotion of our varieties we specifically use the fact that it has been placed on the List of Varieties. So it's fair to say that we primarily focus our breeding programmes on the admittance criteria for the List of Varieties.'*

For arable farmers the List of Varieties is the main source of information for the choice of wheat varieties. Approximately 70 per cent of arable farmers use the List of Varieties as a source of information for their choice of wheat varieties (Wiskerke 1997). When we look at the varieties chosen and cultivated by arable farmers during the past five decades, we find that 75-100% of wheat planted each year is from seeds in category A on the list (*ibid.*) From a quasi-evolutionary point of view, we can conclude that the List of Varieties works as an institutional nexus (Schot 1991, Van Lente 1993). That is, it connects the processes of variation (i.e. breeding of new varieties) and selection (farmer's choice of varieties). According to Schot (1991:85):

> *'these connections are maintained by certain actors or institutions that are responsible for translating certain (...) requirements into criteria and specifications used in developing technology'.*

In this case the VLC is responsible for translating certain requirements into criteria and specifications for wheat breeders. As mentioned earlier, in general these requirements read as 'of demonstrable value to Dutch agriculture' and 'better than existing varieties'. To understand how the VLC translated these general requirements into specific criteria for new wheat varieties we need to examine Dutch and European agricultural

policies in the post War era. The main goals of Dutch agricultural policy at the beginning of this era were:

- A guaranteed supply of food at a low price for consumers;
- Stimulation of the export of agricultural products to improve the national balance of payments.
- A fair income and social life for those working in agriculture.

As early as the early 1950s the second goal of these goals had become the dominant one and gradually started to overrule the third goal (Wiskerke 1997). Increasing productivity, specialisation and bulk production constituted the cornerstones of agricultural policy, science and technological development from the 1950s onwards. Within this 'productivist' paradigm (Roep 2000) wheat quality was conceptualised as 'good raw material for industrial fodder processing' (Wiskerke 1995). The productivist focus of wheat breeders and wheat growers was further enhanced with the creation of the European market and its price policies. This meant that wheat growers could rely being able to sell all their wheat at a given minimum price. The combination of domestic agricultural policy, scientific research and technology development, on the one hand, and the European agricultural policy on the other, led to a situation where the VLC translated the general requirements for accepting new wheat varieties onto the List into one single criterion: a new variety needed to have a higher potential yield than existing varieties. This position was encouraged by the ability of the Dutch milling industry to easily obtain sufficient quantities of good baking wheat from other EU member states. From the point of view of the milling industry there was no immediate need to encourage domestic cultivation of baking wheat. Furthermore, because the Dutch climate is extremely suitable for the cultivation of high yielding fodder wheat varieties the VLC came to the conclusion that within this specific technical-institutional context, high yielding fodder wheat varieties were of 'ample value to Dutch agriculture'. This position and the single-minded focus on yield improvement in wheat breeding and cultivation has remained fairly stable for several decades. In its own somewhat narrow, terms the prevailing wheat regime has been extremely successful. Average wheat yields increased from around 3000 kilograms per hectare in the twenties to 9500 kilograms per hectare by the end of the nineties. Yet as we discuss later, in broader terms it has constrained the development of other approaches to agriculture that emerged as a response to the unforeseen consequences of continual intensification and specialisation.

A summary of the characteristics of the Dutch wheat regime

The aim of this brief historical overview has been to demonstrate how, over a period of several decades, a dominant regime was constructed and stabilised, that subsequently structured and guided wheat breeding and

cultivation practices (see Figure 2). The legal and institutional foundations for this were laid in the first half of the twentieth century. Or, as Sneep (1976) phrased it,

> *'with breeder's rights, a binding List of Varieties and obligatory inspection – which three aspects were, on top of all, fully aligned – a complete closed legal system for seeds and planting materials was created'.*

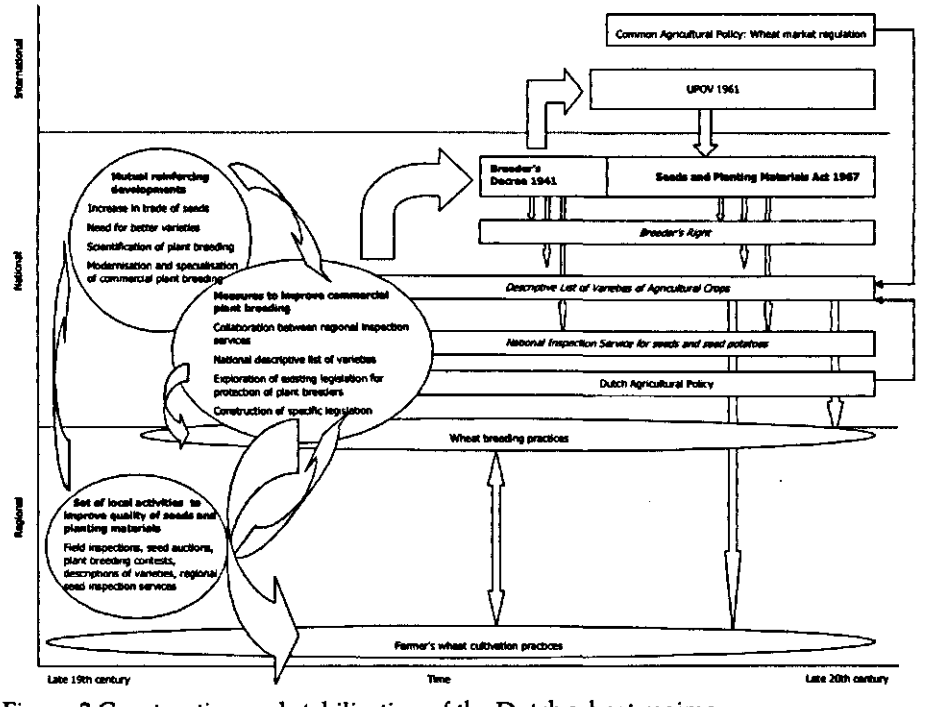

Figure 2 Construction and stabilisation of the Dutch wheat regime

The products of this closed system, i.e. so-called 'improved varieties', quickly became the norm in Dutch agriculture. Farmers who did not use seeds of improved varieties were thought of as being backward (Jongerden and Ruivenkamp 1996) and the so-called 'farmer's varieties' were classified as inferior varieties:

> *'With the confirmation of the Breeder's Decree the trade in uncertified seeds was prohibited. It also meant that inferior varieties could be eradicated'* (de Haan 1949).

After the Second World War the Netherlands became one of the world's largest exporters of seeds (of vegetables and several arable crops) and planting materials (seed potatoes, flower bulbs). In the promotion of Dutch seeds and planting materials breeders and traders regularly refer to the legal regulations as an expression of trustworthiness and reliability. Furthermore, the alignment between breeder's rights, the List of Varieties

and inspection services are seen as the major driving force behind the Dutch' successful international position in the production and sales of seeds and planting materials:

> *'At the moment the legal protection of breeders is a commonly accepted, if not to say given fact. When the draft of the Seeds and Planting Materials Act was presented to the parliament, no one raised the principle question if and why breeders deserved protection'* (van der Kooij 1990). *The regulations embedded in the Breeder's Decree and, later on, in the Seeds and Planting Materials Act have, together with the national agricultural policy and the EU wheat market regulation, shaped the wheat regime, which has focused exclusively on productivity. Within the dominant regime issues such as improving the baking quality of wheat varieties remained an irrelevant issue*

Attempting to find answers to new societal priorities (1985-2000)

In the late eighties several measures were adopted which can be seen as attempts to move away from the exclusively productivist focus of the dominant wheat regime. One such measure was the introduction of differentiation in the EU intervention price for wheat. The aim of this move was to reduce wheat surpluses by encouraging the cultivation of lower yielding baking wheat varieties. The price differentiation was based upon protein content (one of the factors which contributes to baking quality) of wheat. A protein content of 11 per cent was chosen as the threshold for this differentiation. As most Dutch fodder wheat has a protein content that is higher than this, the measure did not lead to the intended results of reducing wheat surpluses or increasing the cultivation of baking wheat.

A second measure, taken at the national level by the Product Board Cereals and the Dutch Cereal Centre, was the certification of domestic baking wheat. The aim of this regulation was to stimulate the cultivation of baking wheat and the use of domestic baking wheat by the Dutch milling industry. This initiative also failed, because the milling industry was not prepared to pay substantially higher prices for certified domestic baking wheat.

Although both these measures failed, they did encourage a debate about the possibilities for baking wheat cultivation in the Netherlands. This debate was formalised, in 1990, by means of the Quality Day Cereals; an annual meeting of the main stakeholders involved in the production, processing, distribution, sales and quality control of baking wheat and bread. The aim of this annual meeting was to explore ways of improving the quality of domestic baking wheat and of increasing the share of domestic baking wheat in flour mixes of the Dutch milling industry. Another important spin-off from this debate was the decision of the VLC to distinguish between baking and fodder wheat varieties, and to categorise them on this basis (see table 3). In the late nineties the VLC also created the space for acceptance of varieties with a specific value for

organic cultivation or for local initiatives. In 2000 the Zeeuwse Vlegel was the first group of farmers ever to succeed in reinstating a previously displaced variety, namely Sunnan, on the List of Varieties.

The dynamics of niche construction and development

Introduction

The undesirable side effects of the modernisation of wheat cultivation – wheat surpluses, environmental pressure through the use of pesticides and fertiliser and lack of knowledge for cultivating baking wheat, – gave rise to an alternative approach to wheat cultivation in the province of Zeeland[5]: the Zeeuwse Vlegel. The objectives of the Zeeuwse Vlegel were – and still are – the realisation of a sustainable and profitable cultivation of baking wheat and the creation of close contact between producers and consumers. The Zeeuwse Vlegel started in 1990 and has developed into a much-heralded example of sustainable regional quality production, one that is widely cited in national scientific and political debates on sustainable agriculture and rural innovation.

The development of the Zeeuwse Vlegel

Back to the eighties

The foundation of the Zeeuwse Vlegel was laid in the beginning of the 1980s. At that time many arable farmers participated in 'wheat study clubs'. Farmers visited one another to compare different wheat cultivation practices. They discussed the choice of varieties, use of fertilisers and pesticides and the economic results. But after a few years the differences in cultivation strategies, yields, use of inputs and economic results were explored and understood. The enthusiasm, that was so evident in the early days of the study clubs, slowly disappeared and many study clubs ceased to exist. The few that remained focussed their attention on the production of baking wheat. Through selective choice of varieties and cultivation methods, the participating farmers succeeded in producing baking wheat that met industry specifications. However, the milling industry was barely interested, as it preferred the large, uniform and cheap batches of French and German wheat. The ambitious study clubs did not get what they had hoped for: a reward for quality and craftsmanship. The study clubs in Zeeland demonstrated that the production of good baking wheat was possible, but that the lower yields were not compensated for by higher prices.

During the same period Zeeland's association of young farmers (Zeeuws Agrarisch Jongeren Kontakt: ZAJK) and Zeeland's federation of ecology groups and nature conservationists (Zeeuwse Milieu Federatie: ZMF) started a discussion group. Farmers and the ecology groups had often been opponents, but ZAJK and the ZMF had come to realise that

continuous opposition was a dead end street. Instead they wanted to discuss the points of agreement. But, as fine words butter no parsnips, they decided to put the points of agreement into practice. This took some years of thinking, negotiating and organising. At the annual meeting of the ZAJK in December 1988 a project for environmentally sound cultivation of baking wheat was announced. In March 1990 a foundation was launched, which was later named Zeeuwse Vlegel.

Organisational aspects

The farmers participating in the Zeeuwse Vlegel constitute the heart of the Zeeuwse Vlegel foundation. The board of the foundation is chosen every five years and comprises mainly member farmers. The aim of the foundation is

> *'to assess the feasibility of environmentally friendly agricultural production, to promote this production on conventional farms and to market the produce. Furthermore the corporation aims to close the gap between consumers and farmers'* (Stichting Zeeuwse Vlegel 1998).

Besides the board of the foundation there is also a broad counselling committee, in which ZAJK, the ZMF, the farmers' association of Zeeland (ZLTO), organic farmers, wheat study clubs, agro-technical organisations, bakers, millers and consumers' organisations are represented. Initially this counselling committee had a temporary status, but after five year it had proved its value and was made a permanent feature.

In 1994 the board of the foundation decided to establish a co-operative, which now runs the wheat and bread project. The reasoning behind this is explained by the product-manager of the Zeeuwse Vlegel:

> *'First of all, we want to show the public that the bread project could stand on its own feet and could operate independently from subsidies. Furthermore, we wanted to apply for subsidies to start new projects. This implied that the bread-project and the wheat cultivation had to be disconnected from the foundation. Otherwise it would remain unclear for what purpose subsidies would be used; for new projects or for financial support of the bread. By establishing a co-operative the bread-project is formally separated from the foundation. ... The co-operative and the foundation are financially independent. However, two members of the board of the foundation are also members of the board of the co-operative. Furthermore, the trademark 'Zeeuwse Vlegel' is owned by the foundation. So, if the members of the co-operative decide to use pesticides in the cultivation of wheat, the board of the foundation can decide to deprive the co-operative of the privilege to use the trademark. This way, all participants in the project keep a grip on the bread-project.'*

Since its start in 1990, the Zeeuwse Vlegel has established many connections in the province, on national and on international level, resulting in a large network of actors who support the Zeeuwse Vlegel in various ways. The network comprises agricultural research institutes,

government bodies, processing and distribution companies, certification organisations, environmental organisations, financial institutes and education and advisory services.

Scepticism and many questions to answer

The reactions to the Zeeuwse Vlegel approach were very sceptical at first, especially within the world of agriculture. Many farmers and agronomists did not believe in the possibility of cultivating baking wheat of a good quality, let alone without the use of chemical fertiliser and pesticides. This scepticism is reflected by the opinion of a 'wheat expert':

> *'Not using chemical fertiliser and pesticides will result in poor baking wheat. In fact it will only give you chicken food.'*

Many questions were raised by the outside world (farmers, bakers, researchers, etc.) and neither the farmers nor the researchers were able to answer most of them. As one of the farmers clearly expressed:

> *'The Zeeuwse Vlegel is a completely new way of wheat cultivation. I had to get rid of all the knowledge I had with respect to conventional wheat cultivation and start working and learning from scratch.'*

The inability to answer the central question posed by the Zeeuwse Vlegel – How to cultivate wheat in an environmentally friendly way and simultaneously produce high quality baking wheat? – demonstrates the impact of the dominant regime on knowledge production. The wheat regime had produced ample knowledge on how to increase wheat yields through breeding and cultivation, but had produced merely ignorance regarding the environmentally sound production of high quality baking wheat (see also Box 1).

The Zeeuwse Vlegel discussed the problem of weed control with organic farmers. The board and the counselling committee had a long discussion about the use of herbicides.[6] In the end they decided to permit their use before the wheat sprouted. After this time the use of herbicides, fungicides and insecticides was prohibited. Over the years the farmers have gained necessary experience in this method of weed control.

The next problem the Zeeuwse Vlegel farmers faced was obtaining suitable varieties of wheat. The List of Varieties was of no use. Most of the wheat varieties on that list were high yielding fodder and filling wheat varieties. In addition, the few baking wheat varieties on the List of Varieties were very susceptible to diseases and could therefore not be used in the Zeeuwse Vlegel cultivation method. An extensionist in Zeeuws-Vlaanderen – the part of Zeeland bordering Belgium – was well acquainted with wheat breeding and cultivation in Belgium. He knew that Belgian breeders and farmers had paid more attention to baking wheat compared to the Dutch. The Zeeuwse Vlegel farmers compiled a list of characteristics that they considered be important: baking quality,

disease resistance and straw sturdiness. On basis of this priority list, the extensionist found several wheat varieties.

Box 1 Baking wheat tests as an example of the production of ignorance during the modernisation era.

The 1993 harvest was very good in terms of protein content. The classification system used by the milling industry led everyone to believe that the quality of the flour would be very good and much better than the year before, when the average protein content was lower (see Table 2). The Hagberg index and the Zeleny sedimentation value did not differ significantly. However, the baking test (to determine indicators such as dough quality, bread volume, bread colour, baking nature and bread structure) proved everyone wrong. This led the board to believe that there was something more to the story of baking quality. In 1994 the board of the Zeeuwse Vlegel therefore decided to conduct separate baking tests of several batches. The results of these baking tests are given below and compared with the result of the baking test of the 1993 harvest. It shows that Sunnan has a better overall baking quality than the meal from the 1993 harvest, despite having a lower protein content and Zeleny sedimentation value.

Indicator	*Batch ZV218*	*Batch ZV201*	*Batch ZV204*	*Batch ZV215*	*Harvest 1993*
Wheat variety	Sunnan	Renan	Franco	Arcade	Mix of varieties
Hagberg index	327 sec.	359 sec.	359 sec.	318 sec.	297 sec.
Protein content	12.4%	12.6%	11.7%	12.4%	13.6%
Zeleny sedimention value	42	39	50	42	49
Dough quality	excellent	good	medium	good	good
Bread volume	4200 ml	3900 ml	4100 ml	3800 ml	3600 ml
Colour	8	8	8	8	8
Baking nature	8	7	7	6	6
Structure	8	7.5	6.5	6.5	6.5

That also explains why the overall baking quality of the 1992 harvest was better, despite having a lower protein content. The 1992 harvest contained a higher proportion of Sunnan. This suggested that the variety itself is a determining factor and not just the (proxy) indicators used by the milling industry to classify batches of wheat. The board of the Zeeuwse Vlegel discussed these results with food-technologists, baking wheat experts and scientists. None of them could explain the results of the baking tests. All they could conclude was that there was something more to baking quality than the indicators that were, and still are, used by the milling industry. It leads to the conclusion that protein content is not a universally applicable indicator for grading the quality of baking wheat (see Table 1) at least for some varieties. The same might hold true for the Zeleny sedimentation value.

Besides weed control and selection of baking wheat varieties, the farmers had to find an answer to the problem of manuring: what kind of manure to use, how much, how and when to apply it? These problems had to be solved through a process of trial and error. And even after ten years of

experimenting there are still questions to be answered. After three years the Zeeuwse Vlegel advised the farmers to apply pig-slurry in early spring. From an environmental point of view, spring application is much better than autumn application, the soil temperature is low resulting in a slower mineralisation of nitrogen. Furthermore, it seems to contribute to a better baking quality of the wheat:

> *'Using the manure in the right way was the biggest puzzle during these years. It was really an 'Eureka' effect when we found out the good way to use manure in spring and to see that the baking quality also improved'*

The Zeeuwse Vlegel in practice

The Zeeuwse Vlegel prohibits the use of chemical fertilisers and pesticides. To ensure that farmers comply with these conditions, these aspects of wheat cultivation are inspected by an independent organisation, NAK. More importantly there is an element of 'social inspection'. As soon as the wheat has sprouted, every participating farmer is obliged to place a large sign, stating *'Hier groeit uw Zeeuwse Vlegel'* (Your Zeeuwse Vlegel is growing here), in his field. All the neighbouring farmers know that the use of chemical fertilisers and pesticides is prohibited in a field with this sign and will keep an extra eye on that field to make sure that no chemical fertiliser or pesticide is applied.

After the harvest, every batch of wheat is stored separately. A sample is taken from each batch to determine the baking quality and all those that meet the criteria are mixed. Thus the bakers will be provided with a homogeneous flour *mélange* for the whole year. The wheat is milled in two traditional windmills in Zeeland and the flour is distributed to the bakers in 25kg bags. From one bag of flour 50 loafs of bread can be baked. Fifty wafers are supplied with every bag of flour and the bakers are obliged to place a wafer on every loaf of bread. In this way consumers can be sure that the Zeeuwse Vlegel loaf that they are buying is genuinely made from Zeeuwse Vlegel flour. The board of the Zeeuwse Vlegel determines the size, form, decoration and price of the bread. Because the bread is slightly more expensive than 'ordinary' whole-meal bread (appr. € 0.10) and, more important, because there are very few links in the producer-consumer chain the farmers receive a much higher price for their wheat compared to the EU-price. This is necessary as, although cultivation costs are similar, the yields are much lower compared to conventional wheat cultivation.

Until the middle of 1994 Zeeuws Vlegel bread was only baked and sold by local bakers, underlining the artisanal character of the approach. However, to increase sales the board of the Zeeuwse Vlegel decided to permit the sale of Zeeuws Vlegel bread in supermarkets, provided that they did not undercut the standard recommended price.

Since 1994 several new projects have been started. The first of these, Zeeuws Vlegel beer was launched in November 1994. The beer is brewed

from environmentally friendly cultivated barley, grown according to rules similar to the ones for wheat. In 1996 more new products were launched: wheat meal cookies and a range of meat products (beef, pork and turkey). The meat is produced on farms subject to regulations concerning the environment and animal welfare. Two reasons underlay Zeeuwse Vlegel's decision to start with the producing other ranges. On the one hand the need for broadening the economic basis of the Zeeuwse Vlegel emerged in 1993, as bread sales were not meeting expectations. On the other hand the Zeeuwse Vlegel hoped that the introduction of these new products would have a positive effect on bread sales:

> *'It is possible that the sales of bread will stabilise or even decrease in the future. In that case it is useful to have a broader range of products. New products contribute to the economic basis of the Zeeuwse Vlegel. And new products will hopefully support the sales of bread. When we introduced the beer we got a lot of publicity. And every article in the newspaper starts with the 'bread story'.'*

Sales of both beer and meat failed to live up to expectations. The meat project was abandoned several years after its start and production of Zeeuwse Vlegel beer was discontinued in 2000.

The past few years, the sales of the bread have declined a little, forcing the Zeeuwse Vlegel to search for alternatives. In 1998 several new products were launched which are produced from the Zeeuwse Vlegel wheat such as cookies, and pancake flour. These products can be conserved much longer than bread, and they can be distributed through channels other than the bakeries. In this way, the Zeeuwse Vlegel hopes to broaden its market. For the same reason they joined a new platform of 27 regional producers called *'Van 't Zeeuwse Land'* ('Produce from the Zeeland Countryside'). This platform, established in March 1999, distributes regional products throughout the province. In the remainder of this chapter we will focus on the core activities of the Zeeuwse Vlegel, wheat production and the distribution and sale of bread.

Farmer's strategies

The mainstream wheat cultivation strategy in Zeeland is yield maximisation. This entails the use of high yielding fodder varieties (i.e. varieties recommended by the List of Varieties) and frequent applications of pesticides and chemical fertiliser. Most farmers also don't know where their wheat ends up (Wiskerke 1997: 121-159). Farmers participating in the Zeeuwse Vlegel have chosen an alternative strategy that entails a combination of low inputs (pesticides and fertiliser), lower yields, quality production and higher prices. In addition, the farmers involved collectively control processing, distribution and sales of their wheat.

Farmers participate in the project for different reasons. For those involved in setting up the project a wish to 'turn the tide' was the leading motive. They rejected the passive and defensive attitude of many of the arable

farmers and of the farmers' associations and shared the idea that farmers themselves have to take the bull by the horns if they want something to change:

> *'Many farmers let others decide what they have to do: they let the seed-supplier choose the varieties, the sales representative of the pesticide-company chooses the pesticides, the extentionist of the farmers' association decides on the crop rotation and the cultivation strategy, etc. Many arable farmers have a very low income or no income at all. Most farmers have become very capable in blaming others for their bad financial situation. I agitate against that because I am of the opinion that you first have to look at yourself before you start to blame others.'*

They considered the Zeeuwse Vlegel as a means to regain control and power over their own profession and to cultivate wheat in accordance with demands from society for ecologically sound production. Environmentally friendly wheat cultivation is linked to the production of high quality baking wheat. The higher price of the wheat compensated for the lower yields and is made possible because the members themselves organised the processing and distribution of the wheat.

> *'My main motivation to become part of this project was that it offered the opportunity to determine the price of our product ourselves.'*

In the past decades, direct relationships between producers and consumers diminished as a result of the rationalisation of production and distribution. Wheat cultivation has evolved into producing for an anonymous market. Restoring the link between production and consumption has been another driving force for the early members to participate:

> *'You know where your wheat ends up and where and how it is milled. You have more insight in the whole chain from producer to consumer. That is very important to me. Most arable farmers have no idea about the destination of their wheat. They transport it to the regional co-operative grain storage, and that's where the story ends for them. They don't know where it ends up and what is done with it.'*

The opportunity to experiment with an environmentally friendly way of production was another motivating force for most of the early participants. Because of the increasing dependence on pesticides and the increasing pressure from the government to reduce pesticide use, conventional wheat cultivation was seen as a dead end street. The Zeeuwse Vlegel offered an offensive strategy to tackle these threats:

> *'Especially in the first years, growing Zeeuwse Vlegel wheat was exciting. I was not sure if I could do it without using pesticides and fertiliser. I've learned a lot, also because we exchanged experiences among ourselves during summer excursions in the field.'*

In contrast to the early members, the participants who joined in later were mainly interested in other aspects of the Zeeuwse Vlegel, such as a higher price for their wheat:

'I joined the project because I heard about the substantial higher price they are aiming at.'

Also the challenge of experimenting and cultivating in a way that was generally considered impossible, appealed to many members, both the pioneers and those who joined in later:

'Cultivating wheat in a different way was something I felt attracted to. Getting the hang of something new, taking up that challenge; that appealed to me.'

Another reason mentioned frequently nowadays – not so much for joining, but for continuing to grow the wheat- is that the cultivation method is easy and demands very little labour. It is, however, only labour extensive since a couple of years as the farmers have learned to tackle all problems of the cultivation method:

'Growing the Zeeuwse Vlegel wheat is easy because once I have sown the seeds and spread the manure in springtime, I only have to get on to the field for harvesting. It is nice to see it grow without doing something.'

The impact of the Zeeuwse Vlegel on the farm as a whole varies among the members. The average farm cultivates Zeeuwse Vlegel wheat on four hectares, a relatively small proportion of average farm sizes. However, the cultivation of Zeeuwse Vlegel also offers the members a means to experiment with different techniques and to obtain knowledge that can be used in other crops as well:

'The Zeeuwse Vlegel is a good intermediate between conventional and organic farming. It gave me the opportunity to experiment with environmentally sound cultivation on a part of my farm.'

Most of the farmers, however, see the cultivation of Zeeuwse Vlegel as more or less separate from other crops. The cultivation method and the use of fewer inputs have had no impact on the other parts of the farm. Those farmers describe the Zeeuwse Vlegel mainly as a 'commercial hobby':

'The Zeeuwse Vlegel suits me, I like to provoke a bit by doing things differently compared to my neighbours. Growing wheat for Zeeuwse Vlegel is a hobby for me. The impact on the rest of the farm is minimal.'

Collective strategies

The unique organisation of the Zeeuwse Vlegel, being involved in production, knowledge generation, and the marketing and promotion of sustainable wheat products, offers many opportunities to initiate collective action. The collective strategies of the Zeeuwse Vlegel project take place in the following fields:

- Lobbying, interest promotion, pressure group.

- Developing production methods for sustainable wheat production.
- Distribution and marketing, linking producers and consumers, promotion.

Being active in those three fields implies that the Zeeuwse Vlegel embodies three different types of networks: 1) socio-political, 2) technical, and 3) economic.

Interest promotion and lobbying

The Zeeuwse Vlegel is at first an initiative of arable farmers who wanted to turn the tide by exploring the possibilities of sustainable arable production:

> *'We started the Zeeuwse Vlegel project because we didn't want to depend on the subsidies from Brussels anymore. As the prices of wheat went down at the same time it was a good time to explore new possibilities. At the same the time society started to question the way we produced. They talked about sustainable production, quality production and regional products as being the opportunities for the future. The Vlegel started as an experiment to find out if it really worked.'*

By getting organised in the Zeeuwse Vlegel, the farmers became an interlocutor for both regional and national governments on issues on rural development and sustainable production. Being a project they also could get support from the government for initiating the network and promotion of the Zeeuwse Vlegel bread. The regional government embraced this first initiative of regional sustainable production, because it complied with its policy plans. The Zeeuwse Vlegel also contributed to a better image of the arable production in Zeeland and the image of the province as a whole. The national government however, was initially reluctant to support the initiative. In the first year the project could only make a start because the initiators won an environmental prize. The Ministry of Environment was the first to support the project. The Ministry of Agriculture only contributed to the project after they received European subsidies for disadvantaged areas (Objective 5b funds). As the chairman points out:

> *'Though the government contributed to the project in several ways, it was not always easy to get support. It has been a continuous struggle to convince them of the importance of this project.'*

For the Zeeuwse Vlegel, the strategy of producing sustainable wheat and being an interlocutor at the same time has important advantages: instead of spreading only words, they can make their efforts visible because there's a tangible artefact, the bread:

> *'We took the challenge by starting the Zeeuwse Vlegel. Now we have many years of experience which gives us a position in the debate on sustainable production.'*

As an interlocutor for government bodies, the Zeeuwse Vlegel also contributed to the debate on the availability of varieties. Having experienced difficulty in obtaining suitable varieties for their wheat cultivation, the Zeeuwse Vlegel started a lobby to change the regulations concerning the breeding and spreading of varieties:

> *'The List of Varieties for wheat suitable for the Zeeuwse Vlegel is rather limited because there is not a large market for these varieties and the rules for breeding are very strict. It is therefore very difficult to preserve these varieties. The variety we use the most, Sunnan was bound to disappear because we were not allowed to exchange seeds.'*

In 1999 their efforts to become recognised as the legal maintainer of the wheat variety Sunnan were rewarded. The Zeeuwse Vlegel was recognised by the Council for Breeders' rights as the organisation that officially maintains this wheat variety. In addition, the Zeeuwse Vlegel succeeded in replacing Sunnan on the List of Varieties. The farmers are now officially allowed to reproduce and trade seeds of this variety. Organic farmers have shown serious interest in Sunnan. This means that the Zeeuwse Vlegel will not only reproduce seeds of Sunnan for the project itself, but also for other groups of farmers interested in disease-resistant, high quality baking wheat varieties.

The role and experiences of the Zeeuwse Vlegel are often quoted in political debates on genetic resources and regulations concerning the breeding of, and trade in seeds and planting materials. Because conventional research on varieties is often only focussed on productivity aspects, new suitable baking varieties for sustainable production systems are hardly available. Therefore the Zeeuwse Vlegel started, almost right from the start of the project, its own variety research on the regional experimental farm in Zeeland. In 1998, the Zeeuwse Vlegel received a subsidy from the government of Bhutan to support research on sustainable baking varieties of wheat[7]. When he handed over a cheque of USD 100.000,- to the Zeeuwse Vlegel, the Bhutanese minister of agriculture stated that biodiversity is at the very heart of sustainable development. The Zeeuwse Vlegel demonstrated great appreciation for this unusual support:

> *'For the Zeeuwse Vlegel this subsidy is a welcome gesture and not just from a financial point of view. It again focuses attention to a fundamental problem in sustainable agriculture. On the one hand the government encourages us to work in a more environmentally friendly way, but on the other hand it maintains and legally protects the monopoly of the large commercial breeding companies who only introduce high yielding varieties. We hope that our project, supported by this grant from Bhutan, opens the political debate on the relationship between sustainable agriculture and the constraining regulations with respect to genetic resources.'*

The collective strategy of interest promotion and lobby has been successful in the sense that the project is well known and appreciated by many actors in the domain of policy making, politics and society. Not all members think this amount of attention has been of value to the Zeeuwse Vlegel:

'The amount of attention we have got over the years can be dangerous. In many publications our initiative has been set as an example for sustainable agriculture. Sometimes they forget to keep in touch with reality: 70 hectares of wheat is not much compared to the total acreage of wheat in Zeeland and the rest of the Netherlands. The whole story is sometimes blown up, which might also turn against us, because it can used as a proof that sustainable wheat production is the future for arable farming in the Netherlands. Our chairman once said: the Zeeuwse Vlegel is used as a loincloth.'

Knowledge exchange

The first years, the collective strategy of the members within the project was also focussed on the technical aspects of sustainable wheat production. As a group they could learn from each other and get in touch with research institutes and advisors to obtain the necessary knowledge. By experimenting, exchanging information and obtaining experience from earlier years, they managed to grow the wheat without any major difficulties. In the first years the group of members regularly came together in the summer season to look at the crops and discuss problems and solutions:

'Especially when we started, we spend a lot of time gathering and exchanging the knowledge and experience to grow the wheat in this way.'

After a few years, the need to get together to discuss the growing problems was not there anymore. The enthusiasm to get together and to join excursions became less:

'Compared to the early years in which the exchange of information was also a means to meet each other, there is now less need to see each other. By now, we know how it works, so most farmers don't go the information evenings anymore.'

This lack of occasions to meet each other also affects the feeling of being part of a group. When farmers refer to the Zeeuwse Vlegel corporation, not all of them express being part of a collective initiative. Especially the ones who joined in later talk about 'them' and 'they' when they give examples of what is happening:

'I'm not actively involved in the corporation. Only when they ask me, I sometimes go to a market fair to promote the Zeeuwse Vlegel.'

'I choose the varieties for my fields out of the variety list they give to me.'

One reason for the lack of the feeling of being part of a group is the limited impact of the Zeeuwse Vlegel on the farm as a whole:

'I don't have the feeling of belonging to a group. The interaction is rather limited especially now we have tackled all the technical problems. The Zeeuwse Vlegel is only a tiny part of my farm.'

Other reasons can be found in the lack of market growth and therefore the lack of opportunities to become actively involved in the corporation. Those who have been members from the start talk more in terms of 'we' and 'us' and give examples of collective strategies such as experimenting with new varieties:

'We take care of the availability of the different varieties of wheat. The varieties we use are not of interest to the large commercial breeding companies. The varieties we need have to be resistant to pests and diseases and need to have a good baking quality. Because no research is done incorporating these particular criteria, we do it ourselves.'

Marketing and distribution

Since the start of the Zeeuwse Vlegel much time and effort has been put into the distribution and marketing of the products. As this is a time-consuming activity, the farmers of the Zeeuwse Vlegel employed a 'product manager' to organise the distribution and marketing of bread and (later on) other products. The organisation of distribution and marketing, as a third collective strategy, was thus delegated to one professional employee. Since his appointment, the product manager has also been involved in the other collective activities, but most of his time was dedicated to this third collective strategy.

In the first years the 'marketing and distribution' strategy focussed on increasing the sales of the bread. As it was one of the first initiatives for regional environmental production, it got a lot of attention and publicity. Besides this 'free publicity', the Zeeuwse Vlegel also invested in promotion material. Furthermore member farmers dedicated time to present the Zeeuwse Vlegel at fairs and markets. The signposts in the field, which state 'Your Zeeuwse Vlegel grows here' appeared to be especially effective.

However, the publicity and promotional efforts did not meet the expectations regarding bread sales. In some years, more wheat was produced than could be sold. This was a disappointment for members, several of whom had hoped to expand production. The main reason for poor sales lies in the attitude of consumers who appear uninterested in environmentally friendly bread:

'It is now the time consumers show their commitment to the environment by actually buying the bread. That is what holds us in expanding this project.'

Since the start of the Zeeuwse Vlegel, other regional products, such as beer and bread, have emerged on the markets in Zeeland. Most of these are individual marketing initiatives, in which environmentally aspects

play no role. They do however seriously compete with Zeeuwse Vlegel products, as does the increasing availability of organic products:

'The Zeeuwse Vlegel has a difficulty in distinguishing its products from other regional labels and hall marks. A lot of regional or environmentally friendly products emerged and the difference between these products is often not clear to consumers.'

Assessment of the collective strategies by farmers

When assessing the impact of the Zeeuwse Vlegel the members stress two different aspects. On the one hand they consider the project a success, but on the other had they perceive several failures. The project is considered to be successful for various reasons. First, they have demonstrated the technical possibility of environmentally friendly wheat cultivation:

'The Zeeuwse Vlegel has shown that we are able to produce in a more environmentally friendly way. That is what I like about this initiative.'

In addition they stress that the Zeeuwse Vlegel shows that farmers are willing to adapt their practices to the demands of society. In this they stuck to their approach and vision, despite the negative response of the conventional farming community in Zeeland:

'They (conventional farmers) see our approach as a personal attack. They believe that we condemn their way of working.'

Furthermore, they have been able to build an extensive network of actors. They have involved researchers, policy makers, marketing experts, bakeries, millers and quality control organisations to support and enable their initiative:

'The Zeeuwse Vlegel shows that a bottom up approach, with an open mind for possible supporters, can be effective.'

This support not only enabled them to produce and market wheat, it also got the Zeeuwse Vlegel involved in political debates on the renewal of the countryside and the debate on genetic resources. Many people set the project as an example of the new opportunities in sustainable agricultural development. This attention and support has been a reward for the energy, time and investments the members have put in this initiative. They also consider their project has improved the image of arable agriculture in Zeeland and generated other regional initiatives. They are proud that they have contributed to this:

'The Zeeuwse Vlegel has been a motor for other initiatives in the region.'

Apart from these successes, several members show disappointment when looking back at the past ten years. The project has not met all the expectations of the members. For instance, in 1992 the members expected it would be possible to produce at least 250 hectares. Now they have had to lower their sights:

'The Zeeuwse Vlegel only covers a small area in Zeeland, 70 hectares. It is a pity.'

Members are disappointed in the lack of consumer interest in Zeeuwse Vlegel bread. Sales remain limited, even after extensive promotion campaigns and new product launches. After working so intensively to develop a sustainable production method in resposnse to societal pressure, they find that this lack of interest leaves a bitter taste. They feel society is letting them down:

'I am disappointed in the consumer. They preach sustainable production, but once they are in the supermarket they choose the cheapest product.'

Also the amount of attention they got, gives them the feeling of being 'cuddled to death'. While facing decreasing sales and lack of possibilities to expand on the one hand and being praised as an examplar project on the other hand, they get an awkward feeling that something is wrong. Some feel they've let themselves go on the waves of attention and therefore lost their initial focus: cultivating sustainable wheat and distributing it themselves:

'We have been to busy with constructing the building of the Zeeuwse Vlegel and its network. In doing this, we might have lost sight of the purpose of the building.'

Furthermore, the chairman states:

'It is really a lot of work to manage a project like this and to keep things going. Most of the work is done by volunteers and to maintaining continuity is a job on its own.'

Future collective strategies

For the future most members think it is important to reconsider the Zeeuwse Vlegel project. New challenges are needed to maintain members' interest. Some members are even thinking that the project has had its day and is bound to fade away:

'I get the impression that we lack a collective approach to give the Zeeuwse Vlegel a new incentive. Or should we just face the truth and accept that this is it?'

But most members still see a challenge for the Zeeuwse Vlegel, although they find it hard to give clear ideas:

'In terms of acreage the Zeeuwse Vlegel is very small. I think we should focus on something which is really new and innovative instead of holding on to the old formula.'

Individually, they like to continue to cultivate the Zeeuwse Vlegel wheat, but they question if this will remain possible if nothing changes. The Zeeuwse Vlegel is facing difficulties in the sales of its products. Access to subsidies and financial support is decreasing, both because of the competition with emerging initiatives and the attitude of financiers. They think that the Zeeuwse Vlegel has to stand on its own feet after ten years and they perceive the Zeeuwse Vlegel as being less innovative. Some members get the feeling of being entangled in a Catch 22 situation: to take

up new challenges to get more financial backing, they need to have money for new investments, which is presently lacking:

> *'To strengthen the Zeeuwse Vlegel and to start new activities which give the project a new impulse, we need money and that is something we don't have.'*

Most members see new opportunities in expanding the number of products, not necessarily wheat based products:

> *'Personally, I see a challenge in more products, but the experience thus far with new products is not really satisfying.'*

No one seems to really know how to avoid the same kind of disappointments that happened with the introduction of beer and meat. Despite the fact that the present sales do not meet the expectations of the members, some believe that the only possibility for the future of the Zeeuwse Vlegel is to expand sales of their main product. Some think this can be done through intensifying promotion:

> *'In the future we should focus more on promotion of our products. If we don't succeed in expanding, we won't be able to continue the Zeeuwse Vlegel project for a long time.*

In 2002 the Zeeuwse Vlegel celebrated its tenth anniversary. Inevitably it was a time of reflection and of assessing the organisation, goals and results of the Zeeuwse Vlegel. It is clear that despite the successes and accomplishments of the Zeeuwse Vlegel, there are many questions to be answered and constraints to be tackled. The members of the board think the anniversary presents a good occasion for redefining collective strategies.

The institutional relations of the Zeeuwse Vlegel

An expanding network: network morphology and dynamics

The start of the Zeeuwse Vlegel brought many actors together who used to be opponents or did not have direct relationships with each other. At first the network was built around three pillars: ideology, market and the public sector. Ideology comprises the farmers' organisation (ZLTO, ZAJK), the environmental federation (ZMF) and the consumers association (Consumentenbond). The activities of these groups are mainly those of on interest promotion. These actors came together to initiate the project and to set the aims and objectives of the Zeeuwse Vlegel. The second group of actors, the market parties (millers and bakeries) was involved to concretise ideas and to develop the bread concept. The public sector, especially the Province of Zeeland and the Ministry of Environment contributed to the start of the project and provided the project with several subsidies to facilitate the activities.

Once the Zeeuwse Vlegel had been started, other parties were involved according to the emerging needs of the project. The Zeeuwse Vlegel established links with research centres, the advisory service and quality control organisations. As mentioned before, the network expanded as far

as Bhutan. Presently, the Zeeuwse Vlegel is trying to expand the market for their products by getting involved in another regional initiative, Produce from the Zeeland Countryside.

The collective strategies of the members of the Zeeuwse Vlegel take place in three different fields and incorporate three different, though overlapping, networks:

1 Economic: processing, distribution, sales and promotion.
2 Technical: research, extension and knowledge exchange.
3 Socio-political: interest promotion and policy-making.

In the following section we discuss the involvement of external actors in the Zeeuwse Vlegel and briefly discuss their assessment of the Zeeuwse Vlegel. The role of the regional farming community is included as a part of the socio-political network.

The economic network: processing, distribution, sales and promotion

Two millers and a large number of bakeries (104 in 1997) are involved in transforming the wheat into Zeeuwse Vlegel bread. The millers and bakeries are represented on the counselling committee. Their involvement in the decisions taken by the Zeeuwse Vlegel corporation is organised through regular bakers meetings. During these meetings, the bread concept is discussed.

The millers who grind the wheat, both work with traditional windmills. This type of processing is not feasible anymore for ordinary wheat for economic reasons. Thus the Zeeuwse Vlegel enables the millers to continue their trade, and for the windmills to remain as working buildings. One of the millers regrets the lack of consumer interest for quality production. To him, it is the major constraint for more Zeeuwse Vlegel production:

> *'I would like to grind more Zeeuwse Vlegel wheat, so I find it a pity that it is so hard to expand the market. I do believe in the Zeeuwse Vlegel because the wheat is of superb quality. It is a pity that bakers and consumers do not always appreciate this quality. We use the whole grain when processing the wheat, while factories often leave the wholesome parts out.'*

For bakeries and supermarkets, the Zeeuwse Vlegel bread is one of the many varieties they offer in their stores. Sometimes there are over 50 different types of bread. So the Zeeuwse Vlegel bread does not always get the attention that the corporation would like to see. The participating bakeries and stores sell an average of 5-10 loafs of bread a day and most is bought by a small group of regular customers. The price of the Zeeuwse Vlegel bread is around 15 per cent higher than the price of an average loaf. Bakers do not get an extra percentage compared to the other breads they sell. Bakers' commitment to the initiative varies. Most of the bakers and shopkeepers we informally interviewed (pretending to be customers) have no clear reason for selling the Zeeuwse Vlegel bread. Many did not

know the Zeeuwse Vlegel story and don't link the bread with environmentally friendly production. In one shop which sells the bread we were told the following:

> *'I don't think we have any environmentally friendly bread, this loaf of bread (the ZV bread) contains more fibres because it is made in a special way.'*

However, a few of the bakers/shopkeepers support the Zeeuwse Vlegel bread because they like to have environmentally friendly bread in their assortment:

> *'Nowadays you just have to have an environmentally friendly product in your assortment.'*

Other bakers/shopkeepers like to have regional bread. The Zeeuwse Vlegel sometimes has to compete with other breads with regional names such as Zeeuws Wit and Zeeuws Landbrood.

> *'I like to sell a regionally product and some of our regular customers specifically ask for it.'*

Some bakers think that the rules and regulations, which are set by the Zeeuwse Vlegel corporation, constrain the sales of the bread. It is for instance not allowed to sell the bread at a discount. Some bakers think this is a pity because special offers create consumer awareness, which may later stimulate sales. Furthermore, the Zeeuwse Vlegel corporation determines the ingredients and shape of the bread. Some bakers think this is a pity, because it looks more like ordinary bread than healthy wholemeal bread which is asked for by discerning consumers:

> *'If they allowed seeds and whole grains in the bread, it would be more appealing and it would look more environmentally friendly. I think more people would buy it'*

There is, however, a small group of bakers who participated from the beginning who supported the project throughout the years. They believe in regional production and are proud to sell the Zeeuwse Vlegel bread. They give the bread a prominent place on their shelves. The product manager of the Zeeuwse Vlegel thinks it is a pity that the Zeeuwse Vlegel was not able to stimulate this commitment and enthusiasm amongst other bakers:

> *'We never got a break through and a general acceptance of our bread by bakers in Zeeland. To me, this is the main reason for stagnating sales.. After ten years, only a few bakers are willing to bake a substantial amount of bread. We were not able to motivate a larger group. Also our decision to sell Zeeuwse Vlegel bread in supermarkets resulted in a refusal of bakers in two large cities to sell the bread.'*

Interviews with bakers and employees of supermarkets demonstrate that most of the consumers buy the bread for its taste and healthiness and not for its environmentally friendliness:

'I believe that our customers buy Zeeuwse Vlegel because they like the taste of it and not out of conviction.'

The promotion of the Zeeuwse Vlegel bread has been supported by the ZMF. The ZMF is a regional umbrella organisation for environmental groups. They contribute to sustainable agriculture by supporting innovative farmers, lobbying and advising in regional politics; and putting pressure on farmers who pollute the environment. The Zeeuwse Vlegel initiative fits in their view on sustainable agriculture includes both organic and integrated agriculture. The ZMF is represented on the board of the Zeeuwse Vlegel. Apart from their advisory role, they support the Zeeuwse Vlegel initiative by promoting the products to their members and lobbying for additional funds. A representative of the ZMF acknowledges the marketing problems that the Zeeuwse Vlegel is currently facing and the difficulty in finding solutions:

'The negative experience with Zeeuwse Vlegel meat is probably a constraint for new products. We (ZMF) missed some opportunities with these products. We failed to promote the meat. Promotion is and remains important to market new products.'

According to the representative of the ZMF, one of the reasons for disappointing sales is the producer orientedness of the Zeeuwse Vlegel. The Zeeuwse Vlegel is above all an initiative of farmers, who wanted to produce wheat in a different way. Selling the bread was not on top of the priority list at the beginning, so it might have been taken too much for granted that the bread would be easy to sell.

'A problem is that the Zeeuwse Vlegel is not enough consumer oriented. It is, or at least has become, too much of a producers' initiative. (...) When the Zeeuwse Vlegel wants to survive, it has to enrol consumers, retailers, distributors, supermarkets, etc.'

Furthermore the marketing of products needs professional skills and is time and money consuming. It means keeping up with consumer demands and translating these into bread concepts. For a small organisation, the budget for marketing and promotion is limited. The representative of the ZMF thinks that despite limited funds, a new marketing strategy could provide a solution:

'It's difficult to say whether a new type of bread would increase sales. And won't you lose a group of regular customers with the introduction of a new type of bread? I think it is useful if the Zeeuwse Vlegel were to anticipate the trend of tasty and healthy. Perhaps the best solution is not to replace the current type of Zeeuwse Vlegel bread but to introduce a second type of bread.'

The introduction of new products could be a means for increasing the sale of wheat products. For this, she thinks that organisational changes are needed:

'It remains important to develop new products. To do so, the Zeeuwse Vlegel needs a group of farmers, who are open to new and innovative ideas. The

Zeeuwse Vlegel needs new élan; people who are not hampered by the frustrations from the past and who dare to let go of things.'

However, the chairman of the Zeeuwse Vlegel wonders whether new products, new members and new *élan* would solve the current problems of decreasing sales:

'I don't think that sustainable production is possible through creating niches in the market, as we did with the Zeeuwse Vlegel. The same counts for other forms of certification. Certification means that the ones who produce sustainably and in a proper way have to make extra efforts to ensure quality and marketing. That means extra costs, while the production costs are also higher than in conventional production. This limits the chances for success. After ten years of Zeeuwse Vlegel, I am convinced that sustainable production is not a neo-liberal issue in which you can trust on the market as structuring principle.'

The technical network: research and extension

The first years, the development and implementation of new types of technologies and production methods was a core activity of the Zeeuwse Vlegel project. Weed control, resistant varieties, the use of manure, baking quality; a lot of questions needed to be answered. For this, the Zeeuwse Vlegel established links with regional research centres to learn about environmentally friendly practices and the production of high quality baking wheat, the advisory service for the most suitable varieties of wheat and quality control organisations for determining the quality of the batches of wheat.

After a few years, several national research institutes were enrolled to provide answers to specific questions. The University of Leiden was contacted for a life cycle analysis (LCA) of the environmental aspects of the Zeeuwse Vlegel, the Centre for Genetic Resources to test suitable varieties, and the Agricultural University of Wageningen to investigate market opportunities and threats. For the selection of good varieties of wheat, the Zeeuwse Vlegel crossed the border and established links with foreign breeding institutes. As mentioned before, the network expanded all the way to Bhutan, from where the Zeeuwse Vlegel received both moral and financial support to continue the research on the utilisation of sustainable wheat varieties. These researchers and other actors involved in the technical network of the Zeeuwse Vlegel have supported the project and its goals throughout.

The socio-political network: interest promotion and policy-making

In 1990, the establishment of the Zeeuwse Vlegel was a tentative initiative. Arable farmers were confronted with decreasing prices for their produce and increasing pressure from environmental policies to reduce pesticide use. The partnership between farmers' organisations and government

bodies crumbled and opposing views and ideas about agricultural development dominated political discussions.

Politicians and policy makers welcomed the Zeeuwse Vlegel project, because it was a living example of sustainable agriculture in practise . It was seen as a model for innovation towards sustainable development in using only manure and no pesticides. The province therefore contributed to the Zeeuwse Vlegel by providing subsidies and by organising promotional activities. According to representative of the province, politicians also used the Zeeuwse Vlegel as a showpiece:

'The Zeeuwse Vlegel project is often used in speeches by members of the Provincial Executive to create a positive image of the arable sector in Zeeland.'

The Province hoped that the Zeeuwse Vlegel would have an effect on the arable sector as a whole. As a representative stressed:

'We hoped that the Zeeuwse Vlegel would be a spin off for sustainable practices in other crops and products. However, this turned out to be too optimistic. The environmental impact of the Zeeuwse Vlegel is limited. Off course, the members grow environmentally friendly wheat, using very strict rules, but the effect on arable agriculture as a whole is limited. It is a pity that the acreage could not grow.'

Farmers see the lack of bread sales as a major constraint for expanding the acreage of the Zeeuwse Vlegel. When discussing this with the representative, he thinks that the Zeeuwse Vlegel might have chosen a difficult market segment, 'ordinary/plain looking' bread. Adjusting the bread concept should be an issue to consider in the future:

'The consumers have a positive image of the Zeeuwse Vlegel, but not many are buying the bread. What I've noticed is that the health aspect is more of interest to the consumer than environmentally friendliness. Maybe the Zeeuwse Vlegel should adjust its bread concept by making it look 'more healthy'.'

There is little doubt that the Province intends playing a less active role in Zeeuwse Vlegel in the future:

'Over the years, the Zeeuwse Vlegel received a lot of financial support from the Province. Now we think it is time the Zeeuwse Vlegel stands on its own feet. The Province is 'subsidy tired' and therefore reluctant to give more financial support. Furthermore, I think the challenge of the Zeeuwse Vlegel lies more in strengthening their own activities instead of trying to get more subsidies. These activities could include: other products, more consumer-oriented products and more investments from farmers themselves in marketing the produce.'

Over the years policy makers have moved fro a position of warm support for the Zeeuwse Vlegel initiative to one where they feel that it should stand on its two feet (as indicated above).

The opinions of neighbouring farmers and farmers' organisations have, however, moved in te opposite direction. Initially many local arable farmers were extremely critical about the Zeeuwse Vlegel. A member farmer states:

> *'Many arable farmers in the neighbourhood are of the opinion that the Zeeuwse Vlegel is a step backwards because our yields are much lower, because we have reintroduced old cultivation techniques, because we have more weeds in our wheat crop compared to them, because we put so much time and effort in promoting and selling the bread and because it is a small scale-project.'*

Over the years this attitude changed. The regional farmers' organisation (ZLTO) is currently participating in experiments for sustainable practices in pesticide and fertiliser use. Also neighbouring farmers seem more and more interested in the cultivation aspects of the Zeeuwse Vlegel.

> *'The Zeeuwse Vlegel creates room for discussion with colleagues. Normally farmers only talk about the yield when you ask them about the result of the wheat harvest. I am glad that they no longer ask me about the yield, because they know the yield of Zeeuwse Vlegel-wheat is much lower compared to conventionally cultivated wheat. Furthermore, they know that the yield of the wheat is of minor importance in our approach. So that implies that they have to talk about other aspects of wheat cultivation and such a discussion is more fruitful to me compared to this useless talking about yields.'*

Concluding remarks

Zeeuwse Vlegel: success or failure?

There is no straightforward answer to the question of whether the Zeeuwse Vlegel has been a success or a failure. To tackle this question we have to examine the results of the project in relation to the goals the Zeeuwse Vlegel set for itself and the perceptions of the participants of whether the project is a success or failure. The main goals of the Zeeuwse Vlegel are:

- To examine the feasibility of economically viable and environmentally friendly cultivation methods on conventional farms and to market the produce.
- To implement economically viable and environmentally friendly cultivation methods on conventional farms and to market the produce.
- To reduce the alienation between consumers and farmers.

On all three of these accounts, the Zeeuwse Vlegel can claim to have been a success. In the first place, the Zeeuwse Vlegel has demonstrated that the environmentally friendly cultivation of high quality baking wheat is technically possible, and profitable. Secondly, the participating farmers, together with other actors, have succeeded in organising the processing, distribution and marketing of Zeeuwse Vlegel products themselves.

Finally, the Zeeuwse Vlegel has partially succeeded in bridging the gap between producers and consumers from the point of view of traceability of products. Their bread and other products can be traced from the field to the bakery shops.

The actors involved in the project also refer to a number of other indirect effects of the Zeeuwse Vlegel as indications of its success. These are:

- An increase in Zeeland in the production and sales of regional products;
- More environmental awareness among conventional farmers and farmers' unions;
- More institutional support for similar types of sustainable agricultural development.

Tangible proof of the latter is the recent replacement of the Sunnan wheat variety on the List of Varieties.

Despite a number of successful results, the Zeeuwse Vlegel can also be seen as a failure:

- The sales of bread and other products remain limited and are currently declining;
- Only a limited number of participants is possible;
- A gap still remains between producers and consumers, in the sense that many consumers do not share the philosophy of the Zeeuwse Vlegel. The Zeeuwse Vlegel has also failed to adjust its production regime to meet consumer demands.

Overall perhaps the Zeeuwse Vlegel can be considered a minor success. It met most of its initial objectives and had some spin off benefits. But at the same time it has not yet established a viable market position. It has failed to incorporate all interested farmers. And, if the sales of bread are used as an indicator, it has failed to close the gap between producers and consumers.

Impact on sustainable agriculture

Although it remains difficult to measure the exact impact of the Zeeuwse Vlegel on sustainable agriculture, , it is fair to state that the Zeeuwse Vlegel has contributed to sustainable agricultural development at local and national levels. It has actively contributed to the political debate on genetic resources and the legal barriers for sustainable agriculture embodied in the Seeds and Planting Materials Act. As a consequence the Dutch government now recognises these barriers and intends to adjust legislation (albeit within the boundaries of international legislation, treaties and agreements). Furthermore the Committee responsible for the List of Varieties intends to give more attention to varieties or genetic characteristics that contribute to ecological sustainability. The reinstatement of the Sunnan wheat variety on the List of Varieties, is tangible proof of this intention.

Another impact of the Zeeuwse Vlegel on sustainable agriculture is that there is less aversion to spring application of slurry and manure amongst arable farmers in Zeeland. Many conventional farmers are now interested in using spring application methods, not only in cereals but also in other crops. Spring application on a large scale is not yet feasible as the necessary technologies for arable crops are still in the process of development.

Inspired partly by the Zeeuwse Vlegel, the provincial government has switched to a pro-active role in designing the future of arable farming in Zeeland: it now strongly supports the development of regional products and organic farming. The Zeeuwse Vlegel also opened the debate within the regional farmer's unions on other development paths besides intensification, scale-enlargement and bulk production. Many of the representatives of the regional farmer's unions nowadays support the idea that regional quality production and organic farming are economically viable ways of farming. Production and sales of regional products and the on-farm sales of artisanal products have increased in Zeeland in recent years. The Zeeuwse Vlegel, supported by the change in attitude of the provincial government and the farmer's unions towards regional products, has been an impetus to these changes.

The direct and indirect impact of the Zeeuwse Vlegel on sustainable agriculture in Zeeland is mainly of a socio-economic nature. The ecological impact is somewhat limited as a result of the small acreage of the Zeeuwse Vlegel and the fact that for mainly of the farmers involved the Zeeuwse Vlegel has not influenced cultivation methods for other crops. Furthermore, the number of arable farmers that have converted to organic farming, inspired by the experience of the Zeeuwse Vlegel, is very small. Overall, national policy measures (particularly towards manure and pesticides) have contributed more to the ecological sustainability of agriculture in Zeeland than the Zeeuwse Vlegel has.

Driving forces

The Zeeuwse Vlegel had a very successful start in producing environmentally friendly baking wheat and establishing an, albeit small, market niche. This was due to the enthusiasm of all the actors involved – and a firm shared belief in the goals of the project. Enthusiasm was further triggered by the many challenges the participants had to deal with and the many interesting questions had to be answered. In addition, almost all of the early participants felt responsible for the project and realised that collective action was needed to achieve success. These were all important driving forces at the start of the Zeeuwse Vlegel. The enthusiasm, combined with the feeling of responsibility, of a few key actors is still a major driving force at the moment. They dedicate a lot of time and energy to 'keep the Zeeuwse Vlegel going' and seeking new challenges and opportunities. At the same time this has become a major

barrier, as the dynamics of the Zeeuwse Vlegel more or less depends on these key actors.

Another important ingredient for success was the co-evolution of a product (environmentally friendly bread) with a new network of socio-technical relations. During the past ten years the Zeeuwse Vlegel has been supported by policy makers at the provincial and national levels. In the same period the Zeeuwse Vlegel succeeded in enrolling a large number of institutional actors. Institutional embedding and support is a crucial driving force for environmentally friendly farming. At the moment this 'convergent' network of socio-technical relations remains an important driving force. This however only holds true for the socio-political and the technical network. The economic network of the Zeeuwse Vlegel lacks sufficient convergence.
In more general terms one could conclude that new forms of sustainable farming not only demand the creation of new products (including methods, practices, knowledge, etc) but also the societal embedding of these new products. Building and establishing a supportive socio-technical network is thus a prerequisite for new forms of sustainable agriculture.

Barriers

The main barrier facing the Zeeuwse Vlegel is the slow decline in bread sales and the poor sales of other products (especially meat). In the case of bread this is due to the limited commitment of bakers and supermarkets to the goals of the Zeeuwse Vlegel and the limited or even non-existent knowledge about the philosophy behind the approach. Bakers of Zeeuwse Vlegel bread are not really committed to the project because many of them do not actively support the goals of the project and because they don't receive any added value compared to other types of bread. Many of them have no strong reason to promote Zeeuwse Vlegel bread, as it is just one of many types of bread that they sell. According to bakers consumer demand for Zeeuwse Vlegel bread is limited. It is not a distinguishable type of bread (compared to ordinary wholemeal bread) and does not have the image of healthy wholefood. Bakers claim that 'environmentally friendly' doesn't sell bread anymore. As one baker clearly expressed:

> *'I need to earn money, so that's why I don't give a damn about this environmentally friendly bullshit.'*

Given the limited commitment of bakers, who play such a key role in the economic network, it is not entirely surprising to see a decline in commitment and support. In the design phase of the Zeeuwse Vlegel the bakers were actively involved in the design of the project, in particular in the construction of the bread concept. The product that emerged was the outcome of negotiations between farmers, bakers and environmentalists.

However, during the following years the bread concept remained the same, because bakers thought a new concept would not work. Marketing of products not only implies the construction of a coherent network, through alignment of actors in the design phase, but demands continuous effort to maintain alignment and the willingness of key actors (in this case the board of the co-operation) to be open to changes. This is especially relevant in a very dynamic sector like the bread market. Failure to maintain the engagement of bakers, and their ongoing commitment, is one of the evident shortcomings of the project.

A second major barrier, which is more of an 'internal' problem, is that the notion of collectivity has slowly disappeared. The dynamics of the project are centred around two people: the chairman of the board of the foundation and the product-manager. These two, to some extent supported by members of the boards of the foundation and the co-operative and of the counselling committee, feel responsible for the future of the Zeeuwse Vlegel. Most of the participating farmers, let alone other actors involved in the economic network, do not share this feeling of responsibility. They more or less sit back and await suggestions and options from these 'leaders'. This also implies that most participants are reluctant to reflect on the shape, contents and goals of the project or to critically judge new options bought forward by the few more active members. For the future of the Zeeuwse Vlegel it is therefore of crucial importance to revitalise collective responsibility. We have to admit that this is easier said than done.

Another barrier, partly related to the former one, is the lack of new challenges and innovations. In the beginning of the project many questions had to be answered and this triggered enthusiasm and collective action. Collective action took place in several, unexplored fields: marketing and distribution of products, environmentally friendly cultivation methods, selection of suitable wheat varieties and network building. More recently, the challenge of marketing and distribution has been reduced to the question of how to increase sales or, more pressingly, how to maintain the current level of sales. For many participants this issue is the responsibility of the product-manager. The possible range of environmentally friendly cultivation methods has been explored and the most suitable ones have successfully been implemented. The challenge of cultivating has been transformed into optimising both yields and baking quality. Finding and selecting suitable wheat varieties demands continuous attention and research. The quest for better varieties than those currently being used remains challenging, but most farmers see this activity as the responsibility of the board, the product manager and the regional experimental farm. As with distribution and marketing, the

testing of wheat varieties is not perceived as a collective responsibility. Creating institutional support by enrolling relevant actors, and thus by constructing a network, has been a challenging activity from the very start of the Zeeuwse Vlegel. Expanding this network through the enrolment of new actors, especially in the fields of research, utilisation of genetic resources and legislation at the national levels, still is a challenge for some members of the board and is part of the daily work of the product manager. Although the participating farmers support the expansion of the network in this way, most of them do not feel responsible for it.

A fourth barrier that, in fact, comprises all the barriers discussed above, is the fact that all efforts of the actors involved were dedicated to secure the continuation of the Zeeuwse Vlegel in the direction that was set out at the very start of the project. During the last ten years the value of the Zeeuwse Vlegel has never been an issue. As a member of the board stated:

> *'During the past ten years we have only been working on the building called 'Zeeuwse Vlegel', but forgot to ask ourselves why we built it, why we want to continue working on the building and what the use and value of this building is.'*

In group discussions we sensed that, for most members, the structure of the building was so evident that it was unthinkable to transform it, let alone to question its foundations.

Network dynamics

To improve and/or re-direct network dynamics it is of the utmost importance to restore or redefine collective responsibility. For the group network this implies the necessity to define new common interests and challenges. In that respect it may be worthwhile to collectively invest in new options, instead of applying for subsidies, thereby creating common interest and individual responsibility for the collective at the same time. Stricter measures may also help restore collective cohesion, for instance by only allowing farmers who are willing to invest labour, time and/or money in the Zeeuwse Vlegel to participate. This implies that the board of the Zeeuwse Vlegel should reject passive farmers, who only participate for personal gain.

During the later years much of the collective effort has been dedicated to building and maintaining relationships with the outside world. However, a collective strategy should also include the maintenance of relationships between group members. This has been neglected in the last years and thus deserves extra efforts and attention in the near future.

Finally it is important to define clear goals, to monitor progress towards these goals and to undertake action on basis of this. This means that the group has to (re)consider on a regular basis what they want to achieve, how, why and with whom. One of the great challenges the Zeeuwse Vlegel is thus facing is how to incorporate moments of learning and

evaluation in the project. Doing so makes possible to identify whether, and in what ways, collective actions (i.e. networking strategies) are effective.

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Notes

1 The Hagberg index is a measure for the percentage early germination. The Zeleny sedimentation value is a measure for the protein quality.
2 The Centre for Variety Research, The Netherlands (CVN) performs statutory tasks for the Dutch government, including the official testing of varieties for Plant Breeder's Rights (PBR) and the co-ordination of testing for the Value for Cultivation and Use (VCU). The CVN is an independent unit within Plant Research International, one of the research institutes of Wageningen University and Research Centre.
3 Signed in Paris in 1961 this is better known as the UPOV convention (Union pour la Protection des Obtentions Végétales).

4 The binding status of the Dutch List of Varieties lapsed in 1975 with the introduction of the equally obligatory EU List of Varieties. Since then the Dutch List of Varieties is a list of recommended varieties for Dutch Agriculture. In practice farmers mainly choose varieties from this list (Wiskerke 1997).

5 Zeeland is a relatively small province in the southwestern part of the Netherlands, bordering Belgium. Six different regions, mainly former islands, can be distinguished: Schouwen-Duiveland, Tholen, Noord-Beveland, Zuid-Beveland, Walcheren and Zeeuws-Vlaanderen. Approximately 83 per cent of the agricultural land (124.000 ha) is used for arable agriculture, 11 per cent is grassland and 6 per cent is horticulture (both fruits and outdoor vegetables). Tholen, Noord-Beveland and Zeeuws-Vlaanderen are typical arable farming regions, while Walcheren is still known for its relatively large number of traditional mixed farms (arable crops and livestock). Fruit production is mainly located in Zuid-Beveland. The six regions also differ with respect to the average farm size. Farms are relatively small in Walcheren, Tholen and Zuid-Beveland (especially in the fruit production area) and relatively large in Noord-Beveland and the western part of Zeeuws-Vlaanderen. Small scale farming in Tholen mainly involves the labour intensive production of early table potatoes, vegetables, flowers and seeds (flowers and vegetables). In Walcheren small scale farming usually consists of a combination of arable crops, vegetables, dairy farming and agro-tourism (bed & breakfast, mini-camping, etc.). The large farms in Noord-Beveland and western Zeeuws-Vlaanderen are mainly specialised arable farms, growing crops such as winter wheat, grass seeds, potatoes, sugarbeet and unions.
6 In this discussion the participants not only took the problem of weeds in baking wheat for the Zeeuwse Vlegel into consideration, but also the wider and long term effects of inadequate weed control in baking wheat. In the daily practice of arable agriculture, farmers prefer to control the weeds in cereals, as it is fairly easy in those crops. Control of weeds in crops like potatoes and sugar beet is more difficult and implies a need for more herbicides. So one can choose not to use any herbicides in wheat cultivation, but if that implies that the overall effect is that more herbicides will be used on the farm as a whole, then nothing is gained from an environmental point of view.

7 This subsidy is the result of the treaty on sustainable development between the governments of the Netherlands and Bhutan. This treaty also entails the principle of reciprocity, meaning that the government of Bhutan had to select and financially support a Dutch organisation or project, which corresponds with the Bhutanese view on sustainable development.