

The entrepreneur as the pivot in the transition to sustainable livestock production systems

Result of the project within the framework of the MLNV-programme “Future Livestock Production Systems”

Project: High Quality & Community Farming

Management Summary

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1. Preface

Farming is on a crossroad of different directions towards the future. The agricultural sector is not sure to choose which direction and how to set up and stimulate the process of transition. Transition processes and system innovations are words that are used but are difficult to concretise. In the project 'High Quality & Community Farming' the entrepreneur as pivot in the transition to sustainable livestock production systems' this concretising has taken place. I would like to thank both presidents, Prins and Gussinklo, and members of European Dairy Farmers and European Pig Producers for taking up the challenge to initiate with LEI a project and discuss the flexible, interactive and innovative ways that will lead to an accepted and sustainable agriculture.

In this project EDF, EPP, ZLTO, different WUR institutes (LEI, IMAG, Alterra), ZLTO Advies, the German Innovations team Brandes and Joost de Veer consultancy cooperated with each other, with Bram Prins as enthusiastic project leader. This has been made possible within the programme 348; Future livestock production systems, initiated by the Dutch Ministry of Agriculture, Nature Conservation and Fisheries. Word of thanks to P. Munters and E. Theune for their commitment and critical observations. Also for S.F. Spoelstra, programme leader within Wageningen University and Research centre.

Learning experiences from this project are multiple; especially growing insights in the process of transition and system innovation, the new roles and skills this new paradigm asks for, are worth mentioning. The new approach of the process of transition and working in the new roles has shown to be promising, also for broadening the process of transition.

A word of thanks to all enthusiastic people who participated in this project. It was a very fruitful interaction within the working group, but also in the different national and international workshops. In these workshops there were good discussions between farmers, researchers, advisors, policy makers, representatives from agribusiness organisations and the animal protection organisation. A special word of thanks to the four entrepreneurs, who made a long term sustainable strategic plan for their dairy and pig farms, Johan Martens, Benaar Dirven, Hans Verhoeven and Anton Stokman for their effort and commitment within this project. The entrepreneurs has been facilitated by Albert Voet (ZLTO Advies) and Alfons Beldman (LEI).

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2. Introduction

Agriculture today is at a crossroad. A short historical overview illustrates this.

From about 1970 to 1985 the government policy stimulated growth, by economic and top down communication (research, advice and education) instruments. Farm strategies were focused on increasing the scale of production and using new technology, mostly advised as 'the one best solution'.

From about 1985 to 2000 the government and citizens realized that the 'limits to the growth' had been reached because of overproduction, consumer reluctance against methods of production, environmental pollution and problems with animal welfare and health. The agriculture and entrepreneurs lost their trust of the society. Governments changed their policy to many restrictions for the entrepreneurs and prescribed various production methods the entrepreneurs changed, after some time, their management towards more tactical management and realized that much efficiency and ecological advantages could be gained with the same production (specialization).

From about 2000 onwards there is a transition of the government focussing more on (system)innovation, governing on public goals and issues and focussing lesser on prescribing defined production methods. In this process of transition the government is searching for new policy, goal oriented, instruments. These instruments need to stimulate innovation and sustainability by mutual and balanced improvement of Profit, People and Planet aspects according to the concept of Corporate Social Responsibility. The focus of the entrepreneurs in their management is changing to more strategic and innovative management and regaining the trust of the society (a licence to produce).

In this transition process to sustainable and society-accepted agriculture it is important to find the optimal mix of policy instruments to stimulate the entrepreneurs for new and innovative strategies, both to fit the public requirements but also the private goals. The question is how to get the entrepreneur as the pivot in this process of transition; what does it mean for the role of institutions, for technology, for knowledge transfer, for the facilitation of innovative strategy formulation and implementation?

3. Framework of the project

The Dutch Ministry of Agriculture, Nature Conservation and Fisheries started a research programme called 'Future livestock production systems'. Projects carried out in this programme should have a contribution to innovations in animal husbandry systems so these will be able to meet the high standards of public goals regarding animal welfare and animal health. The programme aims at developing desirable and sustainable livestock production systems for the future (2025-2040), this instead of a necessary and accepted livestock production system in 2002. In doing so, two important items have been discussed, first of all should contact with animals be based on control or on coaxing? The second big item includes everything between land-independent animal production and multifunctional land use.

Within the tension range of these two major axes four visions have been composed. In the lower left-hand corner we see the vision that we refer to as regular-plus in which food production and 'control' set the tune. In this vision the current, prevailing livestock industry is transformed to an animal raising industry that meets all social criteria. This calls for substantial changes in the current system, in which not only environmental and well-being requirements are taken into account but also such issues like profit and working conditions. Bridging the gap between consumer and producer is especially important in this future scenario. Ultimately, the aim behind this scenario is that the producer listens to the consumer. Precision production is the key word. If the production is attuned to the demand, more of the product will be used and this will make a substantial difference in the price. Thanks to modern communication and distribution channels, precision deliveries to the consumer will also be possible.

The second vision (organic production +) entails many elements of the current organic agriculture. 'Coaxing' is the key word here. Food production is the most important objective, but the production is drawn from nature. Interlacing nature and agriculture is therefore an inextricable part of this ideal image. The current organic agriculture is a benchmark for many social organisations: an example of how it should be. There are, however, also a number of desires that shape the organic agriculture of the future: the ideal image thus becomes 'organic-plus'. The power of organic agriculture lies in 'coaxing', which automatically leads to diversity in the production, heaven-sent for those who cannot appreciate the uniformity of the regular production. This also ends the anonymity of the market. Land restraint is inextricably bound up with this vision. Organic agriculture handles risks differently than the regular agriculture. Risks are part of life. New organisation types such as community farming in which the townspeople take co-responsibility for the risks that are part of animal production, can be elements of the ideal image 'organic-plus'.

A third vision is the combination agriculture; maybe better referred to as combination land. In this scenario agriculture is one of the functions, but not necessarily the main one. This could also be water storage or recreation. Food production moves to the background. In some forms of combination agriculture, such as landscape maintenance, control is essen-

tial especially if historical populations of farm animals are introduced. In other forms there is more emphasis on coaxing. Currently, instead of implementing 'control' to all extremes, new strategies for coping with flooding are increasingly based on 'coaxing'. An example of this is the alternative strategy for raised dykes, in which the magic words are 'space for the river'. An important element of this vision is that it demands new forms of cooperation on the side of the production: between the animal raising industry, the recreation sector, nature- and landscape management, and water management.

In the fourth vision the emphasis is on experiencing the agriculture and the countryside. This vision does justice to many functions that animals in the countryside have to offer in the social and psychological arena: for instance, the animal as therapeutic instrument, to cuddle and have as a companion. Animals can also be a source of religious and spiritual experience. The animal system is tailored to the animal and human nature thereby making it possible to coax the animal to be cuddly. This ideal image draws on experiences that are further from man's practical and primary necessities of life such as food, shelter and dry feet. Experiencing agriculture does not only offer food but also surprise, spontaneity, beauty and meaning to human's existence.

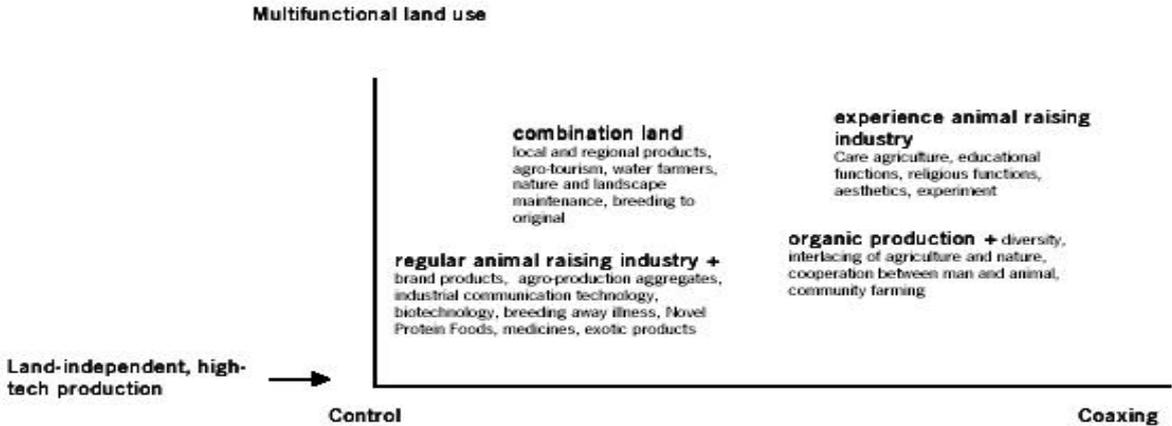


Figure 3.1 Images of future livestock production systems (as in Turning Report 30-3-2001)

To concretise these visions long-term innovation goals have been developed; these serve as a departing point. The innovation objectives fit the visions described above.

Achieving maximum transparency in the chain

Bridging the gap between consumer and producer is paramount. It is, therefore, essential that organisations regain the trust of the consumer. Transparency is the key word. If people don't know what is going on, bridging the gap will be impossible.

Closing cycles to reduce environmental pollution by a factor 20

To achieve a sustainable animal raising industry in 2040 a number of requirements will have to be met. Emissions of nutrients belong to the past, as does exhaustion of resources.

Improving animal well-being and food safety by a factor 20

Durability refers not only to the environment. There is also something called social durability, which includes concern about animal well-being and food safety.

Obtaining animal food products with an additional value

Economic durability must not be forgotten. The basis of this no longer lies in bulk production. Worldwide competition is becoming too fierce. The key lies in the shift from quantity to quality.

Developing new products and services

Innovations should not only focus on development of these new products and services, but also on obtaining the acceptance of the consumer.

Fitting the animal systems to the entrepreneur

System innovations should not miss the connection with entrepreneur. After all, it is they who must do the work in the new animal raising industry.

The result of one of the projects within this programme is presented here and is called **'High Quality & Community Farming'**.

4. Objectives of the project

The main objectives of the project 'High Quality & Community Farming' are to find answers on the following questions:

- what will be the main development trends for future (livestock) production systems, in order to reach the high standards of public goals;
- how can the rather abstract requirements of animal welfare and health be 'translated' into operational criteria;
- what will be the Critical Success Factors in this transition process;
- what are the possibilities for new technology innovations, especially cow and pig housing system innovations by showing some virtual cases;
- how can one facilitate the entrepreneur that he becomes the pivot in the process of transition;
- how can new technologies and management innovations be embedded into every specific long-term strategy of the entrepreneur;
- how can the entrepreneur be flexible in efficiently adapting his long term strategy, according to every time changes wishes of society and how can new housing systems fit into (different) landscapes;
- what are new ways of knowledge transfer to stimulate these transition processes;
- how can this transition process be broadened to the other entrepreneurs in livestock production sectors and other sectors of agriculture and horticulture;
- how to communicate the results of the project?

The approach used in this project is displayed in table 1 on the next page. The relation between objectives, approach and participants is also clarified in this table.

Table 4.1 Approach used in the project in relation to the objectives and the participants during execution of the project

Objective of the project	Approach	Participants
Interpretation of the main development trends of livestock systems	Literature Expert knowledge Brainstorming	WUR
'Translation' of abstract requirements into operational criteria	International workshop with experts from research, agribusiness, non-governmental organisations, farmers, farmers-organisations.	WUR, EDF and EPP-members, Consultants of LTO, Farmers, SGS Agro Control, Nutreco, Animal Welfare Organisation, Rabobank, CR Delta, IPG, DAAC and others
Defining Critical Success Factors for the transition process	National and international workshop	WUR, EDF and EPP-members, Consultants of LTO, Farmers, SGS Agro Control, Nutreco, Animal Welfare Organisation, Rabobank, CR Delta, IPG, DAAC and others
Developing innovative cow and pig housing systems; some virtual cases	International group of researchers and consultants	WUR, Innovationsteam
Defining the process and tools to facilitate innovative and society oriented strategy formulation with the entrepreneur as the pivot in the process.	Using the process procedures and tools of the Interactive Strategy Planning (ISP) approach and combining with the Creativity and Learning Circle	WUR
Embedding the technology and management innovations into entrepreneur-specific long term strategies	Cases with four entrepreneurs, which are facilitated to formulate a long term strategic plan and try to integrate the new developed housing systems Quick Scan Animal welfare and health has been developed and used	Two dairy and two pig farmers, facilitated by LEI-WUR and LTO Advies in cooperation with the Animal Protection organisation and environmental care organisation

Table 4.1 Approach used in the project in relation to the objectives and the participants during execution of the project (continuation)

Flexibility to adapt the strategy to new societal wishes	Facilitating the strategy formulation with different scenario's and choice for flexible housing systems	Four Farmers and facilitators of LEI-WUR, LTO Advies Alterra-WUR
Fitting the new housing systems into the various landscapes	Adapting the housing system to some different types of landscapes	
Defining new approach of knowledge transfer	Workshop with knowledge management experts	WUR
Defining an approach to broaden the transition process	Workshop with experts	WUR LTO Advies MLNV
How to communicate the results of the project and setting up a learning and innovative Network to facilitate the process to Sustainable agriculture	Clear presentations, for example with 3D-presentations during EUROTIER Hannover and RAI Amsterdam (2002), presentations during international EDF and EPP-congress; publication of results on cd-rom, articles, interviews, seminars and Internet.	WUR, EDF, EPP, LTO Advies

5. Interpretation of the main development trends of livestock systems to 2025

To define and interpret some distinguished trends of future livestock systems which will regain the 'licence to produce' of society and which fit the high standards of animal welfare, trust of food safety, etc, some aspects are important.

On the one side there are aspects in relation to the characteristics of the entrepreneur; his vision/mission, his relation with nature and opinions about the usefulness of technology. On the other side there are aspects which are related to the surrounding of the entrepreneur and the method of communication and interaction with the society.

So, one group of entrepreneurs will be more oriented to direct contact and interaction with the consumer and citizen, combined with a more naturally way of production to regain the trust of the society. This type of farming we call Community Farming.

Another group of entrepreneurs tries to regain a licence to produce by giving the consumer and the society an indirect insight in his production methods by guaranteeing high quality of food and animal friendly production methods through certification schemes. To reach such a high quality of production and transparency of production he will use high tech solutions. This type of farming we call High Quality.

These two types of farming are two extreme prototypes, but in reality a lot of combinations will be possible.

The community-based farming and the high quality farming perspective are both to be characterised by high levels of social integration, animal welfare and ecosystem awareness. Each perspective however solves these concerns in a different way.

Community Farming characteristics are:

- relations between community members are direct and many-sided;
- community members share values and worldviews;
- community members exercise forms of reciprocity.

High Quality Farming characteristics are:

- relations between people are indirect and specialized;
- people do not (necessarily) share values and worldviews;
- social relations are not (necessarily) based on reciprocity.

To concretise these abstract future images long-term innovation goals have been set for both systems.

Table 5.1 Long-term innovation goals for the systems High quality and Community farming.

Innovation goal	High quality	Community farming
Maximal transparency within the chain	IT-techniques	Direct, concrete
Closing of mineral cycles	Global, long chain	Regional level, short chain
High level of animal welfare and food safety	Technical	Naturally
Products with added value 'dreaming'	'specialties', Emotional, 'feeling'	
Development of new products and services	Consumer	Consumer/citizen
Balance between animal and human	Stewardship	Partnership
Corporate governance	Social accountability	Direct contact with society

6. Translation of abstract requirements into operational criteria

In this chapter the abstract requirements are translated into operational criteria.

As is shown in the table on the previous page, in the program a rather abstract level has been used, for this project these abstract preconditions have been concretised. These concrete preconditions formed a base for the discussions with the entrepreneurs.

Animal welfare

Optimal animal welfare is one of the first requirements of the project. Animal welfare is one of the wishes society has in giving a licence to produce. But what does this mean for the housing of the animals?

Animal welfare is a term that is hard to define. The question is often asked: what is welfare? It is an ethical and philosophical question and therefore it is a challenge to develop a definition that meets the demands of society. There are two important aspects that will be further concretised:

- building a stable that meets the comfort (and health) of the animal;
- optimal management of the animals.

The definition needs to be concretised. Animal welfare means a high level of well-being on the next 5 liberties:

- free of hunger, thirst and malnutrition;
- free of thermal and physical inconvenience;
- free of pain, injuries and illnesses;
- free of fair and chronic stress;
- free to behave naturally (straw, water, feed, playing).

To concretise this, a 'Scan animal welfare and health' for the dairy farms has been developed and used; goal was to develop a method in which the dairy farmer and the consumer get an acceptable insight in the animal friendly way of producing on the dairy farm. Important starting point is that the instrument gives the farmer concrete tools to analyze and control the situation on the farm. Each part of the scan consists of several indicators with its own target value. When combining the indicators, the farmer can get a score for the different parts. These scores make it possible to give an overview of the farm at first glance (as shown in the picture).

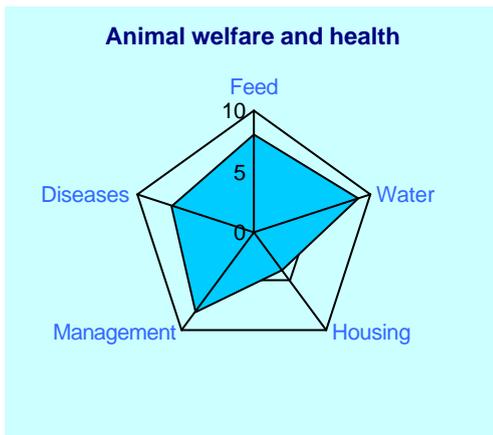


Figure 6.1 Indicators within the 'Quick scan animal welfare and health'

Mineralising the environmental impact

In 2040 the environmental impact will be reduced with a factor 20. Focus must be on closed cycles, there is no accumulation or discharge of pollutants. Nutrient emissions belong to the past. In concrete, this means that the following preconditions are valid:

- nitrate leaching: less than 50 mg/l nitrate, target 25 mg/l nitrate;
- phosphate surplus practically zero (artificial fertilizer phosphate included);
- ammonia emission minimizing;
- emission standards for greenhouse gases (nitrous oxide and carbon dioxide);
- energy use: reduction from current levels and usage of sustainable energy sources;
- plant protection: less than 0.4-1 kg a.s./ha

Food safety

Food safety is guaranteed e.g. by certification and there exist an optimal level of transparency in the food chain.

Economical sustainability

This means that the entrepreneurs are producing products with an added value to gain a profit that is comparable with profits outside agriculture.

New products and services

Such products are in favour of economical sustainability but are also meant to gain the license to produce.

Optimal balance between human – animal

This includes attention for working conditions, physical and mental stress.

7. Defining Critical Success Factors for the transition process

To be successful in regaining the licence to produce, to reach harmony again between society and agriculture, some factors are critical in this transition process. These factors have been identified through an international group of stakeholders. The factors are elements of the farm or farmer that need to be in correct order to be able to continue farming. These factors are:

- new strategies for an integrated and balanced sustainability of production (correct balance between planet, profit and people);
- disclosing, applying and learning the skills of the entrepreneurs (knowledge, experiences, skills, attitude);
- building up trust between the entrepreneurs, in the whole chain, in the region and with the consumer and citizen (e.g. by interaction, communication, certification).

7.1 Concretising of the Critical Success Factors

Integrated and balanced sustainability

The first critical factor to successfully formulate an integrated strategy can be concretised by taking into account the three P's: Planet, People and Profit. Finding the right balance between your own competences and situation is essential. The entrepreneurs scored these three P's for their own situation, at present and future time. In the picture below an example of the scores is given.

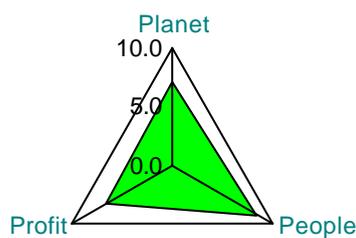


Figure 7.2 Example of the sustainability score on the 3P's: planet, profit and people.

Skills

Changes in society and setting up and implementing new strategies in agriculture demands disclosing, applying and learning skills of the future entrepreneur. Changes will also occur in the necessary skills, knowledge, expertise, and networks of research, advisory and education organisations. Not every entrepreneur has and needs the same competences, because of great differences in possible strategies for the future. For instance a community farmer will be a farmer that focuses on communication.

What determines the skills and knowledge a farmer needs to have? First of all the type of strategy the farmer has or chooses influences the skills and knowledge he needs to develop. Secondly the organisational structure around the farmer sets demands on the needed e.g. communicative skills. Furthermore the strategy is determined by the skills the entrepreneur already has or thinks to develop in the near future. So it is important for the future strategy formulation to pay more attention to the competences of the entrepreneur. First by detecting what they are, then by looking for the right fit between the competences and the possible strategies and last by further developing the competences in for instance learning networks.

Trust building

Building trust can be defined as the effort and work of one to create believe, good will and credit with others. In agriculture it refers to reaching to a desirable way of farming, the farmer being able to run the farm in such a way that he and the agricultural sector on one hand and society on the other, accepts. This acceptation is not only based on economical grounds but also on wishes and demands from society. Two important aspects are related to building up trust: communication within the agricultural sector and towards society, and certification of the product, the farm and its chain in order to provide food-safety.

8. Developing innovative pig and cow house systems; some virtual cases

Within the research programme several production systems have been developed for pig- (Hercules and family systems) and dairy farming (dairy farm 2025). The entrepreneurs could use these systems or parts of them in their vision and strategy for the future. In the following paragraphs these systems are shortly described.

8.1 Hercules system

The immediate cause to develop a new housing system for pig farming was the lack of a 'license to produce'. This lack exists because of environmental problems (manure, emissions and energy), animal welfare problems and growing societal attention for animal welfare. Development of the Hercules system is at an advanced stage; the first pig stock is built.

Essence: Integration of technology on the pig farm and usage of the present surplus energy for the production of high valued fertilizers.

The following elements form part of the Hercules system:

- a barn with minimal emission: 90% reduction of ammonia emission. Reduction of odour is not yet realised;
- processing of manure into compost and concentrate. A better market characterises these products. Transport volume is reduced by 70%;
- the liquid concentrate can be marketed as a fertilizer; the organic products can be used as a soil enhancer or can be further processed into demanded combinations of artificial fertilizer;
- usage of local rest products (the Netherlands, Germany) instead of using products from abroad (America, Asia);
- reduction in energy usage with more than 50%;
- barn climate control: e.g. through floor heating and cooling;
- animal welfare improvement through the usage of straw, more space per animal and better climate control;
- investment per animal are higher than for the traditional system. This will be reduced in further developments;
- costs per kg meat are currently 3% higher at similar technical results. Expectations are that these technical results will increase.

Additional information can be obtained at the IMAG (P. Groot Koerkamp).



Figure 8.1 Picture showing elements of the Hercules Production System

8.2 Family system

Family systems are systems in which animals have the opportunity to live together as groups as natural as possible. Under these circumstances natural behaviour is possible. The system has specific characterisations:

- a stable group of sows with piglets stays together for at least 12 weeks. In principle the sow and her piglets stay together until just before the next litter. In these groups mingling with strange individuals is avoided;
- a boar is temporarily introduced in the group;
- the animals are kept in an enriched environment. This means that there are enough stimuli for explorative behaviour without this leading to animal focused behaviour like the beating of ears and tails and aggression.

The systems of Stolba and Wood-Gush are the basis of this system. In these designs the behaviour of the sows in a semi natural surrounding is the primary focus.

8.3 Stolba family system

In this family system groups of 4 to 6 sows are kept together for their entire productive lives. This is based on the findings of Wood-Gush that in open surrounding groups 6 sows live together with their offspring. A boar visits these groups once in a while. The piglets stay with their mother until the next litter. Because the sows synchronise their heat large groups of piglets with more or less the same age are formed. Based on these findings designs are made and are currently tested in practice. Preconditions for these types of families are:

- no mingling with strange sows;
- demands from basic behaviour;
- for litter: separation and nesting material;

- postpartus: with piglets 2 days in the nest, 2 weeks separate, then mixed with the group, suckling at a distance from one another. After 3 months weaning.

Delaying the moment of weaning and limiting the transportation are important means to enlarge the welfare of the animals. Additional information can be obtained at the IMAG (H. Donkers).

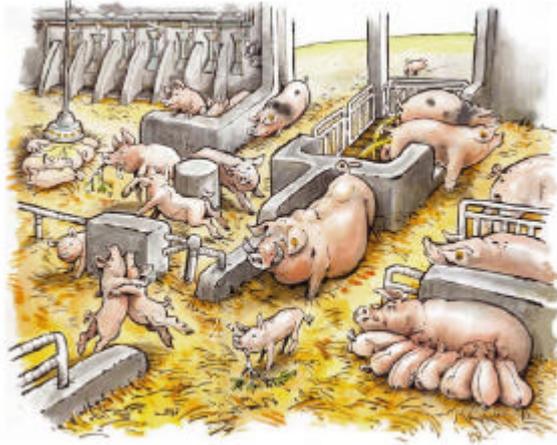


Figure 8.2 illustration of the family system

8.4 Dairy farm 2025

A virtual farm has been developed by international partners. In Dairy farm 2025 cows are treated as herd animals and handled in groups of 40 cows. The social behaviour from cows is leading in the development of this barn. The average expected size of a fulltime two persons farm in 2025 exists of 200 cows. To achieve this, 5 units of 40 cows are necessary. The developed housing-system can be used within both livestock production systems High Quality and Community Farming.

The preconditions for the design of the housing system have been mentioned earlier in this report. Sustainability is reached in several ways. Systems are developed that combine reuse of nutrients with the saving of fossil energy. All the nutrients (N,P,K) and organic matter are recycled and reused, including household wastewater. All residues enter a biogas reactor: organic matter is converted to heat and electricity with a fuel cell. So the system produces its own energy and even some surplus. Wind and solar energy are also available. The energy surplus is delivered to the grid. To reduce the use of tap water to nearly zero, all the rainwater from the roofs and the drainage in the fields is gathered and treated in such a way it suits to be used as tap water.

Animal welfare is at the highest possible level because of the use of 'lying islands' and provision fresh air and bright light. In these comfortable areas cows do have the possibility to lay down in the same way as in a paddock. No steel barn design will be used anymore. After milking, the cow can choose to go outside in the paddocks, or in the exer-

cising yard outside the barn or of course in these excellent lying islands. The bedding materials look like sand, but don't have the negative aspects from sand. Outside the lying islands the floors are partly covered by soft rubber, for providing the cow with the same comfort she has outside in the paddock. The floors are low emission floors because of the use of drainage perforations and they can easily be cleaned by flushing or special scrapers.



Figure 5 Illustration showing the lying islands of the Dairy Farm 2025

The feeding of the cows is realized by use of a Total Mixed Ration which is almost permanently available and refreshed at least three times a day. Leftovers will be used in the biogas reactor. Feeding equipment consists of a self-propelled feeding device. It operates automatically by sensors; it loads and unloads itself without human control. It has an automatic push-up device.

For Dairy farm 2025 innovative milking systems with fixed milking times per group are developed. New generation 10 stall rotary milking parlours with automatic attach and remove cluster systems are milking groups of 40 cows within an hour. The system uses new technology for teat cleaning and disinfection. A vision system for udder and teat inspection will be used. To reach the highest possible standards for food safety and animal health biosensors are used. The milking process is optimized by fast milk removal and low load for teat and udder tissues. The udder is prepared to ensure optimal milk ejection. The machine will have settings per cow and per quarter.

Additional information can be obtained at EDF/LEI (A.M.Prins) or can be found in the 'Draft report Dairy Farm 2025'.

9. Defining the process and tools to facilitate innovative and society oriented strategy formulation with the entrepreneur as the pivot in the process

Entrepreneurs as the pivot in the process

In this project was chosen for an approach, in which the agricultural entrepreneur is the pivot in the transition towards sustainable agriculture, in this case livestock production. The entrepreneur has an integrated approach and has much tacit knowledge and skills, which are key factors in strategy formulation. Therefore strategy formulation is not only defined by the precondition of the society, but also by the entrepreneurs own mission and goals. Therefore entrepreneurs have been involved in this research to formulate their own strategy for 2025 and to set the implementation for this strategy.

To assist entrepreneurs in the process towards sustainable agriculture, LEI has developed Interactive Strategic Planning (ISP) concepts and tools (More information can be obtained at LEI, C.T. Smit). Basic principle in this method is the focus on the entrepreneur. Important is the relation and balance between the person and his direct and indirect environment. Another leading principle is interaction. This interaction takes places with stakeholders, colleagues and the facilitator. Guideline in the process in this project was the Strategic Management Report (SMR), one of the ISP-tools. The SMR offers a tool for formulating a strategy. The entrepreneur has a facilitator to assist him in this process. This facilitator doesn't provide information but tries by asking critical questions to sharpen the analysis and conclusions of the entrepreneur.

ISP has been developed as a method for supporting the strategy formulation. Innovative about this project is that elements from the programme are used. Preconditions for the researchers in this programme also form the preconditions for the entrepreneurs. Beside these, the farmers could use the production systems (or elements from these systems) developed in the programme.

Within ISP the creativity cycle has an important role in trying to establish system innovations. It facilitates processes to enhance the creativity and innovation. The cycle consists of 4 parts; preparation – imagination – harvesting – implementation. It does not only deal with analysis or with the actions followed but it focusses on the integration and interaction of all parts. Not only (1) learning from day-to-day situations, casestudies and thorough analysis is important but also (2) the generation of new ideas and the (3) enhancement of these new ideas which is followed by (4) concrete actions and try-outs. Then the sequence starts all over again.

Goal of the approach used in the project is to get a better understanding of the critical quality success factors and of dilemmas emerging from implementing strategy within the set of preconditions and to get more insight in the procedures that could be followed.

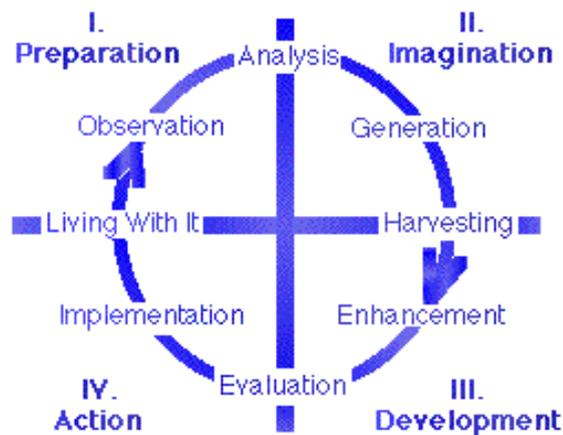


Figure 9.1 Directed Creativity Cycle

The cycle exists of the following steps:

- analysis of the current situation (quick scan of competences of the entrepreneur, the farm, the external chances and threats, the sustainability; animal welfare and health);
- discussing the preconditions for the future and a possible new management approach and application of new technologies;
- the entrepreneurs met in a group to reflect on each other's analyses and strategy and to formulate dilemmas and critical success factors;
- the entrepreneurs discussed these dilemmas with stakeholders and together they searched for innovative and sustainable solutions.

During the process of strategy formulation each entrepreneur wrote his own Strategic Management Report (SMR). This SMR gives the vision of the entrepreneur on his environment and farm as well as sustainability scores for the current situation and the future. The entrepreneur has determined these scores, argued by himself and by interactive discussion with the facilitator and stakeholders.

Johan Martens, Anton Stokman, Benaar Dirven and Hans Verhoeven all wrote Strategic Management Reports. These reports can be found on the cd-rom enclosed.

In this approach the entrepreneur is pivotal in the process. Both the researcher and the advisor are facilitators. The researcher provided expert knowledge in relation to different subjects and was asked by entrepreneurs to solve certain dilemmas or problems. The advisor became more a facilitator of the creative process of innovative strategy formulation. Important aspects were building up trust to set up a good interaction, also with stakeholders, and application of the right process procedures and tools.

The experiences with this new approach and new roles in the process of strategy formulation were good. The main positive experiences were:

- the four entrepreneurs were challenged to look for a long-term sustainable strategy for their farm and they experienced a good contribution and interaction with the facilitators and stakeholders. They were very enthusiastic because they are appealed on their entrepreneurship;

- the researcher and advisor had a new, demand-driven, role and learned a lot from the interaction with the entrepreneurs and stakeholders;
- another advantage was that there was a better and more fruitful interaction between the different types of researchers (e.g. between beta and gamma researchers). There were lesser inefficient discussions about the one best solution. Now the entrepreneur is the pivot and he is responsible for the ultimate choice of his strategy.



Figure 9.2 The entrepreneur as pivot, picture of Hans Verhoeven.

10. Embedding the technology and management innovations into entrepreneur specific long term strategies

The driving force behind future farming is the entrepreneur and his vision. This gives the entrepreneur the best point of departure. It is not easy to let go of the current situation and to formulate a strategy for 2020 or even further. This method however led to more understanding about the different dilemmas the entrepreneurs encounter. It was difficult to formulate a strategy that satisfies all preconditions.

The entrepreneurs rejected the production systems, developed within the programme at first. The production system was too technical and did not fit with their situation. But when the strategy was formulated from their own situation and vision, elements from the production systems returned. If one looks back at the process then it may be possible that they rejected the system in the beginning, because it was not their own. When they analysed their own situation with the same preconditions as the researchers, they found that certain aspects of the systems indeed fitted with their situation. The difference however is that this time they found this out themselves.

The farmers used the tool 'Strategic Management Report' for the process of strategy making. Together with good facilitation, the farmers were content with this method. This method demands high commitment and trust of the farmer (openness) and facilitator (process guidance; so a new generation of advisors). The farmers all developed different strategies. One farmer concentrates on technological development of the agricultural production on his farm (High Quality (HQ) farming concept), another focuses more on non-agricultural activities like care, nature conservation or excursions (Community Farming (CF) concept). Most strategies, including these of the four farmers, combine aspects of both concepts.

The choice for a certain strategy has not only to do with the farmer himself but also (especially for dairy farmers because they use a great deal of land) with the direct neighbourhood of the farm. For example, one dairy farm is located inside the boundaries of a national park. This farm has more opportunities for nature production and recreation (CF concept) than for production on a large scale (HQ concept).

So the farmer himself (competences and his evaluation of social and market developments), the farm and the direct neighbourhood of the farm determine the farmer's strategy. Considering this, it is clear that the four cases cannot be used as rigid examples for future developments. As the entrepreneurs stated, these are four individual strategies. In fact this means that all farmers have to make their own analyses to construct a strategy.

Focusing on the entrepreneur as the pivot in the process of innovation, combined with his strategy formulation and embedding new technology in his system seems a very promising new approach. Research and advice are no longer leading and the farmer has to adopt. In this approach there is an optimal interaction process between researcher, advisor, entrepreneur and other stakeholders. The roles, the mental references and the paradigms are changing drastically and it takes time to adopt this approach.

The role of technology has also changed; it is no longer an autonomous process. The entrepreneurs embedded elements of the given technology in their own strategy and management system; they are asking now for new technologies. In this long-term strategy

formulation the entrepreneurs choose the different elements in an integrated way according to various criteria, e.g. according to the three P's, and not in a one dimensional way.

In a workshop with the entrepreneurs, the facilitators and the Animal Protection Organisation the entrepreneurs mentioned that such a new approach of 'the entrepreneur as the pivot in innovation and strategy formulation' can successfully support the transition process to sustainable agriculture. In the past almost every research and advice organisation gave advice from their own, one dimensional, viewpoint. The participants of the workshop gave the recommendation that stimulation by the government of setting up a strategic farm plan according to the new process will be very supportive in the transition process to sustainable and innovative agriculture.

Dilemmas encountered in the process

Two major dilemmas were encountered during the process of strategy development with the four entrepreneurs. These dilemmas were:

- animal welfare versus animal health, food safety and trust building;
- flexibility of the livestock housing systems versus new investments with high fixed costs.

The first dilemma can be illustrated with the distinction made between the citizen (interested in animal welfare) and the consumer (interested in cheap and safe food). Starting a dialog with all involved organizations was considered to be a manner to work with this dilemma. The second dilemma emerges with the high investments that are needed for new housing systems. On the other hand it was concluded that demands from society will keep on changing. It is not easy to cope with this dilemma. Options are mentioned in the next paragraph.

11. Caring for flexibility to adapt the strategy to new societal wishes

The long-term strategy needs to be flexible because of the every time changing wishes from society. Otherwise investments in new housing systems are high; so it is rather difficult to choose the right strategy and implementation. To support an easier and efficient adaptation of the strategy in the future, some actions are taken by the farmers, such as:

- defining strategies for the farm under different scenario's;
- choosing more flexible investments in housing systems;
- looking for creative and low cost solutions of present dilemmas and problems;
- setting up a good interaction and trust building with the stakeholders.

Fitting the new cow and pig housing systems into various landscapes.

The four entrepreneurs in their strategy formulation discussed the relation with the environment and the way their farms fit or should fit in the landscape. Elements of the environment and the cultural historic values play a role in the lay out of the farm. The diversity to concretise this, resembles ones again the approach of the entrepreneur as pivot.

For example the Community Farming system of Johan Martens is situated in a National Park. This has been used in the farm lay out. Johan has chosen to broaden his dairy farm with departments that fit with this National Park and in which it strengthens the farm. Guests for instance visit the farm because it is situated in the Park. Bennaar Dirven creates a fit with the landscape by carefully planning of materials and colours he uses in the buildings and the planting of the yard. The usage of manure with straw on the land that attracts birds, is a way for Anton Stokman to contribute to the nature land that is situated nearby.

12. Defining new approach of knowledge transfer

In the current situation society demands for cheap food-production, but it also interferes with the way food is being produced. The experiences in this project show that different entrepreneurs in different situations and with different skills develop different strategies. Each one of them tries to find the right balance between the three P's (Planet, People and Profit). Because of the balancing of the three aspects it is per definition impossible for research to come up with the one best solution, because there are different ways to balance these three aspects. The way knowledge transfer fits this situation best could be called the network or interaction model (illustrated in figure 9).

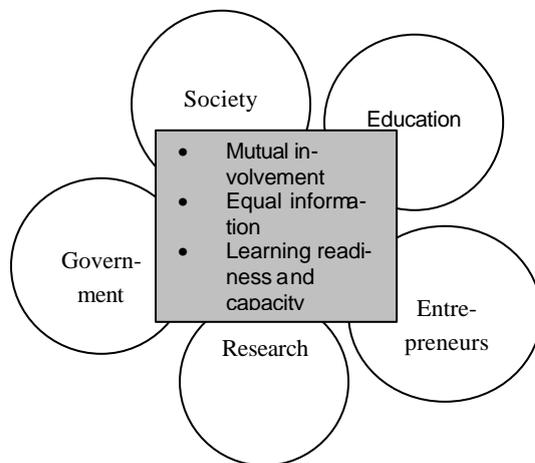


Figure 12.1 The network model knowledge transfer in a complex surrounding (based on S.A. de Groot, LEI).

The entrepreneurs in this project cannot be considered as perfect examples for certain future livestock production systems. The entrepreneurs themselves emphasize this strongly; they don't want to be role models for the future. They also agree on the importance of the right structured process. It is important that every farmer develops his own strategy. More farmers can use the method that was used in the project.

The common feature of the four participating farmers is that they have a large network with colleagues, but also with stakeholders. These entrepreneurs created these networks themselves. Not all farmers will do this easily. In order to get a structure for knowledge transfer it can be useful to facilitate farmers in creating networks. This can start with a group of farmers that wants to develop their own strategy. From these strategy-groups new groups can be formed that have common interests or common problems. From

the starting-groups it will be possible to form innovation groups. This can be a group within a certain sector, but it will probably be more interesting to form groups from different sectors who will discuss about the process of innovation. Experiences from this project in which two dairy farmers and two pig farmers reflected on each others strategy support this.

This new approach changes the role of the entrepreneur but also of the advisor. The entrepreneur should have the lead and is responsible for the strategy that will be developed. The advisor has to fill in the role of process guidance. He should not come up with the one-best solution but should facilitate the entrepreneur to find the solution that fits best with the competences and situation of this specific entrepreneur.

The focus in knowledge transfer should be on the process and less on technical information. If the process is facilitated in the right way, the right technical questions will be asked.

What is important in this new way of knowledge transfer are:

- the entrepreneur as pivot is an important starting point for a successful transition;
- flexibility;
- an integral approach;
- a practical and pragmatic approach;
- a dialogue between entrepreneur and facilitator as well as reflection of the entrepreneur are very useful;
- working with an individual score for the three sustainability-P's (Planet, People, Profit) forces the entrepreneur to analyse his own situation.

The focus in the new paradigm and within knowledge transfer should be on the process and less on technical information. If the process is facilitated in the right way (following certain procedures and using process tools that fit these procedures), the right technical questions will be asked.

13. Defining an approach to broaden the transition process

The question is how can this new approach be broadened to the other entrepreneurs? The entrepreneurs in this project cannot be considered as perfect examples for certain future livestock production systems; the chosen systems cannot be copied. As a consequence of the presentation of some results of the project to MLNV, Heerink (ZLTO Advies), de Hoop (LEI) and Prins (EDF), have done some proposals for broadening the transition process to Sustainable Entrepreneurship (in the paper ' The entrepreneur as the pivot in the transition to Sustainable Agriculture; 28-8-2002). The proposals will be shortly described below.

13.1 New process approach for facilitating innovative strategy formulation

What is important is the use of the right structured process. It is important that every farmer develops his own strategy. Stimulation of the process of innovative and sustainable strategy formulation and implementation is necessary. More farmers can use the new approach that was used in the project. The Critical Success Factors for such an approach are:

- *the entrepreneur as the pivot in the process:*
the adviser as strategic and innovative facilitator;
- *competence-oriented:*
strategy formulation fits with the competences of the entrepreneur;
- *integrated:*
not only one theme or problem but fitting with the overall farm strategy and looking to the three P's (People, Planet, Profit);
- *interactive:*
in good communication with the stakeholders;
- *action driven:*
translating the strategy to a clear action plan for implementation, monitoring and evaluation.

13.2 Setting up new learning Networks and 'Train the Trainers'.

Such a new approach requires another role of the surrounding organisations and persons, such as research and advice organisations and organisations in the chain. It can be stimulated by courses, such as 'Train the Trainers'. Another support will be the setting up of learning and innovating networks. A proposal for such a Network with entrepreneurs, agri-business, researchers, facilitators/advisors and other stakeholders is an international Network of Innovative and Sustainable Entrepreneurs (NISE).

13.3 Organising new learning groups of entrepreneurs and stakeholders

These groups can be composed of various entrepreneurs from different sectors, from different parts of the chain and different actors in the region. A strategic advisor or facilitator can facilitate these groups in his new role and with new process procedures and tools. These groups can also learn from each other.

13.4 Setting up a international 'Agro Centre for Sustainable Entrepreneurship'

The goal of such a Centre will be to be supportive in the transition process to Sustainable Agriculture. It can be supportive as to different, also international, organisations like advice organisations, banks, and organisations in the chain, national and local governments, education organisations.

The main task of such a centre can be:

- stimulating the process of innovative and sustainable strategy formulation and implementation;
- facilitating the process with concepts and tools;
- guaranteeing the process by certification and evaluation;
- stimulating the transition process by facilitating pilot projects and by financial stimuli.

14. How to communicate the results of the project and setting up a learning and innovative Network to facilitate the process to Sustainable agriculture

The results of the different products from the project are communicated with the agricultural sector and their stakeholders in different ways.

Clear presentations, for example with 3D-presentations, presentations on congresses, and publication of results on cd-rom, different articles, interviews, seminars and Internet sites.

The Internet page www.vsys.nl project High Quality and Community Farming

On the international exhibition EUROTIER in Hannover 12-16 November 2002 in a common booth with the project Hercules. This by means of 3-D animation movies and questionnaires. A lot of interesting remarks are gathered from countries all over the world. Companies like to develop the Dairy farm 2025. Research institutes and schools are asking for the reports and animations.

Different papers in and outside The Netherlands; e.g. Paper on a congress of 150 vets in Papendal

Meeting with government officials from the Dutch Ministry of Agricultural, nature conservation and fisheries discussing the transition processes and system innovations.

Developing together with the Agricultural High School CAH Dronten a new curriculum for young entrepreneurs. Cooperation with several other schools within the Netherlands.

During the RAI exhibition from 10-14 December in Amsterdam the project results will be handed out to the Dutch minister of Agriculture, Nature and Fisheries Dr. C. Veerman.

RAI Amsterdam: Together with ING- bank organising different sessions with visitors during the exhibition and showing the results by posters, handouts and the 3-D animation Dairyfarm 2025.

Strategic Management Reports of Anton Stokman, Hans Verhoeven, Benaar Dirven and Johan Martens.

Several seminars, interviews and conferences are planned e.g. Innovation day (27-1-2003) and Delaval Global 3D congress in Hamra (S; 3-6-2003)

Other products (can be found on www.vsys.nl)

- Tools for innovation process (in Dutch: tools voor innovatieprocessen ten behoeve van interactieve bedrijfs- en beleidsvorming) (F.A. Eiff)
- Possibilities of implementation of HACCP-certification in the dairy sector; preliminary results from the questionnaire (editor B. Prins and F.A. Eiff)
- High Quality & Community Farming; building stones for realising future farming (editor C. Smit)
- How to innovate? Theory and backgrounds (In Dutch: Hoe te komen tot innovatieprocessen?; achtergronden en theorie) (E. Leander)

- Pig farming in the future; brainstorm sessions (In Dutch: Varkens houden in de toekomst; procesverslag denkstormsessies) (E. Leander and F.A. Eiff)
- High Quality and community based farming; Conceptual clarification (J.W. van der Schans)
- Characteristics of innovators (In Dutch: Kenmerken van innoverende agrariers) (editor K.Poppe)

Contents of the cdrom:

1. Management Summary
2. Video Dairy Farm 2025
3. Dairy Farm 2025 draft report
4. Community Dairy Farmer Johan Martens
5. Community Pig Farmer Hans Verhoeven
6. High Quality Dairy Farmer Anton Stokman
7. High Quality Pig Farmer Benaar Dirven