ECO·PB

European Consortium for Organic Plant Breeding

Different models to finance plant breeding

Proceedings of the ECO-PB International Workshop on different models to finance plant breeding

27 February 2007
Frankfurt Germany

Edited by
A.M. Osman, K-J. Müller and K-P. Wilbois

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Preface

These proceedings summarise several presentations of the ECO-PB International Workshop on 'Different models to finance plant breeding' which was held in Frankfurt in the Ökohaus KA Eins, Germany on 27 February 2007. This workshop was organised by the European Consortium for Organic Plant Breeding ECO-PB (Klaus Peter Wilbois/D), Association of Biodynamic Plant breeders ABDP (Karl Josef Müller/D) and the Louis Bolk Instituut (Aart Osman/NL). Among the participants were farmers, breeders, researchers and policy makers. Examples of different existing models and new ideas have been discussed by plenary oral presentations, because there is a clear need to find ways to make (organic) plant breeding less costly. These proceedings show possible scenario's in building up new relationships between partners in breeding. ECO-PB will keep on stimulating the international exchange of such strategies. We thank the sponsors Triodos Foundation (NL) and the Zukunftsstiftung Landwirtschaft (D) for supporting this workshop.

Edith Lammerts van Bueren
Chair of ECO-PB

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Content

Introduction

A.M. Osman[1] and K-P. Wilbois[2]

[1] Louis Bolk Instituut, Hoofdstraat 24, NL-3972 LA Driebergen, The Netherlands,

[2] FiBL Deutschland e.V., Forschungsinstitut für biologischen Landbau Galvanistr. 28, 60486 Frankfurt am Main, Germany

Why this workshop?

To be able to produce healthy and tasty food, organic farmers need varieties that are well adapted to their way of farming. Within the organic sector there are only a small number of organic breeders to produce such varieties. Therefore organic farmers also depend on varieties that are produced by conventional breeding companies. While most of these do not pay special attention to the organic sector, a few conduct part of their breeding programme under organic conditions. One of the limitations for an increase in organic breeding are the resources required for this effort.

Within the organic world there are different views on the financing of breeding. In the first contribution of this volume Oliver Willing of the Foundation on Future Farming, an important donor for organic breeders in the German speaking countries, shows that some argue that breeding and seeds are a public good and hence should be financed by society. Although the organic community also finds that seeds should not become monopolized by a handful of private multinational corporations, part of the sector also sees a role for those private seed companies that do respect the values and needs of the organic sector.

For both situations, public or private organic breeding, a tremendous increase in financial input is needed for the development of a sufficient assortment of well adapted varieties in all cultivated crops. To achieve this we need to think of new models to finance plant breeding. The purpose of this workshop was to discuss these with a broader public in order to inspire participants in generating new ideas.

The presentations in this volume

A first theme that was touched in two presentations at the workshop were ways to reduce breeding costs. Johan Birschitzky of Saatzucht Donau proposes to diminish the costs of organic breeding by combining organic and conventional programmes. Besides costs of breeding itself, the official release procedures of varieties of arable crops are a bottle neck. These are so high that these can hardly be earned back when one breeds for a small market, such as the organic

market. Karl-Josef Müller of Cereal Research Breeding Darzau shows that there are a number of legal ways to deal with this.

In the case of small potato breeders, breeding costs and risks are shared between formal breeders and farmer breeders. This model is also a form of participatory plant breeding. In the potato case farmers' contribute "in kind", through doing selection work, and also may share in the profits.

In the example of Ton den Nijs of PRI conventional fruit growers and partners further down the production chain actually financially invest in the breeding. In organic agriculture the case of the Sativa Bread in Switzerland is an example of a chain approach that includes an organic breeder, farmers, millers, a baker and the COOP supermarket. Together they produce bread that is sold under the brand name "Sativa". This example inspired Aart Osman of the Louis Bolk Institute to propose partners in the Dutch organic wheat chain to get involved in financing breeding.

Common to most models is an appeal to partners in the chain to take their own responsibility. The idea of a shared responsibility for our food production is presently receiving more attention in the organic world. In the different European countries new organic trade concepts are emerging which appeal to this. The challenge is to extend this growing awareness of traders and consumers of a shared responsibility for food production to plant breeding.

Breeding research and development as a social task

O. Willing, Zukunftsstiftung Landwirtschaft in der GLS Treuhand e.V., Christstraße 9, D-44789 Bochum, email: willing@zs-l.de

Why does the Foundation for Future Farming consider plant breeding as a social task? Why is it not only the obligation of seed producers or the government? What is our most important point of view on the Future of Agriculture's Seeds?
Plant breeding represents an important key to the future and is increasingly recognized as a market of the future. World-wide, seed is the basis of our daily bread and nourishment. Those who dominate the seed market decide what we, our children and our grandchildren eat. Seeds are our cultural inheritance. But today they are increasingly considered more economic goods, and so, become the raw material of the biotechnology industry and the stock market.
Which ingredients, which external necessities (food, energy, nutrients, clothing, regionalism, climate change etc.) or internal necessities (flavor, strengthening of intellectual or spiritual abilities, health), which ethical values should be fulfilled by future varieties? What does food quality really mean? Which of our ideas about humanity and the world effect breeding methods? (Patricia Taterra "We are what we do!", also can say: "We are what we think!" and this means for breeding: We eat what we think!)
Breeding gardens are our 'Kindergartens' and learning grounds for the future of food! In our opinion, however, the future of our food should not become the plaything of powerful economic interests or capitalist markets.

Over the last 25 years, these factors (capital and powerful interests) have gained increased influence. While not a single breeding firm possessed a world market share above 1% in the year 1980, 10 Agro-corporations dominate over 50% of the global seed market today. The privatization of the seed sector goes hand in hand with its domination by corporate giants / stock corporations. Varieties disappear from the market and make their way into companies' own private variety banks. What are the consequences of the privatization and concentration?
For example, in 2002 the largest vegetable seed company at that time, Seminis, removed over 2000 open pollinating varieties from its program due to streamlining! In 2004, Seminis was bought out by Monsanto.
In our view, this trend towards privatization is wrong. Seed is a cultural asset. As an inheritance from our ancestors, we have an obligation to administer and develop our seeds responsibly. Therefore breeders can make a decisive and valuable contribution. This contribution, however,

must serve the common welfare and not capitalist interests. Similarly, breeding must be financed by the whole of society.
As the basis of our food source, seeds need to be as available as water and air. Seed is closely connected to mankind's most basic rights.

Therefore, plant breeding must:

- occur regionally and ecologically;
- be based on transparent and ecological methods;
- not technically exclude generative reproduction (hybrids, CMS[1] hybrids, terminator gene technology); and
- be participatory, in other words occurring in connection with the involvement of the users and in the dialogue with users.

In our view, this will ensure:

- diversity;
- independence from large corporations;
- social discourse; and
- our ability to further develop seed in the future.

These are some of many reasons that the Foundation for Future Farming has fostered and supported ecological and biodynamic breeding research for more than 12 years.
As the Foundation possesses only limited capital stock, it depends on donations in order to continuing sponsoring research. This means that for our sponsored projects, we need socially concerned individuals, who are not geared towards a return on investment in the typical sense.
When the Seed Fund first began, its research on ecological breeding free of genetic modification was supported almost exclusively by consumers and private persons. In the last few years, however, retailers, processors, farmers, bakers etc. are increasingly supporting the Fund.
In our opinion, viable future breeding research and financing should be built on three pillars:

1. consumers;
2. the chain from farmers/gardeners to processors and retailers; and
3. state support, since it is the responsibility of the state as a provider of public goods to facilitate open-ended research. Further: as long as substantial state funding is appropriated for genetic engineering, it is imperative that alternative approaches receive equal treatment. Breeding research and breeding in general are time-consuming, labor-intensive and consequently, very costly.

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[1] Cytoplasmic Male Sterility

The development of one variety takes 10 years and, according to the Federal Association of German Plant Breeders, costs approximately 60.000 Euros annually.
At present, the Foundation for Future Farming supports 26 projects on breeding research with almost 600.000 Euros per year. However, almost 1.5 million Euros per year are needed for these 26 projects alone.
Therefore, independent and ecological breeding research for organic farming depends upon expansive support from all areas of society. We will continue to work towards this goal. Many good ideas and concepts are needed in order to ensure the financing of this all-encompassing obligation.
A decisive factor will be, how each of us visualizes the meaning of the future of seed. Whether we accept the privatization of seed or whether we consider the seed question to be interlinked with the basic rights of mankind and consequently as a cultural obligation for the future.

So everybody can help to develop a sprout for the future!
Be a part of the future!

Economic perspectives of breeding cereals for organic farming through a combination of organic and conventional selection strategies

J. Birschitzky, Saatzucht Donau GesmbH & CoKG, Saatzuchtstrasse 11, A-2301 Probstdorf, Austria,

Email: johann.birschitzky@saatzucht-donau.at

Introduction

Organic farming has been increasing for many years in European Agriculture. In organic plant production cereals are the most important group of species. Organic farmers are not allowed to use chemical-synthetic fertilizers and pesticides, therefore healthy seeds of varieties with high quality and a broad disease resistance are very important. Many varieties bred for conventional farming do not fulfil the specific requirements of organic farming.

In the discussion about the best way of breeding cereals for organic agriculture (OA) it is necessary to deal also with the economic perspectives (financing of breeding programmes) besides the scientific topics of breeding and selection.

In the following calculations and conclusions about financing a breeding program wheat (as the biggest cereal species in Europe) is used as an example. It is even more difficult to finance activities in organic breeding and selection of other cereal species (because of smaller acreage and seed markets).

Financing a breeding program

The main income of a cereal breeder is the collection of royalties. These royalties are paid for certified seed in all European countries by the seed producing companies and are included in the price the farmer has to pay for the certified seed. The levels are very different and go from €15-€20 per tonne of seed for older varieties in southern and eastern Europe up to €60-€80 per tonne in western and northern Europe. As an average €40-€50 per tonne can be calculated. For varieties that are marketed abroad the royalty usually is split 50:50 between the breeder and the local representative (breeder or seed producing company).

In some European countries (for example France, Germany, U.K., Sweden, Czech republic,…) there are also different systems established, that collect royalties for the use of farm saved seed.

Other sources for financing breeding include sales of multiplication seeds (depending on the size of the farm of the breeder), research projects, donations, end user royalties (paid by consumers for the used commodity of certain varieties).
In conventional breeding programmes royalties contribute 80-95% to the income of a breeder.

3 ways of breeding cereals for organic agriculture

1. *Selecting the best performing varieties bred under conventional breeding conditions* (CONB). After conventional variety release, additional selection is done by testing under organic conditions.

From CONB many varieties are available all over Europe, some of them fulfilling the requirements of OA. Concern is raised in case of specific traits that are seen as unimportant or even negative in conventional selection (e.g. long straw, lower yielding genotypes of wheat with very high protein content).
For the breeder of conventional varieties the use of these varieties in OA is a possibility to collect additional royalties.

The two biggest problems of this type of varieties are

a. lack of adaptation to organic agriculture and/or
b. the requirement for an additional period of selection.

2. All breeding steps are done on organic plant breeding farms-(OPB)

This approach is relatively new and (therefore) for the time being it is not easy to evaluate all advantages and disadvantages. From our point of view the two biggest problems could be

c. financing of the breeding program and/or
d. genetic diversity in organic agriculture.

In OPB the breeder has to decide whether he wants to have a rather big program with a size comparable to a conventional program. This makes it difficult to earn enough royalties from organic seed production to pay off all costs. The other possibility is a relatively small program with the drawback of both reduced genetic variability and chances to find enough improved varieties.

3. *Varieties that are bred for organic agriculture (BFOA) partly within conventional breeding programs.* Organic selection environments are included, and the varieties are released after official test under organic conditions.

In the breeding station Probstdorf Dr. Franziska Löschenberger and colleagues have developed a breeding scheme for winter wheat for OA. We believe this strategy combines broad genetic

variability with sufficient selection for organic agriculture (5 years, 20-25 organic locations in total) and a good chance to finance the costs of this programme mainly through royalty incomes.

In this breeding scheme we have 5 phases (4 before registration)

a. Creation of variability (F1-F2): Part of the crosses are made with a specific organic perspective but subsequent selection of lines for OA is NOT restricted to these crosses.
b. Selection under conventional conditions (F3-F5): We select in our conventional nursery (low input of fertilizer, no fungicides) mainly highly heritable traits like tillering capacity, early vigour, earliness in heading, disease resistance, plant height, grain characteristics (thousand kernel weight, hectolitre weight, protein content and protein quality). This selection is always done with a special reference to the requirements of OA. Much of the selection in this phase is depending not on measurements but on visual evaluation (One look from a good breeder is the cheapest, fastest and most efficient selection tool).
c. Private trials under organic conditions (F6-F7): In 2 years of private trials under organic conditions (1-3 locations per year) we select the best varieties for official organic trials. With the additional conventional trials we do in that phase we think we can increase the chance to select varieties that are adapted to different environments (which is of special importance in OA.)
d. Official trials under organic conditions (F8-F10): in 3 years with 5 locations our official authority BAES (Bundesamt für Ernährungssicherheit) evaluates the performance of the candidates in yield, quality, disease resistance etc. under organic conditions. After a final report our variety registration commission decides about listing. If the variety is listed seed production under organic conditions starts.
e. Organic trials in Austria and abroad (F11-): After registration the most interesting varieties are continued in organic official trials and in some other organic trials which accompany marketing of the varieties. In both phase 4 and 5 we test advanced material in organic trials with partner companies abroad that are active in organic seed production (for example Naturland, ISZ, Lemaire, Sem Partners, Agri Obtentions etc.).

For five Years Saatzucht Donau is now working with this strategy. From 2004-2006 four specific organic varieties (PIRENEO, AUROLUS, STEFANUS, BITOP) have been registered in Austria. (AUROLUS has been withdrawn because of problems with sprouting resistance (falling number)). The other 3 varieties are now marketed (mainly for OA, partly for low input conventional conditions) in Austria, Germany, France, Hungary and Romania.

Our internal calculation shows that we can breed suitable varieties for OA through our combined strategy of organic and conventional selection environments (BFOA) at 30-50% of the costs of a completely separate organic wheat breeding program.
Based on our calculation the breeding of one variety costs normally approx. 200.000 Euro. With these reduced costs we think it is realistic to finance our breeding work for OA mainly by royalties that we collect for our varieties. Per variety this means seed sales of 2000-3000 tonne compared to the 6000 tonne are necessary to finance an exclusively organic approach. The costs for breeding one variety depend mainly on the size of the programme and the competitiveness of a market and are therefore different for each company.

Small potato breeders in The Netherlands, history and actual situation

J. P. van Loon, De Meteoor 8, NL-8251 AM Dronten, The Netherlands,

email: janannyvanloon@hetnet.nl

History

The interest in better varieties goes back till 1845, the late blight outbreak in Ireland/Europe. In Holland the start of an organized trial was in 1888, with Mr. Geert Veenhuizen, the "godfather" of the Dutch potato breeders. One of his varieties, Eigenheimer is still in our National List.
In Wageningen the Institute of Plant breeding was founded in 1912. The first National List was published in 1924, both very important for breeders. Potato breeding was mainly done by small breeders till about 1930, from then also breeding stations started.
Organisation and coordination started in 1938. SVP was founded for pre breeding in 1948, not only in potatoes. This situation continued till about 1985. Withdrawal of governmental support slowly changed the system. From then on, most small breeders are clustered around a seed company.

Small breeders

A small breeder works on small scale, mostly as a "hobby" besides a regular job. These breeders are seed potato growers or related to the seed potato industry. Usually is mentioned the number of first years clones (single hills, first year in the field, every tuber is a potential new variety) as the size of breeding. These clones derive from true potato seeds after a cross. More precise 90 % of these breeders are selectors, because they work together with a company and the company will do the crosses etc (see Table).
The size, in number of single hills is average about 500 each small breeder. More professional breeders grow till over 1000 and after success and income of royalties even up to 10.000 and higher. Because of the long breeding cycle, investment for a larger program is high. It takes at least fifteen years, from cross to the market.

In 1934 only 17 small breeders were active. The top was in 1956 with 243 potato breeders. Nowadays there are about 160 small breeders. 97 % of them are clustered around a company. Before 1934 it was only private initiative. The Inspection Service, NAK, made a survey in 1934. This resulted in the establishment of C.O.A. in 1938. Almost fifty years, C.O.A. organized pre

trials, advice etc. From about 1950 SVP took over supply of seeds from crosses and clones. After about 1985 companies took over this coordination and pre breeding.

Table: Breeding scheme of potato

BREEDING CYCLE

YEAR
Company: *Pre breeding/creation genetic variation*
-2 - PRE-BREEDING (UP TILL 25 YEARS)
-1 - FINAL CROSSES, (PARENTAGE)
-0 - PRODUCTION OF CLONES (FIELD OR GREENHOUSE)
1. -
2. Breeders:
3. Year in the field
4. 1} Four years: (50.000 x 1plant)
2} - Visual selection
3} - Basic agr. characters
4}
- -
Breeders + Company:
5} Four years selection for: - production
6} - resistances
7} - quality
8} - adaptations
- - - - - - - - - - - - - POTENTIAL VARIETY- - - - - - - - - - -
Company:
9} Four years research for - market
10} - variety list
11} - plant breeder's right
12}
- - - - - - - - - - - - - VARIETY LIST- - - - - - - -
Company
13} Up till four years: (1 x 50.000 = 1 HA)
14} - Introduction in the market
15}
16}
- - - - - - - - INTRODUCTED VARIETY - - - - -

Cooperation

The main reason for clustering was withdrawal of the government in pre breeding and variety testing. Small breeders increased their contacts with companies. This cooperation is based on contract, but resulted in less open communication and more dependency. Advantage is a program with a large spreading and less labour (investment). Disadvantage is organisation and control over the strategy.

The relation of the small breeder changed from variety contract to cooperation contract on exclusive bases. The cooperation is most organized as "no cure, no pay". See the table with scheme of the breeding cycle for details of cooperation. Only after success, there is share of royalties, based on the rules of the contract.

The royalty has a minimum of € 1,25/100 kg seed potatoes, with an average of € 400/ha to share between the breeder and the company.

Future

The number of small breeders is decreasing. Main reason is one man farms and partly the strategy of the seed companies. Also in the competition the small breeder has to be more professional.
This breeding system seems to be typical Dutch and also typical potatoes. It exists now for over 100 years. Conditions are: small scale and handwork, time consuming. In other crops there are little comparable programs, most in flower bulbs, mainly tulips.
Not only in crops, also in animal breeding you can find it, as hobby. Like domestic animals as rabbits, cats, dogs, birds, but also cattle breeding.

Summary

Small breeders are typical Dutch, mainly in potatoes and over 100 years already. They are very successful, about 50 % of the potato varieties are from small breeders. A decrease is expected, because of shortness of time and to be more professional.
In general: Pleasure goes for money, but results are very important.

Better breeding for niche markets by closing the chain

A.P.M. den Nijs, Plant Research International, Wageningen University and Research Centre, P.O. Box 16, 6700 AA, The Netherlands, email: ton.dennijs@wur.nl

Wageningen University and Research Center (WUR) formed Plant Breeding in 2005 as a merge-between the Laboratory for Plant Breeding, a Wageningen University Department, and the Business Unit Biodiversity and Breeding of Plant Research International (PRI), part of DLO, formerly part of the Dutch Ministry of (then) Agriculture and Fisheries. PRI resulted from a merger amongst several governmental agricultural research institutes including the IVT, The Institute for Horticultural Plant Breeding. This institute had already a long history of plant breeding, starting in the thirties of the last century, and until today Plant Breeding is involved in practical breeding besides breeding research at all levels of sophistication.
The produce chain starts with the breeder creating the varieties, followed by seed or plant propagators, trading houses selling the seed growers, which in turn hand over their products to specialized traders or auctions which bring the product to the market place for the consumer to enjoy.

It can be argued that over time the logical and essential feedback mechanisms have disappeared which should ensure that e.g. the consumer is offered what he/she desires. The psychological and physical distance has sometimes become too great.
Historically governments have recognized the need for improved varieties and have commissioned agricultural institutes to start breeding programs to create these adapted varieties. This was typically to fight hunger or to improve the quality of life of its population, and not with specific consumer demands in mind.

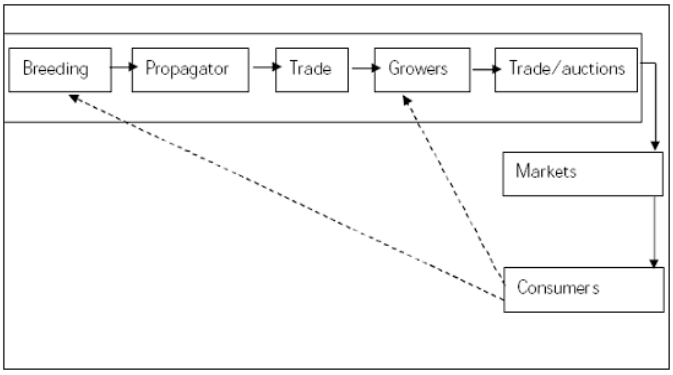
Historically plant breeding tends to shift from being a public endeavour to private business with government concentrating on enabling businesses to take over with the insurance of sufficient production to meet the market demands. This concept can ideally bring about chain integration and better consumer focus in the chain.
Two examples may illustrate this in the field of fruit breeding, typically for niche markets.
IVT was instructed in the 1930's to start breeding programs for small fruit such as strawberry, blackberry, cherry, and prunes but also for apple and pear.

Primary goals were adaptation to local growing conditions to produce varieties for Dutch horticulture, which could then cater to consumer demands for fruit. We shall concentrate on strawberry and apple for the argument in this contribution.

Strawberry breeding is a longtime endeavour with a typical time to market of 12 to 15 years of any new variety from its inception. This requires a long time commitment and some way to ensure footing the bill of the selection and maintenance work until the variety starts to bring in money through licenses based on its breeder's right. During the first years of the program this was not an issue, since the ministry paid the full costs. However, since the nineties this funding stopped and earning the money for the program became important. The IVT program has produced the variety Elsanta, which has long been the leading variety in NW Europe so income from licenses has been adequate but never ensured. Therefore in 2005 the new company Fresh Forward was established by PRI and several strawberry propagating companies united in Fragaria. This company's goals encompass both breeding and marketing of strawberry varieties while ensuring a steady return of licenses in order to stay in business and reward the two parenting organizations for their inputs. At the same time the wishes of consumers are more clearly taken into account in designing the breeding program, because the company knows this is the base line for success,
This approach has recently resulted in the release of Sonata, which variety combines the best characteristics of Elsanta with a better consumer acceptance.

For apple breeding the (his)tory is likewise: from the IVT involvement with well received variety Elstar released in the eighties we are evolving towards a new company set up by Inova Fruit bv. and PRI to develop and breed new disease resistant varieties based on consumer preferences and to develop the market for such varieties.
Inova Fruit prefers a club concept for its varieties whereby the chain of this produce is even more closed than in the strawberry example, ensuring an optimal feedback from consumer demands into the breeding program.

The production chain:



Sativa bread in Switzerland: collaboration between an organic cereal breeder, farmers and a retailer

Aart Osman, Louis Bolk Instituut, Hoofdstraat 24, NL-3972 LA Driebergen, The Netherlands, email: a.osman@louisbolk.nl

Getreidezüchtung Peter Kunz

The Swiss organic cereal breeder Peter Kunz started to work independently in 1992. Before that period he was a breeding researcher at the biodynamic research institute Goetheanum in Dornach, Switzerland. In his breeding work he aims at the development of wheat, spelt and corn varieties that are adapted to organic (bio-dynamic) growing conditions and excel for baking and nutritional quality. He is specifically advertising the good taste of his varieties. Besides that he has learned from consumers with pseudo-wheat allergy , that they have no problems with products that are baked of his varieties. He is trying to sustain these experiences with evidence from scientific research.

His first spelt variety was included in the Variety List in 2002 and since 2004 he also has wheat varieties on the Variety List. At present he has obtained market admittance for 10 winterwheat and 5 spelt varieties.

In the initial years "Getreidezüchtung Peter Kunz" was almost entirely run alone by the founder. With the possibility to market its varieties the company has grown to a staff of five persons.

Organisational structure

To be able to only concentrate on the breeding work, Peter Kunz has delegated the official procedures for obtaining market admittance (registration and application for breeders' rights), seed multiplication and marketing of his varieties to the association "Sativa Genossenschaft für Demeter Saatgut". This association, with about 1000 members, is owner of the breeders rights of the varieties. As an association, "Sativa" can not be involved in commercial activities. Therefore they have established an independent organisation for the multiplication of the varieties. This company, "Sativa Vermehrungsorganisation", passes the license fees to the Sativa association.

Financing of breeding

Costs of breeding programme

The total annual budget of the breeding programme of Peter Kunz is about 350.000 Euro. Besides breeding of winterwheat, spelt and corn, with this budget they also conduct research projects, like e.g. studying the feasibility of oil crops like safflour and sunflower.
During the period that they had no varieties on the market yet, the breeding programme was financed with donations from, among others, members of the "Sativa Genossenschaft" and funds with a special affinity with biodynamic breeding, such as the German "Zunkunftsstiftung Landwirtschaft". With obtaining breeders rights they also have income through license fees, but the amount of seeds that are sold are not sufficient to finance the breeding. According to Peter Kunz to cover breeding costs a variety should obtain an acreage of 20.000 hectare. As this acreage can not be obtained organically, they are looking for alternative ways of financing.

Collaboration with COOP

One example of this is the collaboration with supermarket chain COOP. In Switzerland this supermarket chain is manifesting itself as a "socially fair enterprise". Under the trademark "Naturaplan" they sell a large assortment of organic and fair trade products. With this strategy Coop has grown to the second supermarket chain in Switzerland (Migros is the largest). In the collaboration with Sativa/Peter Kunz, COOP sells bread, that has been baked from spelt and wheat varieties of Peter Kunz, under the trademark "Sativa". The cereals are produced by a farmer cooperative of 20-30 members and it is processed by COOP's own mill and bakery. Farmers do not receive a premium price, because in Switzerland there is a binding price agreement for the whole organic grain sector, which is established yearly by representatives of the sector (Biosuisse, farmers, millers, bakers, supermarkets etc.). Farmers are paid for quality and processors ask for specific varieties. Peter Kunz conducts the quality control and check on varietal identity for COOP. This is a big advantage, because in this way he gets a good idea of the performance of his varieties in practice and he has direct contacts with farmers, millers and bakers. This generates information that he can use in improving his breeding programme.
It started as an experiment, in which COOP offered the Sativa bread for one month in her supermarkets. The sales were so good that COOP signed a three year agreement with the Sativa association and the contract has been extended for another three years at the end of 2006. COOP yearly contributes with a fixed amount to the breeding programme in exchange for the right to be the only supermarket chain that can use the Sativa brand name. This right is not completely exclusive: COOP allows that specialized organic shops also can use the Sativa brand name. This has the advantage for COOP that it strengthens the image of the brand, because in this way it

also becomes an established brand within the regular organic sector. The contribution of COOP is not directly linked to the amount of loaves of bread sold.

Collaboration with Erdmannhauser

In the collaboration with Erdmannhauser, a German manufacturer of bakery products (toasts, crackers, salty sticks etc.), both farmers as well as the producer pay a contribution that is linked to the cereal production. Both pass 5 Euro per tonne of harvested/processed cereals to the breeding programme. Erdmannhauser uses this contribution as "Unique Selling Point": on the packages of their products they thank consumers for supporting breeding.

Another feature of this collaboration is the fact that the contribution of the farmers is not linked to the seed price, which is the usual case, but to the harvested product. In this way the breeder shares the harvest risk of his variety: with a disappointing yield of his variety also the breeder receives less contribution of the farmer. In this way of shared risks Peter Kunz hopes to diminish the resistance of farmers to pay license fees, especially on farm saved seeds.

Note to this contribution:

Unfortunately none of the persons directly involved was able to attend this workshop and present this interesting model. The text above is based on interviews of the author with Peter Kunz and Amadeus Zschunke of the "Sativa Genossenschaft für Demeter Saatgut". The interviews were held in October 2006.

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Mobilising chain partners to stimulate spring wheat breeding for organic farming

Aart Osman[1], Edith Lammerts van Bueren[1] and Conny Almekinders[2]

[1]Louis Bolk Instituut, Hoofdstraat 24, NL-3972 LA Driebergen, The Netherlands, email: a.osman@louisbolk.nl

[2]Technology and Agrarian Development Group, Wageningen University, The Netherlands

Introduction

The Dutch organic wheat sector depends on just one spring wheat variety. Since the introduction of this variety, Lavett, about ten years ago, no new varieties were found that can compete with Lavett for combining good yield with baking quality, despite intensive screening of new spring wheat accessions under organic growing conditions. Apparently, the selection methods and/or criteria used in modern Western European wheat breeding programmes are not suitable for selecting varieties with a level of baking quality that is acceptable for organic wheat. Specific breeding for the Dutch organic sector is required to obtain new spring wheat varieties. However, so far discussion between the organic sector and the seed sector on this issue always ended in the same dead lock: for commercial seed companies the Dutch organic spring wheat acreage is too small to earn back investments in breeding. This holds true for the traditional way of looking at financing breeding (through a license fee on seeds). In order to stimulate out of the box thinking on financing breeding, in the autumn of 2006 the authors started discussions and a workshop with key stakeholders. Before presenting the process and results of this activity, first a brief description of the context of organic wheat production and wheat breeding will be given.

The context of organic wheat production in the Netherlands and wheat breeding

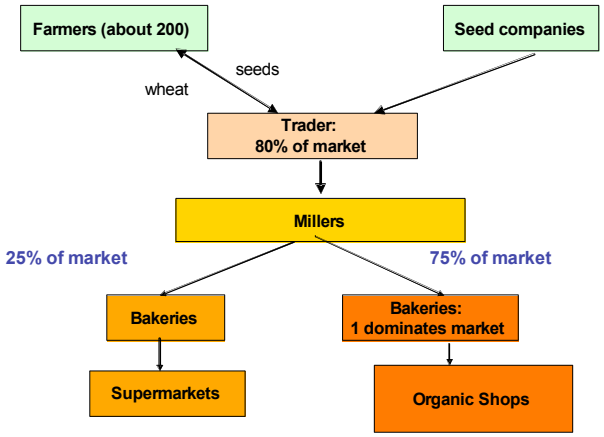
Organic wheat production in The Netherlands

Dutch organic wheat is mainly produced for baking bread and other bakery products, and so not for feed. Farmers are paid a premium price for baking quality. Spring wheat is preferred over winter wheat because of better baking quality. Furthermore, it is easier to manage weeds in a spring sown crop. In humid and mild winters weeds continue to grow in the fields, while the soil is too wet to enter the fields with weeding machinery. About 75% of the organic wheat acreage is sown with spring wheat. Between 2000 and 2004 the organic spring wheat acreage has tripled from 700 hectares to 2100 hectares and involves about 200 farmers.

Dutch organic wheat production is mainly sold on the home market, with some export to Belgium and UK. At the same time, the milling industry imports organic wheat from Germany, France and Eastern Europe. Exact figures of imports are not easy to obtain, but confidence of the Dutch organic milling industry in the quality of home grown organic wheat has risen over the last five years and demand is higher than supply.

A limited number of key players dominate the organic bread production chain (Figure). About 80% of the domestic organic wheat production is marketed through one trader. This trader also produces organic certified wheat seeds for the farmers. Further down the chain there is a division between bakery products which are sold through supermarkets (25%) and through specialised organic shops (75%). Again, one big bakery dominates the latter market channel, supplying more than 300 shops in the Netherlands and Belgium. This bakery has recently merged with the milling company, which used to be its supplier.

Figure: The Dutch organic bread production chain



Wheat breeding

In the Netherlands there are no organic wheat breeders. The only organic spring wheat breeders in North-west Europe are Hartmut Spiess from IBDF in Germany and Hans Larsson from Sweden. Hartmut Spiess only started to dedicate time to spring wheat about eight years ago, and so only recently test results of his first varieties are appearing. Hans Larsson focuses on older Scandinavian varieties, which have yield levels which are too low to be accepted by Dutch organic farmers.

So far, for spring wheat varieties the Dutch organic sector relies on conventional breeding companies. The number of Dutch wheat breeding programmes has decreased dramatically over the last 10 years: due to foreign take-overs only two of the five programmes have survived. One of those two has passed from Danish to French (Force Limagrain) hands in 2006, but still

remains based in the Netherlands. This company, however, already has stopped its spring wheat activities in the eighties of the last century. Which leaves only one spring wheat breeding programme in The Netherlands. Throughout history, however, many spring and winter wheat varieties have been imported from neighbouring countries and appeared to perform well. The spring wheat variety Lavett, which is sown on almost the entire organic acreage because of its good performance, has been bred in Sweden by Svalöv-Weibull. Besides Sweden, also a number of German companies produce varieties, that show good agronomic performance in Dutch organic fields, but lack baking quality. These programmes work for the conventional sector. In conventional agriculture, but also in organic wheat production in the neighbouring countries, spring wheat is a marginal crop, with a much smaller acreage than winter wheat. Therefore a conventional wheat breeding programme in Germany and the Netherlands, on average only dedicates 10% of its efforts to spring wheat and 90% to winter wheat.

Facilitating action to stimulate spring wheat breeding for the organic sector

The approach

The project consists of the following steps:

- Inventory of cases of alternative ways to finance breeding by interviewing key resource persons
- In depth study of selected cases
- Design of alternative scenario's for financing wheat breeding by adapting elements of the cases to the Dutch situation
- Workshop with all key-stakeholders to discuss scenario's
- Formulating an action plan with interested stakeholders

The results

In a workshop the economic consequences throughout the whole chain of four alternative scenario's were presented and discussed with key-stakeholders. Financing breeding through:

- Raising the license fee
- A levy on the wheat acreage
- A levy on meal/flour
- A levy on bread

Point of departure for the calculations was the assumption that, due to its small size, the Dutch organic wheat sector cannot finance a complete new breeding programme and hence should seek an alliance with an existing programme. Furthermore, it was assumed that since a conventional wheat breeding company on average only dedicates 10% of its efforts to spring

wheat breeding, costs of such a programme also are 10% of the total costs of a wheat breeding programme: 10% of €450.000 = €45.000/year. These figures are based on estimates of German conventional breeders of annual costs of a medium sized wheat breeding programme.

Strikingly, in all scenario's raising €45.000 for breeding only results in a small increase in the price of a loaf of bread, from 0,5 to 1 eurocent/loaf of bread. For example, a direct levy on the end product (the loaf of bread) of 1 cent would generate €80.000-€100.000, as annually 8-10 million organic loaves of bread are sold. This made stakeholders aware that there are financial possibilities to support breeding. While some millers and bakers are hesitant to burden consumers with extra costs, other bakers and shopkeepers are convinced that the price increase is so small that it will not put off consumers and that the story of investing in the future of organic production can be exploited as unique selling point.
Furthermore, especially farmers and the trader shared the conclusion of the problem analysis: the sector needs new varieties, but without special action these will not appear from current breeding programmes.
Conventional breeders present in the workshop did see possibilities to work out ways to collaborate with the organic sector, if costs would be divided over the chain.
The positive reactions of different stakeholders stimulated a small group of interested key-players to volunteer to elaborate an action plan to make breeding for organic possible. This action plan consists of further talks with breeders on possibilities to collaborate and talks with milling and baking industry about setting up a fund. If these talks will be successful, the organisation of such a new collaboration will be elaborated

Conclusions

Although there is a need for new varieties with baking quality, talks on breeding so far resulted in a deadlock because both breeders and farmers felt that financing breeding for such a small sector was impossible. Presenting all key stakeholders alternative scenario's for the division of costs among stakeholders changed this situation. Key elements for motivating stakeholders were a shared awareness of the need for new varieties, the fact that scenario's included economic calculations and that the estimated costs were within the reach of the stakeholders. A number of stakeholders committed themselves to work on implementing the ideas, which were generated by this project.

How to deal with the legal system related to small markets for organic cereals in Germany

Karl-Josef Müller, Cereal Breeding Research Darzau, Darzau Hof 1, 29490 Neu Darchau, www.darzau.de

Germany is the most expensive country in Europe for releasing a cereal variety. The costs for usual releasing are between 13.000 and 19.000 Euro related to the species, additional field testing under organic farming or necessary quality tests for differentiation. With a breeders fee of about 10-15 Euro per 100kg certified seed 100-200 tonnes of seeds have to be sold to cover only the official fees. But every year also the yearly fee to the authority, the costs for multiplication and maintenance breeding, seed and field inspection have to be covered. To have a return for the breeding itself takes another five years or more, additional to the years of breeding. And if a variety is rejected during the official tests, because of lower yield under traditional testing or poor uniformity under high yielding inputs, there is no chance to get a return on invest. Looking for alternatives to produce for organic markets Cereal Breeding Research Darzau found some models to be of interest for small markets and started to test them in practice.

Non-EU-Seed-Model

If the criteria of distinctness, uniformity and stability can be fulfilled and the variety is new, it can be registered by variety protection without the expensive tests for value of cultivation and use, which are necessary for releasing under the Seed Marketing Laws. Costs for the EU-variety-protection are about 3.000 Euro and only 5kg during a three year period of tests have to be handed over to the authorities in every year. Seeds of such a registered and protected variety can be produced officially as “Basic-“ and “Certified Seed” with seed and field inspection. On the label of the seed packages the producer has to write “Intended to be used only outside the European Union”. This is necessary to show to the consumer of the seed, that this variety is not tested for “value of cultivation and use” in a country of the EU. But every farmer, who buys the seed can decide himself, whether he will grow it inside or outside the European Union. This model is also useful for grain industries, which are interested in very special varieties for instance to produce ß-glucan from starch of waxy barley, if there is no common market for such varieties. It is possible to combine such a model with a “Farm Saved Seed License”, which will be introduced at the end.

Conservation-Varieties-Model

As soon as the European regulations for conservation varieties are published, it will become possible to market not only old varieties, but also rare varieties, which are threatened by genetic erosion. The demands for uniformity will not be so strong as for releasing a variety in the common manner and also the fees for registration will be extremely lower than usual. But it will not be possible to obtain variety protection for this conservation varieties and also the yearly marketable amount of seed will be restricted. But of course it is possible to get an EU-trademark for the trademark-classes 30, 31 and 32 for seeds, plants, baking products and something like that. With the license it will become possible to finance the maintenance of the conservation variety. To explain the license system for this model in more detail, first the next model has to be introduced.

Closed-Production-Model

If a farmer doesn't get the ownership of the seeds, which he is going to sow in his field, then no "marketing" of seed takes place. Without marketing of seeds or handing over of seeds in the meaning of ownership the "Seed Marketing Laws" are not applicable. But of course it is necessary to proof with documentation that the seed remains under the ownership of the same legal entity. For this reason for instance a growers association as legal entity has to make a contract with a farmer or member of the association to produce grain from the seeds, which were made available to them, only for this association. The farmer or member gets the seed not as an owner, but like a work piece for him, from which he has to produce the next step of seed or grain production as a service. He is than paid not for the grain, but for his service. Always the association keeps the ownership of the seed and the harvest from cultivation of the seed. This has to be documented in a contract before the handing over of seeds takes place. Of course it is not possible to do such a handling with a protected variety, if the owner of the variety protection doesn't allow this. It is possible to use such a model also with non-protected varieties, but it will be easier with a protection, because during the protection the variety will be registered and then nobody else can declare the ownership himself, neither the farmer. What is sold in the end is only the grain for consumption, for eating, baking, brewing or feeding animals. Such a model is also used in the potato starch industry and in the sugar beet industry. This model can be combined with a "Label Protection License".

As an example for a "Label Protection License" it is possible to offer the use of a trademark from the moment, when the grain is sold for consumption by the growers association. Every processor, which receives the grain with a delivery note, where the name is written as a trademark for further use, perhaps combined with special restrictions, like necessary amount of this grain in the sold product, is allowed to use the trademark, but nobody else. Perhaps from

every 100 kg of sold grain 1 Euro could be the license for maintaining the variety, for further variety development or establishing a seed and grain quality system.

Farm Saved Seed License

For varieties, which are protected, it is possible to establish a Farm Saved Seed License model. This is in particular important for small varieties which have a long distance distribution, with high shipping costs. For instance small spelt (T.monococcum) has a small market, is widely distributed and is not listed under the species of the Seed Marketing Laws. It is of course in the interest of the breeder that farmers produce farm saved seed – not only from small spelt –, if the breeding can be financed in any way. If a farmer wants to buy a protected variety, which means that it is a new developed variety, otherwise it would not be protected, he/she signs a Farm Saved Seed License Agreement with the breeder or the owner of the protection. At Cereal Breeding Darzau we developed an agreement, which is terminated after 10 years of saving on farm or the end of the protection, depending on what happens first. During this period the farmer is asked every year, starting after the first possible year of harvest from farm saved seed, from which area he could harvest grain of the protected variety. For this area he/she has to pay 60% of the breeders seed license related to the amount of seed, which usually would be necessary to sow. For instance the breeders license in 160kg of seeds of small spelt, which is usually necessary for 1 ha, is about 40 Euro. The farmer then has to pay 24 Euro per ha cultivated with this variety from farm saved seed. But he doesn't have to order the seed every year from the multiplying organisation and to pay expensive shipping. The experience at Cereal Breeding Research Darzau is that about 50% of the license is coming from farm saved seed and 50% from breeders license of sold seed. Of course a farmer, who doesn't want to sign the agreement, will not get the seed of the new variety, he might wait till the end of the protection period, buy seed form old non-protected varieties or multiply himself samples, which he can get from the gene banks all around the world.