UNISECO

UNDERSTANDING & IMPROVING THE SUSTAINABILITY OF AGRO-ECOLOGICAL FARMING SYSTEMS IN THE EU

ANNEX - Deliverable Report D 5.2 Case studies

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- CIRCLE IN BOX: Consumers
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MISSING VS. NETWORK ACTORS

- WHITE: Network actor
- GREY: Missing actor

ACTOR SCORE AND ACTOR-ACTOR LINKS

- SCORE: influence is proportional to node size
- LINKS: Source to recipient arrows

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1. AT - ECOREGION KAINDORF

UNISECO Partner: BOKU

Authors: *Ruth Bartel-Kratochvil; Alexander Hollaus; Rainer Weisshaidinger*

SNA Option: 3 (8 interviews)

KEY DILEMMA: HOW TO TACKLE IMPACTS FROM CLIMATE CHANGE (E.G., INCREASING WATER STRESS), INCREASE CARBON SEQUESTRATION IN SOILS, PREVENT SOIL DEGRADATION AND REDUCE SOIL FERTILITY LOSS FROM ARABLE LAND WHILE MAINTAINING OR IMPROVING THE FARM'S SOCIAL AND ECONOMIC SUSTAINABILITY AND CONTRIBUTING TO CLIMATE CHANGE MITIGATION.

The case study

The "Ökoregion Kaindorf" is located in Eastern Austria (federal state of Styria) where the eastern slopes of the Alps are slipping into the Southeast-Austrian lowlands and hillsides. The background of the initiative is climate change, a certain exposure to periods of water scarcity in recent years and a higher risk in the coming decades as well as declining humus content on arable land. The initiative to increase soil fertility in the region is supported by three municipalities[1] covering 79 km² with 6,150 inhabitants. Most of the 316 farms in the region practice intensive arable farming (42% of the farms in the region); less important farm production types are pig husbandry, fruit production and cattle fattening. 16 of the farms are organically farmed.

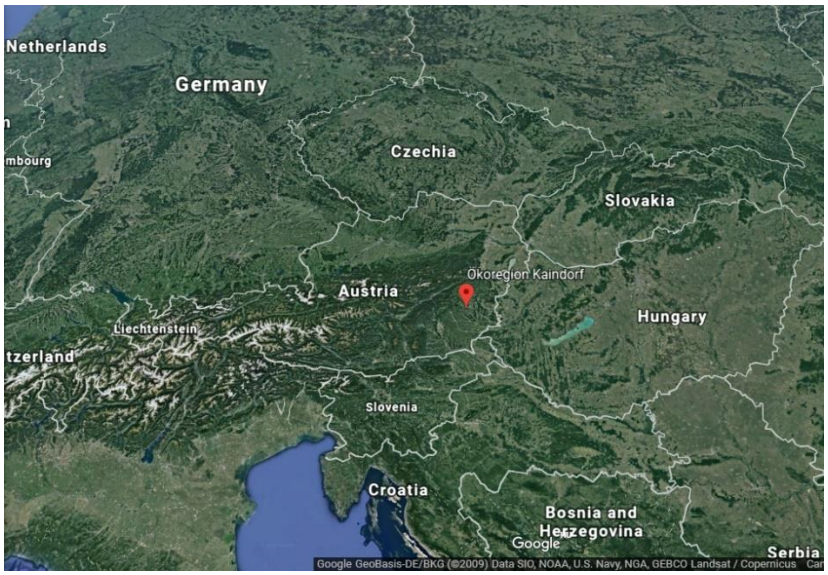

Figure 1. The CS Area

The case study focuses on the "Humus project" of the umbrella organisation *Ökoregion Kaindorf*, which aims at increasing soil fertility and carbon sequestration. The program includes knowledge transfer to farmers (e.g. "Humusakademie"), CO_2 compensation certificates purchased mainly by regional companies, the use of compost and an initiative for biochar, reduction of soil tillage and compulsory greening of arable land, mixed cropping, etc. Experience on increasing soil fertility is exchanged in a group of regulars ("Humus-Stammtisch"). Meanwhile an international audience participates in events of the "Humus project". An average of 10 tons of CO_2 per hectare and year is sequestrated on a total of 2,500 hectares. Water

[1] Due to a municipal reform, the former six municipalities were merged into three in 2015.

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storages capacities have increased significantly. The carbon sequestration-project is accompanied by several smaller agro-ecological projects, e.g. support of agro-forestry, traditional extensive grassland-orchard management systems as well as hemp production.

While most activities of the Association *Ökoregion Kaindorf* take place within the region's borders, the farmers involved in the "Humus Project" are spread across the entire north and east of Austria. There are 250 farms participating throughout Austria with 2,500 ha of arable land.

There are 250 farms participating in the humus formation-project throughout Austria, in the three municipalities in the ecoregion itself there are only about 20 humus farmers.

Actors

The main actors identified in the Social Network Analysis (SNA) of the *Ökoregion Kaindorf* cover a wide range of stakeholders, including associations, farmers, companies, authorities, education as well as actors supporting the ecoregion's idea idealistically (table 1). In the following part, the actors are described and main statements (derived from the interview protocols; in italic) of the interviewees are presented.

The association *Ökoregion Kaindorf* is the central actor with the aim to mitigate climate change locally by implementing projects such as carbon sequestration and humus formation on arable land. The "working group humus formation" (WG Humus) is a sub-platform of the ecoregion that works to increase soil quality and fertility. The WG Humus consists of roughly 30 farmers who aim to study and evaluate new ideas for increasing the humus content of the soil. Another sub-platform of the *Ökoregion Kaindorf* is "Nature in the Garden" (*Orig: Natur im Garten*), where knowledge about the sustainable management of mainly small private and communal gardens are exchanged to raise people´s ecological awareness and to reduce pesticide and mineral fertilizer use to zero.

With regard to the Association *Ökoregion Kaindorf*, the respondents made the following statements (derived from the interview protocols):

- *The Association Ökoregion Kaindorf is paramount for the WG Humus. Without the frame of the broader association, the WG Humus would definitely not exist. The WG Humus take initiatives to increase soil quality and stands for: trial, study and evaluation.*
- *"Natur im Garten" influences the region through the sustainable care of small private gardens.*

"Humus farmers" are considered to key actors for the humus formation project. Changing soil management practices can directly influence the soil conditions, increase humus content and fertility and thereby sequester CO_2. Famers participating in the project are compensated by carbon certificates sold to companies. The provision and trading of certificates are managed by the association *Ökoregion Kaindorf*. Furthermore, experimental farmers act as multipliers by teaching and motivating other farmers to implement measures of carbon sequestration.

Concerning "Farmers", the respondents made the following main statements (derived from the interview protocols):

- *Humus farmers are not only multipliers in the region, but also in other regions of Austria and have a positive influence on other farmers with regard to humus formation.*
- *Humus farmers improve the soil and receive money through humus certificates.*
- *(From all humus farmers) Three experimental farmers, who are part of the WG Humus, are acting as a model site for excursion and training.*
- *Other farmers who do not care about the soil are conventional farmers in terms of soil management. Their aim is to expand their agricultural business economically.*

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Table 1. The actors of AT case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Agricutural Chamber - LEADER region - Local Action Group - Municipalities - State government - Federal Ministry for Sustainability and Tourism	AgrChamber (2) LAG (2) Municipalities (3) State gov. (2) MinSustainab*
	**Farmers and farming organisations**	- Informal network of farmers - Other farmers	Humus farmers (4) Oth. Farmers (2)
	**Agri-food value chain**	- Local companies - Company Sonnenerde	LocalCompanies (4) SonnenerdeCo (3)
	**NGOs, civic society organisations, local community representatives**	- Working Group Humus formation - Working Group Natur im Garten - Association Ökoregion Kaindorf - Mayors of the Municipalities (incl. off-duty)	WG Humus (3) WG NaturGarten (2) ÖkoregionAs (4) Mayors (5)
	**Science, innovation, advisory, capacity building**	- Agricultural Colleges - Company Carbo Cert - Humus certificate buyers - Supporter Dunst Gerald - Creator of the Ökoregion initiative - Supporter and company owner Schirnhofer - Schools - Science	AgrCollege (1) Carbo Cert Co (3) Certif. buyers (4) DunstG (4) DunstR (4) Schirnhofer (2) Schools (2) Science (1)
	**Consumers**		
	**Media**	- different types of media	Media (1)

*missing actors

Idealistic **supporters** influence the *Ökoregion Kaindorf* through their motivation for change. During the interviews, such idealism driven actors were often described as driving forces behind the projects of the *Ökoregion*. Their ideas and concepts, networks and support promote the idea of humus formation as well as other projects. Above all, Rainer and Gerald Dunst (two brothers) are considered to be the key actors: While Gerald Dunst is described as "the brain of the humus project" and manages the AG Humus, Rainer has initiated the *Ökoregion Kaindorf*, developed and guided the founding process and worked for 1.5 years fulltime as volunteer for the project. From the beginning he is the chairman of the association *Ökoregion Kaindorf.* Other people support the *Ökoregion Kaindorf* and carry the idea to other regions (eg "Humus Ambassador" and former EU Agriculture Commissioner Franz Fischler).

In terms of "supporters", respondents made the following main statements (derived from the interview protocols):

- *Rainer and Gerald Dunst are driven by idealism. Rainer Dunst is an alpha leader. Multiplying this project requires people who want to push it.*

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- *Karl Schirnhofer is a great supporter and financier of the first hour, has invested a lot of money for buildings, office and staff. He has promoted greening in his own company very much.*

Authorities include administrative and representative units of the government such as the municipalities, mayors, the state government, ministries and the state and district chamber of agriculture. Their task is either to support the project through promotion and multiplying it, and/or to provide financial support to the *Ökoregion*. At the municipal level, the three communities Kaindorf, Hartl and Ebersdorf are members of the association *Ökoregion Kaindorf* and contribute to its budget. The mayors play a strong supportive role in promoting the region and the ideas. The representatives of the Chamber of Agriculture, who previously worked against the project, are now supporting it.

Concerning "authorities" respondents made the following main statements (derived from the interview protocols):

- *Municipalities are the main pillars. Among the participating farmers are former mayors and vicemayors of the municipalities of the region. The communities financially support the Ökoregion Kaindorf.*
- *The State government of Styria is influencing the ecoregion through financial support.*
- *The Chamber of Agriculture should be more engaged concerning humus formation in the Ökoregion Kaindorf.*

The influence of **companies** on the *Ökoregion Kaindorf* depends on their intention. Companies buy humus certificates for marketing purposes, to improve their image or because of their ecological and social attitude. The economic feasibility of the project is greatly facilitated by the certificate purchasers. Negative influences are supposed to be applied by chemical companies because they are earning money by selling chemicals for agriculture (which in in turn supposed to be reduced when humus content in the soil increases). Companies are also those entities that offer local products to the region. Some companies are strongly involved in the humus project's core business and idea respectively: "Sonnenerde" produces and sells compost, a civil engineer takes soil samples every 5 years of all arable fields, which are part of the program, soil samples are analysed by AGES, the Austrian Federal Office for Food Safety, "Carbo-Cert" is actually transferring the trading concept of CO_2 certificates to Germany and "Green Bridge" hosts humus-workshops.

Concerning "Companies" respondents made the following main statements (derived from the interview protocols):

- *Buyers of certificates must benefit from the humus formation project by either improving their public image or by intending to "improve the world".*
- *Some companies have the basic attitude of working ecologically and socially (together with their employees) and also use these messages for marketing purposes.*
- *The goal of buying certificates is to offset the CO_2 emissions caused by a company. Without the certificate buyers, the project would fall asleep.*
- *Companies are the local suppliers of products to and from the Ökoregion Kaindorf.*

Consumer awareness of the sustainability performance of products is questioned by respondents. Consumer awareness of regionality and seasonality could be strengthened by direct marketers.

The EU (eg **LEADER program**) play a minor role in supporting and promoting the *Ökoregion Kaindorf.*

With regard to the LEADER program and other funding organisations, respondents made the following main statements (derived from the interview protocols):

- *Currently, LEADER does not have much of an impact on the ecoregion, but could increase its influence.*

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- *The CEO of the local LEADER region takes the project very seriously and is looking for an innovative project, e.g., "Ökoregion goes international".*
- *If you want to get things moving as an association such as the Ökoregion Kaindorf, you need support by funding organisations like the EU and the Ministry for Agriculture.*

Education would play an important role in raising awareness of pupils and future farmers in agriculture colleges for the humus formation idea. More recently, the local agriculture college is more interested in the work of the *Ökoregion,* but still provides knowledge conventional farming practice in the classroom. However, such agricultural colleges have an important role to play in the future of the project. Respondents made the following main statements (derived from the interview protocols):

- *Secondary School's task is to raise pupil's awareness of what's happening to the earth, to stimulate critical thinking and civil courage.*
- *Agricultural college students only learn the old, traditional stuff only.*
- *All young farmers who attend the agriculture schools could be encouraged to do "humus formation".*

Science is involved in the *Ökoregion* by conducting research projects on humus formation, eg the University of Natural Resources and Life Science (BOKU). Science can provide the necessary information and evidence for policy-making and legislation as well as advisory services on the success of humus formation and its benefits to the region (eg groundwater protection). However, science is also criticized for sometimes working on very narrow, non-system-oriented issues, referred to by one respondent as *"Silo Thinking Science"*. Respondents made the following main statements (derived from the interview protocols):

- *The cooperation with the BOKU connects more students with the topic "humus formation".*
- *Scientific evidence of humus formation would force policy-making to implement improved laws in on soil fertility.*

Media are important to report on the project and inform on the progress made. Agricultural media have not yet reported on the project. Respondents made the following main statements (derived from the interview protocols):

- *Positive media coverage is essential to the project, and without it, society, and especially politicians, will be hard to convince.*

International regions are **Partners** of the *Ökoregion*, in which similar projects are carried out to improve soil fertility and humus content in agricultural soils, eg in the Netherlands (Friesland), Slovenia and Hungary. These regions apply both the idea and the concept of the *Ökoregion Kaindorf*. International partner regions pay franchise-like fees to the association *Ökoregion Kaindorf* for this. Concerning partners, respondents state (derived from the interview protocols):

- *International partner regions in Slovenia adopted the concept for the working groups and the corporate design from Kaindorf.*

The **society** receives the *Ökoregion's* services and should support the project (statement derived from the interview protocols):

- *Rainer and Gerald Dunst want to give something back to society.*

Tourism could be used as a means of raising awareness and, vice versa, the *Ökoregion*-project could support the tourism marketing of the marketing (eg by events like the GIRO) (statement derived from the interview protocols):

- *Awareness raising by Genussradtour (GIRO).*

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Governance network

Knowledge and information (figure 2) are thoroughly exchanged between the main actors in the humus formation project (humus farmers, Gerald Dunst, civic engineer, Green Bridge, etc.). Before humus farmers receive any money, they must complete a questionnaire on the farm management practices that they have applied on the fields that are part of the project. Gerald Dunst and his extensive knowledge of soil quality occupy a central position in the network in terms of knowledge entry into the system. In the association *Ökoregion Kaindorf* and its members, this knowledge has been shared, processed, further developed and multiplied over the last years. In the dissemination of information and knowledge, Gerald Dunst himself, the humus farmers and the sub-platforms of the association *Ökoregion Kaindorf* (eg AG Humus, "Nature in the Garden") play a crucial role. In addition to personal contact, the association applies a number of approaches and tools to inform the network inside and outside the region (eg international partner regions, the State government): the annual "Humus conference", the association's magazine, a number of leaflets and an informative homepage (see website: https://www.oekoregion-kaindorf.at/kaindorf.at/). The association is currently beginning to commercialize knowledge on humus formation by charging international partner regions franchise-like fees.

The most important flow of goods and services (figure 3), which is important for the key dilemma and challenge, follows the certificate scheme, which involves humus farmers, the association *Ökoregion Kaindorf* as well as the certificate buyers. On the one hand, compensation payments are made to farmers for the formation of humus, on the one hand, CO_2-certificates are sold to companies in order to compensate for their CO_2-emissions. The *Ökoregion Kaindorf* manages the certificate system (humus monitoring at farm level, provision of certificates for farmers, trading of certificates to companies). Other flows of goods and services are those supporting the humus farmers (eg soil sampling, seeds, compost) as well as funding for the association *Ökoregion Kaindorf* of organisations such as the municipalities and CO_2 compensation payments supporters or the LEADER program.

The centralization of the Ökoregion Kaindorf is a reality and the weak connections among other actors are another reality. This centralization was probably an important factor for establishing the initiative, but eventually is a threat for the future.

In general, the results show that there is a fundamental trust in the *Ökoregion* between the different actors. A great openness to new ideas and the willingness to try things are characteristics of the *Ökoregion*. Interviewees describe communication within the *Ökoregion* as appreciative and on an equal footing. Communication at eye level and the willingness to listen to one other seem to be largely developed. A trustful collaboration exists between humus farmers, the association *Ökoregion Kaindorf*, the certificate buyers, local companies as well as the State government of Styria.

Especially at the beginning in 2007, the main protagonists of the project opposed great scepticism in the region. Over the years, this scepticism has disappeared in some parts of the population, while in others it has led to envy of those who benefit from the project.

Sometimes contradictory interests arise between individuals or municipalities. For example, concerning the fusion of municipalities that took place in 2015, some citizens wanted to merge the six *Ökoregion* municipalities into one, but in the end the *Ökoregion* remained divided into three municipalities.

Although interviewees perceive improvements, the main actors still have some distrust of the Chamber of Agriculture. A few years ago, there was a conflict between the *Ökoregion* and the company Frutura (SPAR), a large nationwide supermarket-chain, which was one of the biggest buyers of certificates at the beginning of the project. According to some respondents, SPAR tried to gain influence in the region and attempted to lower certification criteria and standards. As a result, SPAR has withdrawn from the region and developed its own humus certification scheme. There is further scepticism towards chemical companies providing fertilizers because they are supposed to have conflicting interests concerning the *Ökoregion's* core ideas.

The association *Ökoregion Kaindorf* has formed working groups that carry out projects and search for members who implement and work on projects. In addition to the AG Humus and "Nature in the Garden",

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eg the project “Greenshop” (sale of second-hand clothes) is being carried out with support of volunteers. Everyone is invited to participate and collaborate. Members from all professions can get involved, work actively in the groups and form a huge network.

Members of the AG Humus and other interested people meet regularly in so-called regular tables (“Stammtisch”), where topics related to humus formation and soil fertility are discussed. Thus, these regular tables are platforms for promoting the exchange of knowledge between the farmers already involved in the project, active farmers and non-active farmers who are interested in becoming members.

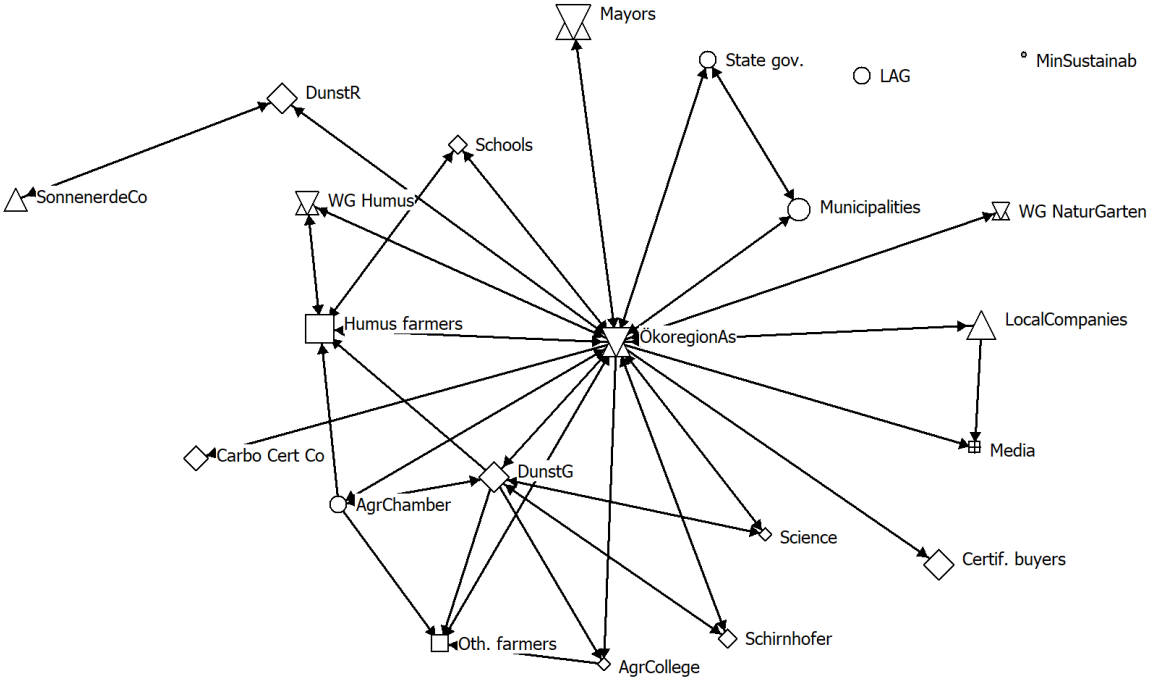

Figure 2. Knowledge and information flows in the AT case study

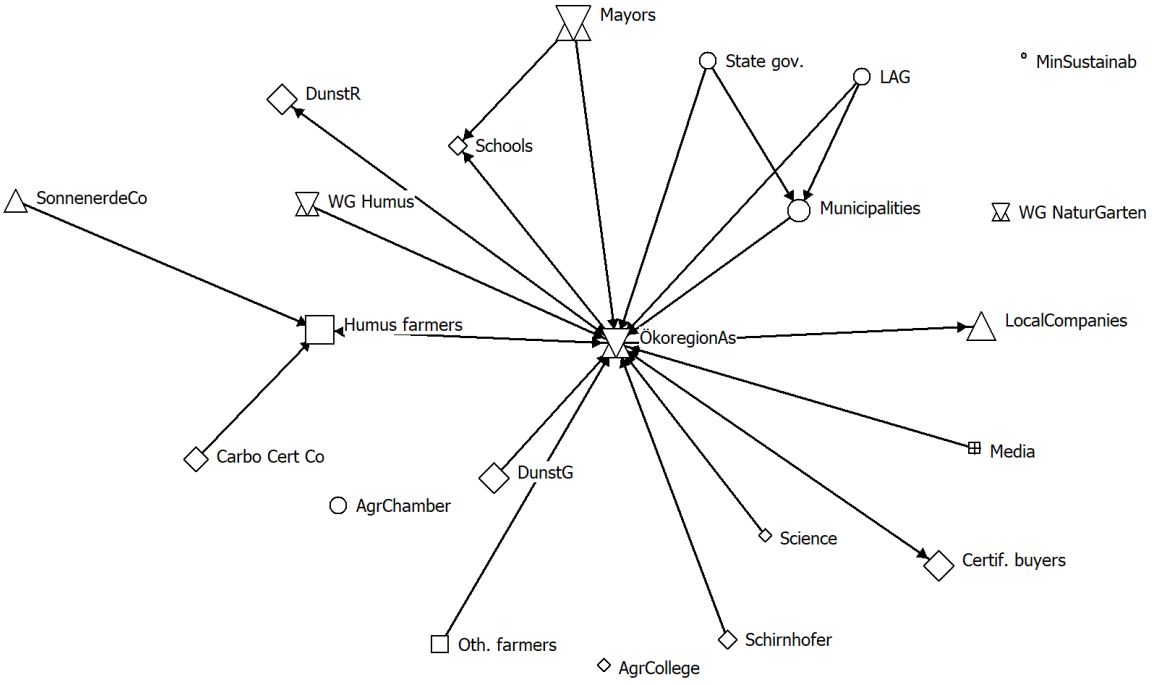

Figure 3. Goods and services exchanges in the AT case study

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Decisions affecting the whole association *Ökoregion Kaindorf* are made by the board, which consists of 23 people. This group of people is made up of the leaders of the single working groups (eg AG Humus, Natur im Garten), the mayors of the communities and the association's chairman, Rainer Dunst. Resolutions are passed by simple majority. Project ideas and other issues to be decided by the board are developed and presented by the working groups. Before a board meeting, the ideas are sent out and later discussed and decided in the meeting. The administrative unit of the association checks the financial feasibility of project ideas.

The Ministry for Sustainability and Tourism (including agriculture) is the missing actor most frequently mentioned by the respondents. The ministry is said to have a plenty of power to push the project further, setting legislative frameworks, guiding decisions from stakeholders – especially farmers – by subsidies and introducing the topic at EU level. Another actor, the interviewees expect more activity, is the agricultural college, which is implement the topic of humus formation in its teaching. Other missing actors quoted are: more humus farmers within the municipalities of the *Ökoregion*, a broader involvement of the non-agricultural population to increase awareness and knowledge, the State Government of Styria, which is to support the willingness of farmer to participate in the project by legal amendments, more system-oriented research by universities and other research institutions, as well as small producers and consumers, who should be more involved in the project *Ökoregion Kaindorf*.

The most important improvement to address the key challenge and dilemma would be to increase local farmer's participation in the project. One measure is therefore to expand the possibility to participate in the humus project not only in arable lands, but also with grasslands and permanent crops. The partly high proportion of rental area on farms constitutes an important barrier for expanding humus formation activities. The money is paid to farmers only after 10 years of proven humus formation, thus farmers do not participate with their rented areas in the project, which does not guarantee the possibility for long-term management. In addition, the exchange between humus and non-humus farmers and the transfer of knowledge about humus to non-humus farmers in general should be further intensified.

A major lever could therefore be the Chamber of Agriculture, whose staff could lobby for the humus topic among farmers. Moreover, there is room for an intensification of knowledge exchange between the main actors of the AG Humus and the agriculture college. Furthermore, the exchange of information between *Ökoregion*-projects and other schools could be enhanced. One of the interviewees believes that the links between the single *Ökoregion*-projects are a somewhat lacking and that an increased connection could possibly lead to something new. A closer network with the state and federal authorities could further push the ecological approach in politics. More money should be spent on humus research. Science could act as a lever if it can demonstrate that the measures to improve soil fertility are effective. The creation of a "humus product label" would be a way to make the humus formation more visible along the value chain and to consumers. The development of a catalogue of criteria for regional humus products is a current project of the *Ökoregion Kaindorf*.

Mitigating and adapting to climate change (impacts) by improving humus content in agricultural soils is the main challenge addressed in the *Ökoregion Kaindorf*. This challenge is addressed by the Association *Ökoregion Kaindorf* and its various working groups which work on different sustainability-related topics. As the central actor, the association links different stakeholders and provide a platform to encounter the key challenge. Key action according to the central challenge is bundled it the humus formation project aiming to sequestrate carbon in arable land. Thus, key actors are the humus farmers and companies buying CO2-certificates, who are exchanging the network's main flow of goods and services as well as knowledge and information. The latter is of significantly high importance for the project. Within the network, fundamental confidence and trustful collaboration between different actors, a great openness for new ideas and communication at eye level seem to be broadly developed. Despite several years of extensive and intensive work on sustainability issues, the involvement of civil society actors as well as farmers is still limited. Thus, the most important improvement to address the key challenge and dilemma would be to increase local people's and farmer's participation in the project.

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2. CH - INTENSIVE ANIMAL FARMING IN THE LUCERNE CENTRAL LAKES REGION

UNISECO Partner: FiBL

Authors: *Rebekka Frick*

SNA Option: 3 (10 interviews)

KEY DILEMMA: HOW TO REDUCE THE HIGH ANIMAL DENSITIES AND AT THE SAME TIME REMAINING PROFITABLE AGAINST THE BACKDROP OF IMPORTANT PATH DEPENDENCIES (BARN CONSTRUCTIONS, DEPTHS, UP- AND DOWNSTREAM MARKET, KNOWLEDGE SYSTEM).

The case study

The Swiss case study encompasses the agricultural area in the Lucerne Central Lakes region with its three lakes: Lake Sempach, Lake Baldegg, and Lake Hallwil. The agriculture in this region is dominated by animal production. The region is one of the most intensive pig farming regions in Switzerland as well as in Europe. About 8% of the farms are specialised pig farms. The most important farm types are specialised milk farms (31%) and specialised cattle rearing and fattening farms (14%). Generally, the canton of Lucerne has animal densities which are above the Swiss average[2]. The number of animals has increased by 7% in the last five years.

Figure 4. Localisation of the CH case study

The detachment of animal numbers from agricultural area causes important environmental problems. The farms buy in a high share of the required fodder and thus create nutrient surpluses (manure). To comply with the nutrient balance required for receiving farm payments, manure is transported to other farms. Thus, surpluses not only occur on the farm buying in fodder but also on other farms. The most important emissions resulting from the high animal densities include ammonium, nitrate, phosphorus and methane (BUWD 2018). These emissions cause different environmental problems. Ammonium emissions lead to

[2] BUWD (2018). Umweltbericht 2018. Bericht zum aktuellen Zustand der Umwelt im Kanton Luzern. Luzern, Kanton Luzern, Bau-, Umwelt- und Wirtschaftsdepartement.

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nitrogen inputs to sensitive ecosystems and a reduction of biodiversity. Nitrate emissions are harming the drinking water quality. Moreover, the region has a long story of high phosphorus emissions and a consequential oxygen-depletion in the lakes. In the 1980s, this originated in the installation of aeration facilities in all three lakes, which are running until today[3]. 70% of the phosphorus reaching the Lucerne Central Lakes originates from agriculture. The situation has improved in the last decades but P loads into the lake are, especially in Lake Baldegg, still high. Furthermore, the storage and spreading of liquid manure occasionally results in losses due to leakages, technical failures and wrong application. These so-called „manure accidents" cause important damages to water ecosystems. Finally, the animal husbandry, namely the pig farms produce odour nuisances, which is an issue for neighbours and the local population. Summarising, the central challenge of this case study region is the high animal density, the related emissions and their effect on the environment.

Actors

Table 2 gives an overview of the 25 actors identified in the CH CS.

The **Cantonal Agricultural Schools** are a public institution offering the courses for the agricultural apprentices as well as extension services to farmers. Different interviewees consider the agricultural school as being a central actor having important influence on the dilemma . However, some interviewees stated that it remains unclear to what extent the school makes use of this influence, i.e. by teaching farmers how to use resources carefully and sustainably because not all teachers and advisors are sensitized to the dilemma.

The **Federal Office for Environment (BAFU)** is responsible for the enforcement of environmental legislation. Recently, BAFU has been putting more pressure to ensure environmental laws are complied with, paying special attention to agriculture. Two interviewees stated that the federal authorities (i.e. BAFU and BLW), together with the cantonal authorities, have the highest level of influence in the system. On the other hand, one interviewee stated that there is insufficient funding available for a proper law enforcement and the office having rather focused on being diplomatic.

The **Federal Office for Agriculture (BLW)** is the primary implementation authority of the federal agricultural policy. Different schemes within the agricultural policy are of high relevance for the present case study (e.g. phosphorus project, payments for resource efficiency, incl. Nitrogen efficient feeding strategies for pigs, investment credits for barn constructions, etc.). BLW exerts important influence in the revision processes of the agricultural policy, which takes place every four years.

The **Cantonal Parliament** is affecting the key challenge by the definition of cantonal agricultural law and the translation of the federal agricultural policy to cantonal regulations. With Lawa and the farmers (union), the parliament has in common that there is a general tendency towards maintaining the status quo and to look at the topic from an economic point of view only. The challenge is mainly recognised but is considered to be tackled with the help of technical approaches.

The **Construction Industry** is of high relevance because they build barns. Their main interest is the generation of new orders. Therefore, they are specialised in advising farmers to expand by increasing animal numbers and generating the demand for new constructions. They have a strong lobbying and marketing division and are sometimes even more connected to the farmers than the advisors from the agricultural school.

The **Farmers** are the key actors because they take the ultimate decisions on how and what to produce. Most relevant for this case study are those farmers who mainly affect the key challenge, i.e. animal

[3] Scharrer, B. (2013). "Dem Sempachersee kommt die Gülle hoch": Das Spannungsfeld zwischen intensiver Tierhaltung und Gewässerschutz im Kanton Luzern 1976-2003. Nordhausen, Bautz, Traugott.

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husbandry farmers with intensive, animal dense farming systems, representing the predominant production systems in the region. These farmers operate in a market system specialised in intensive animal husbandry (both upstream and downstream markets) and got heavily into debt for building barns. Most interviewees agreed that farmers have a high level of influence, namely a strong political representation, advocating for preserving the status quo and tackling the problem with the help of technical solutions. Lately, there are, nevertheless, more and more farmers who change to alternative and namely more extensive production systems.

The **Farmers Union** (national and cantonal) is considered as one of the actors with most influence, both at the regional and at the national level. The farmers unions tend to advocate for preserving the status quo, namely the animal intensive production systems. Lately, there is however more recognition of the key challenge in comparison to 10 years ago. The farmers union sees themselves in an ambiguous role: Keeping farmers from increasing the stocking density vs. defending the farmers' interests against the implementation of new regulations/laws.

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Table 2. The actors of CH case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Cantonal Office for Agriculture - Cantonal Office for Environment - Cantonal Office for Spatial Planning and Economics - Cantonal Parliament - Federal Office for Agriculture - Federal Office for Environment - Federal Parliament - Local Municipality Associations - Municipalities	Lawa (4) Uwe (3) Rawi (3) Cant. Parl. (4) BLW (4) BAFU (3) Fed. Parl. (4) Mun. Ass. (3) Municip. (3)
	**Farmers and farming organisations**	- Farmers Union - Farmers (animal husbandry, intensive)	Farm. Union (4) Farmers (4)
	**Agri-food value chain**	- (Feed) Mills - Barn construction companies - Fenaco (Swiss Agricultural Cooperative) - Meat Processing Industry - Milk Processing Industry - Retailers - Tourism	Fodder Ind. (3) Constr. Ind. (3) Fenaco (4) Meat Ind. (3) Milk Ind. (4) Retailers (3) Tourism*
	**NGOs, civic society organisations, local community representatives**	- Pro Natura, Environmental NGOs - Public (Voters)	Pro Natura (3) Voters (3)
	**Science, innovation, advisory, capacity building**	- Cantonal Agricultural Schools and Extension Services - Other Research, Higher Education	School, Extension (4) Research (2)
	**Consumers**	- Public (Consumers)	Consumers (3)
	**Media**	- Media	Media (3)

*missing actors

The **Federal Parliament** defines important parts of the legal framework, which affect the key challenge. The main schemes include the agricultural policy and water protection policy. Moreover, the parliament is in charge of the obligatory supervision of the offices, e.g. BAFU and BLW. Most of the interviewees consider the federal parliament as the actor with most influence in the system. One interviewee stated that conservative politicians (right wing parties, farmers' lobby), who aim at preserving the status quo, play too much of a role in order to change the system.

Fenaco is the most important agricultural cooperation in Switzerland being present both on the upstream and downstream side of the market, including branches that are highly relevant for the key dilemma such as fodder mills, animal trade, meat processing, and institutes providing guarantee declarations for farmers

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for barn constructions. Theoretically, they could exert important influence and initiate changes but practically Fenaco benefits of the animal intensive production systems and ensures the preservation of the status quo by political lobbying and by providing advisory services to farmers. Fenaco advisers are often more trusted by the farmers than the cantonal advisors.

The **Fodder Industry** plays an important role because the predominant farming system relies on the use of important amounts of concentrate fodder. They are such a central actor because they advise farmers to intensively keep animals in order to create and ensure the demand for concentrate fodder. Often, they have good and easy access to farmers' data. Different interviewees state, that all upstream market actors have a very strong influence on what farmers do and that they take influence through political lobbying.

The **Office for Agriculture of the Canton of Lucerne (Lawa)** is responsible for the implementation of Swiss and Cantonal agricultural policy, including the allocation of direct payments to the farmers. Traditionally, there was a strong focus on fostering intensive animal husbandry with the objective to ensure farm productivity and value creation. Lawa is member in the Agricultural Credit Institute, which allocates interest-free loans for (barn) constructions and it is also involved in the authorisation process for barn constructions. Moreover, Lawa is responsible for the control of water pollution from agriculture and for the implementation of counter-measures such as the phosphorus project. Lawa doesn't claim anymore that animal numbers should be increased. Generally, the office operates between fostering high productivity on one hand and ensuring environmental protection on the other hand.

The **Meat Industry**, namely the large meat processers, are important downstream market actors being the main buyers of animals from intensive farms. They are represtented by associations exerting influence through lobbying, through engagement in political parties and through providing advisory services to farmers. The meat industry focuses on intensive animal husbandry systems producing meat at low prices. They enter into contracts with the farmers, which is how they create important dependencies of the farmers on them.

Similarly, the **Milk Industry**, namely the milk processing companies, play an important role because they put pressure on farmers to produce more milk for less money. In order to exert more influence both politically and economically, farmers are organised in the regional association of milk farmers ZMP, which represents more than 3000 milk farmers. ZMP buys the milk from their members, organises the logistics and transportation

In the case study region, there are two **Municipality Associations** with members from the lake municipalities. Their aim is to ensure a good health of the three lakes. They are responsible for the aeration of the lakes. The associations are in favour of stopping the aeration of the lakes. In order to exert influence, the associations would have to confront and criticize the Canton. The members of the associations are, however, political representatives of the respective municipalities and have to deal with actors of the Canton a lot, also for other issues/topics unrelated to the municipality associations. Also, they do not have any direct relationships with farmers. Overall, the association do, therefore, not exert important influence.

The **Municipalities** in the case study region are on one side affected by the environmental problems caused through the intensive animal husbandry systems. On the other side, the local population generally supports the local agriculture. Farmers' interests tend to be well represented in the municipality councils. The municipalities cover different roles: First, the municipalities exert relevant influence on the challenge through planning decisions, i.e. decisions on land use. Second, they are involved in the authorisation process for barn constructions. Moreover, the municipality tries to solve conflicts between farmers and neighbours, such as complaints with regards to odour nuisances. Finally, the municipalities fund the municipality associations and the aeration of the lakes.

The **Press** (regional newspapers, regional TV emissions) are central when it comes to raising awareness among the general public about the problems caused by intensive animal husbandry. Recently, they report more on the topic because there is a general rising interest in the population. Generally, media take influence on all actors involved and all interest groups try to exert influence on politics through media.

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Different **environmental NGOs** are active in the case study region. The most important is **Pro Natura**, which is the owner of lake Baldegg and transformed the lake into a nature conservation area. The association can, however, only decide the rules for the lake itself and not what type of land use and management is allowed in the areas surrounding the lake. The overarching goal of the different NGOs with regard to the case study region is the reduction of livestock. The main role of the NGOs is to raise awareness for the key challenge among the general public and to exert influence through political lobbying at both federal and cantonal level.

Consumers can influence the challenge by changing their consumption patterns. In Switzerland, there has already been a decrease of pork consumption of 3% per year in recent years. Generally, there is a higher demand for products with sustainability labels. Some interviewees stressed that, nevertheless, among consumers there is lacking willingness to pay more for such products.

The general public does not only act in the role of being consumers, but also in the role of being **Voters**. This is currently of high relevance in Switzerland, because there is a range of agricultural initiatives (means of direct democracy) that the population had and will have to vote on recently and in the near future, tackling questions of how to produce food, what type of agricultural inputs should be allowed and what production systems should be used in animal husbandry. These processes, which take place at national level, have important influence on what happens at regional level.

The **Cantonal Office for Space and Economy (Rawi)** is the leading authority when it comes to the authorisation of barn constructions. The requests for constructions go from the farmer to the municipality, who hands it over to Rawi. Rawi carries out a consultation process involving Lawa and Uwe. Rawi has two conflicting interests: They are responsible for the promotion of growth in the region and at the same time, they have to enforce the landscape planning law. One interviewee states that the Rawi tends to authorize most of the requests. Their decisions can be challenged by appeals at the federal tribunal.

Research Institutes and Higher Education play a central role because they provide information about the state of the environment and the level of pollution from animal husbandry systems while at the same time educating future agronomists, advisors, etc. EAWAG (aquatic research) and Agroscope (federal institue for agricultural research) have carried out different research projects in the case study region. Different interviewees emphasize the fact that a lot of research was carried out in the case study region and that a lot of knowledge is available on the situation. The results should however be better communicated to the general public. Different interviewees state that the level of influence exerted by research is rather low.

Retailers are considered an important actor because they have important market power and can exert influence with the creation of sustainability labels. One interviewee states that in practice they do not change much however.

The **Office for Environment of the Canton of Lucerne (Uwe)** is responsible for the implementation of water and air protection laws and the measurement of water quality of the case study region's lakes. They are the contracting authority of the municipality associations. In the past, Uwe was also responsible for nature protection in agriculture (see *Lawa*). Uwe is, however, involved in the authorisation process for barn constructions. They try to exert influence through dialogue and discussion with Lawa. However, one interviewee stated that Uwe has the reputation to be against the farmers and not being suffiently transparent.

Governance network

The network of actors involved in the key dilemma is very tight and there are many connections (goods, services, information, knowledge) between the actors (see figure 5 and 6).

Different interviewees talk about a path dependency of knowledge referring to the fact that the predominant knowledge system has focused for years on the intensification and industrialization of agriculture. This is because intensive pig production was (and still is) a very profitable sector. Costs for production inputs such as electricity, water, and transportation were cheaper in the past supporting the

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profitability of the sector. Cultural and social values support this system, which has been predominant in the region for many years - even decades.

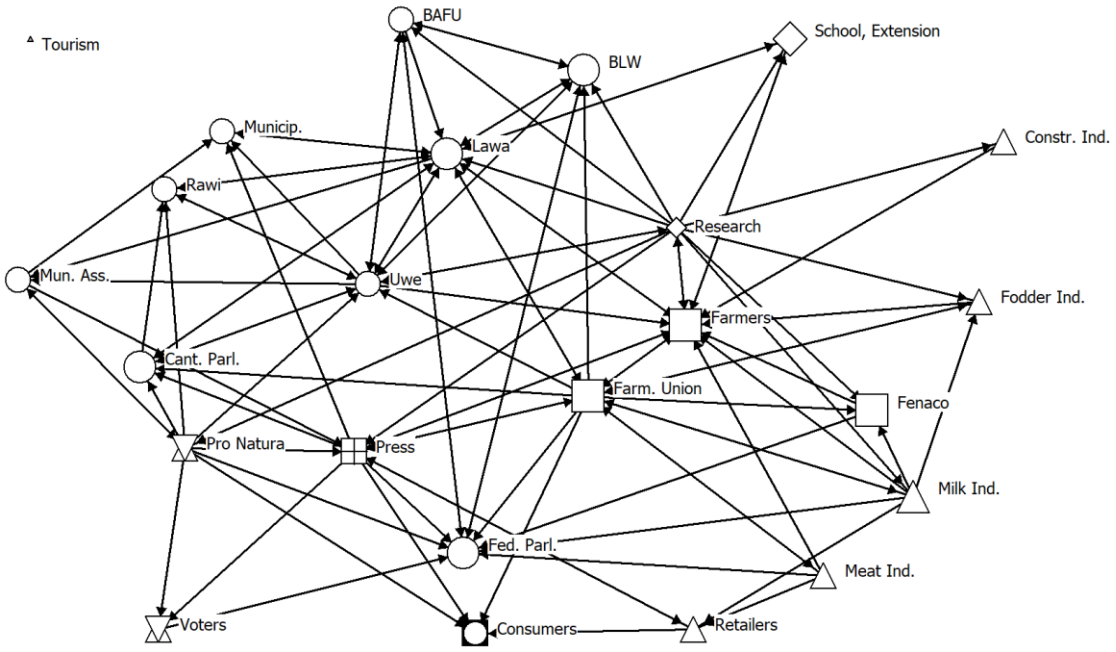

Figure 5. Knowledge and information flows in the CH case study

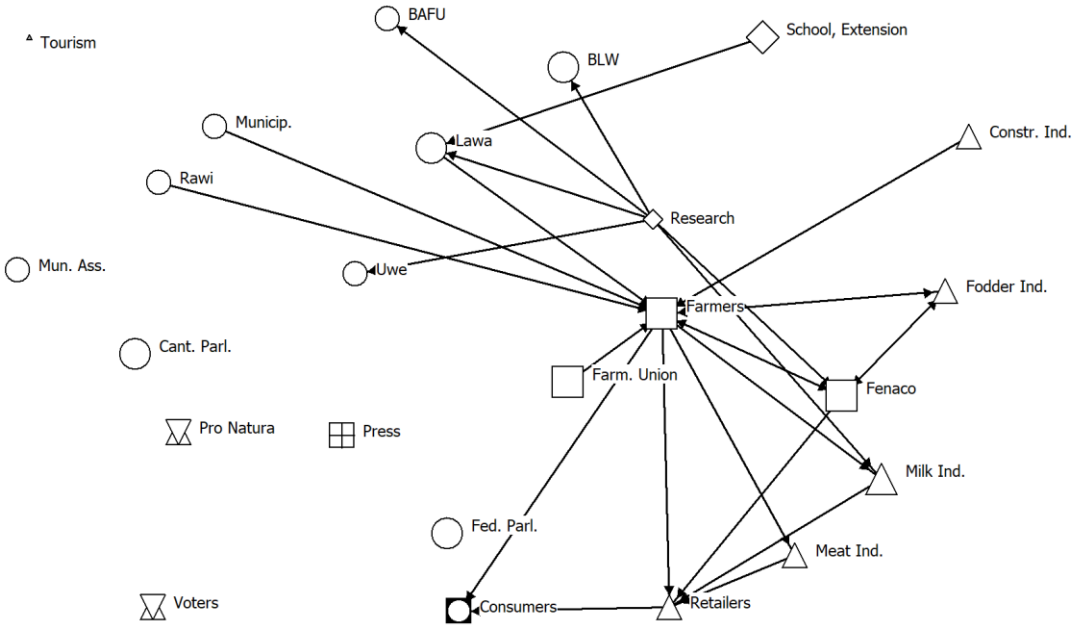

Figure 6. Goods and services exchanges in the CH case study

Important information and knowledge is created by research institutes and shared with all types of actors. Both public and private institutions are contractors of research projects. Information is collected both at biophysical as well as at economic and social level (e.g. from farmers). Knowledge and information flows include advisory services, both public (agricultural schools, office for agriculture, ETH, Agridea), and private (farmers association, feed mills, …), as well as peer-to-peer learning processes. Information about water and air pollution is an important basis, on which voters make their election and voting decisions, and on which consumers make their consumption decisions. This also includes biased information, e.g. information provided by retailers through advertisement.

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The main goods produced and traded in the region, and which are relevant for the key challenge are agricultural input products (e.g. animals, fodder, pharmaceuticals) and the actual food products (e.g. meat, milk, eggs, and cereals). Services include the construction of barns (including planning), the granting of credits (namely for barn constructions), the authorisation of constructions, the lease of land, and performance of research projects.

Generally, there is a broad variety of interests and goals represented by the actors of the network. The most important conflicting topics are the conservation of nature and natural resources on one hand, and the insurance of farm productivity and farm competitiveness on the other hand. Moreover, competition over land and issues related to land use planning are of great importance. This leads to conflicting interests among varying institutions, which can't, however, simply been divided into two groups with differing interests. Many institutions have to represent members with differing interests within themselves.

Nevertheless, different interviewees state that there is consensus among most actors that the existing structures have to be dissolved and animal density has to be reduced. However, there is no agreement on the extent of the problem, on who should solve the problem, how much influence public actors should play in the resolution, and what role private actors should play. Surprisingly, even though the problem has been ongoing for decades, interviewees didn't mention that there is resignation among the actors. In institutions such as the ASSAN working group on the rehabilitation of the lakes, a number of actors with differing or even opposing interest get together on a regular basis to exchange and discuss potential solutions.

The central actor are the farmers. They are connected to the up- and downstrem market actors, to the municpality and cantonal actors as well as to actors providing advisory services. We can't talk of farmers as one specific actor though, as there is a large variety of farms in the region. Even among animal farmers, there are differences and they base their decisions about how and what to produce on a number of information sources, whereas advisory services (both public and private) and peer-to-peer learning play a crucial role. Farmers are more and more pressured to reduce their animal density and emissions. At the same time, they are trapped in path dependencies due to important infrastructural investments taken for keeping up the animal intensive production system. The farmers' union is a key actor when it comes to political lobbying for the preservation of the status quo. Nevertheless, its influence is decreasing since agriculture has become more and more under pressure from the general public with regards to how it produces.

Also the actors of the up- and downstream agricultural market exert important influence at political level. This industry (e.g. fodder industry, barn construction industry, Fenaco) builds and relies on the intensification of agriculture, namely on the increase of animal density. Overall, only few actors of the network are connected with actors of the upstream and downstream market. Apart from the farmers, this is only the case for the farmers union.

The agricultural policy and namely the direct payment system is a crucial connector in the network. All actors involved in the implementation of the policies and the allocation of farm payments are closely connected. This does not mean, however, that there is a high level of trust between these actors. At the level of design and implementation of laws, we could detect a substantial conflict between federal and cantonal offices: the cantonal offices considering being not involved enough and only being ordered by the federal institutions to implement policies, which are not adapted to the needs and characteristics of the region. At the same time, cantonal actors feel that the state simply hands over the problem-solving part to the canton and that solutions are not sought for at national level.

Different actors criticized the level of implementation of existing laws, claiming that the legal framework would in itself be sufficient for solving the key challenge but that there is a lack of implementation.

The municipalities are central actors when it comes to conflicts between agriculture and the local population, being the first instance for complaints (e.g. odour nuisances).

Different interviewees consider the environmental NGOs as not being so influential. Environmental NGOs, and namely Pro Natura, have a lot of supporters in the region, but there is a part in the population that

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finds their positions to be too extreme. There is a good collaboration between the NGOs, the municipality associations and Uwe.

The general public (in its role as consumers and voter) is considered as having a strong (potential) influence on the issue but stays rather remote in the network. Different interviewees emphasize the fact that there is important mistrust among the general public, namely the local population when it comes to animal farming. Today, there is more awareness among the public when it comes to environmental problems.

The tourism sector was mentioned as actor who is missing in the network. This sector is relevant because it benefits from well-kept landscapes and from extensive agriculture.

To better address the key dilemma and to solve the various path dependencies, the present network should be improved in different regards: there should be a clearer division between different public offices representing opposing interests. The focus should be less on finding compromises but on the thorough implementation of existing laws. Moreover, the general public, who exerts a high level of influence, should have a more prominent role in the network. There is a lack of communication about the state of the ecosystems and there could be more pressure exerted from environmental NGOs. Moreover, production and consumption are almost completely detached from each other with different actors of the downstream-market controlling the market. There should be a closer connection between farmers and consumers to ensure that consumers get a better idea of how their food products are produced.

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3. CZ - DAIRY FARMS IN VYSOČINA REGION

UNISECO Partner: BIOInst

Author: *Andrea Hrabalová*

SNA Option: 1 (4 interviews)

KEY DILEMMA: HOW TO MAINTAIN THE GOOD PERFORMANCE OF ARABLE LAND MANAGEMENT IN ORGANIC DAIRY FARMS IN VYSOČINA REGION TO REDUCE ARABLE SOIL DEGRADATION AND WATER POLLUTION BY PESTICIDES WHILE ENSURING ECONOMIC VIABILITY

The case study

The Czech Republic (CZ) case study is about organic dairy farming (ODF) in the Vysočina Region (figure 7), which face the challenge of how to balance good farming practices on arable land with economic viability.

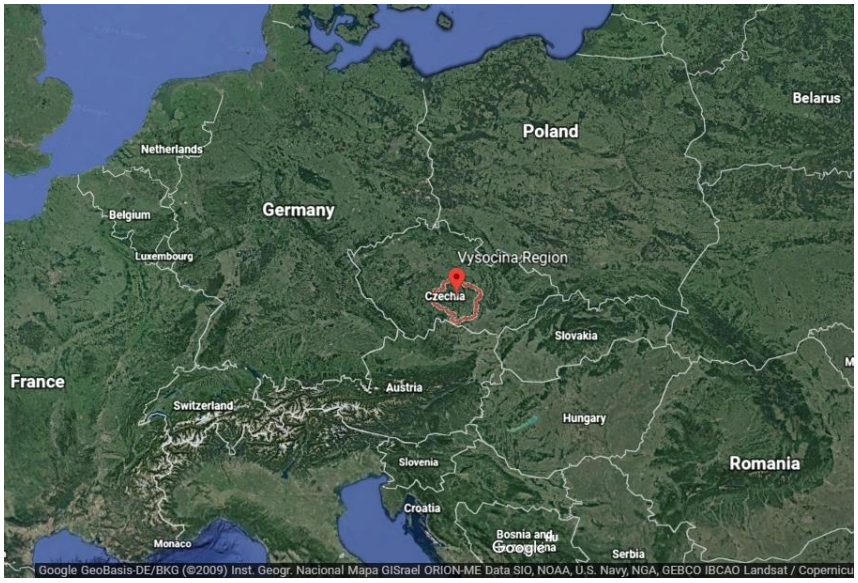

Figure 7. Vysočina Region

Besides the increased soil fertility, major benefits of the adoption of ODF are associated with the improvement of underground water quality, mainly due to the pesticide ban and the replacement of mineral with farmyard fertilizers on arable land. Then, adopting ODF in protection zones for underground water resources could greatly imporve the overall performance of dairy farming in CZ, and especially in the CS area, which hosts important freshwater and underground water resources. Dairy farms operating in protection zones have to comply with more restrictive rules for the use of chemical inputs compared to non protected areas. Adopting ODF may help farmers with rule compliance; however, increasing farmers' motivation to adopt ODF is an issue. Currently, just 1% total milk production is labelled as organic in CZ. Although organic dairy products are one of the most popular categories of organic foods among CZ consumers, the volume of consumption is still small. Moreover, some of the organic goods are still imported by supermarkets from abroad.

The Vysočina Region hosts 15% of CZ dairy farms (450 out of 2866) and is the largest milk producer in CZ, with 571 million liters production in 2018 (one fifth domestic production). Furhtermore, Vysočina is the largest producer of organic milk, with 9 million liters in 2018 (30% domestic production), though the share of ODF with respect to conventional farming is 3% (15 farms), somewhat lower than the national figure, i.e. 5% (141 farms).

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In CZ, there is just a marketing cooperative for organic milk, i.e. “Czech Organic Milk”. The coop was established in early 2012 by 9 farmers in Vysočina. By the end of the year, 5 more farmers joined the coop from the South Bohemia Region. Gradually, other organic dairy farmers from across CZ have joined the coop, which nowadays has 30 members and supplies ca. 45% domestic organic milk production (approx. 14 million liters in 2018). The main challenge of the coop is ensuring a fair price for producers, both in the domestic and the export market.

Most dairy cows in CZ (75%) are hosted by farms covering over 1000 ha. The large farm size may be an obstacle for farmers’ decision to adopt AEFS, given the generally greater workload for farm management. In CZ, most organic milk (80% dairy cows under ODF) is produced in smaller farms, which still exceed 200 ha. This farm structure is typical of post-communist countries.

The 2008-2009 crisis was the main driver of the diffusion of ODF in Vysočina. After producer price of (conventional) milk fell to 5 CZK/L (0,18 cents per litre), farmers had looked for a cost/effective way for assuring the viability of their firm. The project OrganicMilk (2009-2011), funded by the Ministry of Agriculture, and the increased demand for organic milk by the Vysočina Region dairy “Lacrum” offered farmers a feasible solution, which resulted in an increase of organic milk production in the CS area (from 5 farms with 4 mil. litres in 2009 up to 14 farms with 7 mil. litres in 2012). Farms received consultancy on conversion to OF, the quality of organic milk and its benefits was promoted. Unfortunately, in 2011 the dairy Lacrum underwent a change of company management and quit producing organic food, as the demand for organic products was lower than expected. Eventually, this originated a second crisis in the Vysočina dairy sector and forced ODF to act and look for other ways of selling their organic milk. Unfortunately, a premium price is not available for the compliance of quality standards other than the organic certification (e.g. GM-free, antibiotic-free).

The PRO-BIO Association helped the "Czech Organic Milk" coop and put the coop in contact with the German dairy Glaeserne Melkerei through the help of the control body GÄA. All farmers in the coop should adopt the GÄA organic certification. The Geman demand for organic dairy products was exceeding the domestic supply. During the period 2013-2017, the incresed exports of organic milk to Germany allowed to stabilize the organic milk market in CZ (withdrawal of overproduction) and maintaining the price premium for organic milk in CZ. At the coop level, thanks to export, the producer price increased to a grater extent compared to the average price in CZ. The price of organic milk for coop members exceeded the national average with 2 CZK to organic milk and 4 CZK per liter to conventional milk. Thanks to this better price the coop members received the necessary funding for the modernization and payment of earlier loans.

The increase in the domestic supply of organic milk decreased the demand on the German market. In 2018, export to Germany ended. Since then the coop has been looking for new sales. Currently (2019), the coop have sold 1/3 total milk volume as organic milk to Poland and Slovakia and 2/3 total milk volume to domestic dairies – about half is used for the production of certified organic food, half as conventional milk. In CZ, dairies stive to increase the sales of certified organic food to the retail sector, unfortunately shops still import a substantial part of organic dairy products from abroad.

Against that background, the economic viability of ODF is challenging. According to experts, some farmers might decide to shift to meat or even crop production or to quit farming. Despite that, organic farmers are happy with the application of the organic regulation rules and are not willing to go back to the conventional management system.

Actors

In the CS, there are two main groups of actors that activecly influence (or are influenced by) the challenge, i.e. value chain actors and authorities/administrations. Beyond these two main groups, new actors are emerging - so far with little influence but higher potential in the future (Table 3). The present paragraphs

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starts by listing and briefly describing the actors of the three groups; next, missing actors with potential influence on the challenge are presented.

Table 3. The actors of CZ case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Ministry of Agriculture - CAP Department - Ministry of Agriculture - OF Department - EC (Brussels) - Agri Committee of Chamber of Deputies - Ministry of Environment - water authorities (municipalities) + river basin administrators (state institutions) - SZIF - paying agency - Administration Vysočina Region	MoA-CAP (5) MoA-OF (5) EU (4) Govnmt (4) MoE (3) WaterAdmin (3) PayingAgency (2) Municipalities*
	**Farmers and farming organisations**	- Conventional dairy farms (Vysočina) - Organic dairy farms (Vysočina) - PRO-BIO Association of Organic Farmers - Agrarian Chamber (AK) - Agricultural Association (ZS) - Association of Private Agriculture (ASZ) - Foreign associations (Bioland /Naturland)	Farms conv (1) Farms org (2) PRO-BIO assoc (4) AgriChamber (3) AgriAs (3) Private AgriAs (3) Foreign OrganicAs (4)
	**Agri-food value chain**	- Cooperative Czech Organic Milk - Cooperatives/sales organizations - Dairies - Dairies certified for org. milk processing - Dairies abroad (Glaeserne Melkerei/other) - Supermarkets (shops) - Cooperative dairy + focus on local sales	OrgMilk Coops (4) ConvMilk Coops (2) ConvDairies (2) OrgDairies (2) OrgDairies abroad (5) Retail (1) Local OrgDairy Coop*
	**NGOs, civic society organisations, local community representatives**	- ZERA Agri-Environmental Regional Agency - Landowners - Biogas operators (crop demand) - Environmental NGO - Water companies	AgriEnviron Agency (2) Landowners (4) Biogas (1) EnvNGO* WaterCo*
	**Science, innovation, advisory, capacity building**	- ÚZEI - data, arguments - Consultancy - transition to AEFS	ÚZEI (2) OrgFarming Consultants *
	**Consumers**	- Consumers + consumer organization	Consumers*
	**Media**		

*missing actors

Value chain actors:

- Cooperative “Czech Organic Milk”: together with the PRO-BIO Association of organic farms, the actor tries to motivate other farms to adopt ODF.
- Cooperatives/sales organizations collecting milk for processing: the actor can significantly help the transitions towards ODF in the CS. However, they are not interested in organic production yet,

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most of them do not apply quality price premium and the coop Czech Organic Milk see as a competitor.

- Dairies certified for organic milk processing: thoughout the country, five dairies have the organic certification. All of them, processes both organic and conventional milk to deliver organic and conventional dairy products; moreover, often a relevant share of organic milk is purchased and processed as it were conventional, due to low demand of domestically produced organic dairy products by the retail sector. These dairies carry out organic production for a long time and keep it due to the link to specific farms (property or human connection), therefore they buy organic milk at a higher price, even though they process part into conventional products. They buy most of organic milk directly from their farms, the cooperation with the organic coop is weak – they have opposite goals of the price negotiation.
- Dairies convetional: none of the dairies in Vysočina process organic milk. The local dairy could significantly help the transition towards ODF in the CS, but only if it succeeded in the market with new organic products (e.g. milk for clean water).
- Dairies abroad (Glaeserne Melkerei/other): so far, foreign dairies have helped the development of ODF the most, thanks to demand, higher prices and solid business practices. Incentives to transition to AEFS/OF come mainly from abroad. Foreign connections in general (sales, research, projects, know-how, demonstrations of good practice) have a huge impact on the shift towards AEFS in CZ.
- Supermarkets (shops): as the main points of food sale could have a significant impact on the way crops and animals are grown. The first innovators are already occurring: the announcement of termination of the sale of cage eggs, in the case of milk – the promise of Billa supermarket to end the import of organic milk from Slovakia and to increase sales of domestic production. According to all interviewees, market signals are a very importnat incentive for trasition to AEFS/OF.
- ZERA envi NGO: Agri-Environmental Regional Agency operating in Vysočina and promoting OF + composing for a long time. ZERA also covers regional food competition and promotes winners (often organic food) in the region.
- The PRO-BIO Association: together with the coop, supporting the development of ODF within the overall OF promotion (eg. negotiates with the Trade and tourism association representing supermarkets in the Czech Republic to shift organic food from luxury goods to regular ones with lower margins, with the Agriculture Committee of the Chamber of Deputies to support the purchase of organic food in public procurement and possibly reduce the excise tax, with MoA to support the organic milk sector (project OrganicMilk), with State Agricultural Intervention Fund (SZIF) to support the national organic food campaign or to set less stringent conditions for the recognition of sales organizations in OF etc.). Common effort of PRO-BIO Association and the coop Czech Organic Milk is to stabilize the dairy market and to expand ODF in CZ.
- The Department of Organic Farming at MoA: has a special role in supporting OF development – it mediates communication between OF sector and the rest of MoA, is responsible, among other things, for implementing the Action Plan for organic farming, providing support to NGOs in the field of organic farming promotion, providing support for OF projects (eg. OrganicMilk, Bio to school..), newly considering the creation of a working group for organic milk (focused mainly on sales).

Authorities/administration actors:

- Agricultural unions (the strongest Agrarian Chamber, Agricultural Association and Association of Private Agriculture): through their regional/district organizations solve local challenges and influence the implementation of farm management rules. (NB: The activities of these associations focus primarily on a defence against tightening conditions from the MoA, less on proactive innovative ideas for envi-improvement in farming). Common goal of all unions is the economic viability of farms - but each of them solves it by own way. PRO-BIO Association promotes OF

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development as only one sustainable form of farming, ASZ promotes as sustainable mainly family farms with own land and close links to the region, AK and ZS promote maximizing profit and production and big farms. For this reason, PRO-BIO and ASZ are closer to each other and, on the other hand, AK and ZS are allies.

- The Department for CAP at MoA: has the strongest position to determine the changes in agricultural management. Partly as well the European Commission (EC) if the measure needs to be notified and approved. Most projects to support organic milk production, national organic food campaign, national welfare measure… required notification.
- The Agriculture Committee of the Chamber of Deputies: has also an important position– already a number of projects and themes with environmental topic have been pushed into reality through this institution. Some of the commission members are in favor of the development of organic farming and support projects. (there is some support for the PRO-BIO Association proposals).
- Service and scientific organizations: prepare documents and arguments for MoA and working groups as a support for discussions with agricultural unions, especially when adjusting policy towards environmental protection (NB: there is always strong discussions due to EU pressure to "greening" agricultural policy and a limited budget for support in general). ÚZEI has a central role (Institute of Agricultural Economics and Information) providing the documents for almost all agricultural policy proposals of MoA. Among other research organizations involved in setting up environmental measures belong: UKZUZ prepares the methodology for the determination of organic matter in the soil for the evaluation of the correct farming of farms, VURV defines the fertilisation limits according to the Nitrate directive, VUMOP defines the conditions for areas at risk of erosion... (NB: a disadvantage of the outputs of research institutions is their partial detailed focus, which sometimes in practice is difficult to realize).
- The Ministry of Environment (MoE) enters into negotiations increasingly in line with the evolution of the CAP towards environmental protection. MoE no longer protects only the PLA and national parks, but also tries to interfere in the open landscape. (NB: The limit of MoE is a small budget for its plan, should cooperated in close with MoA and trust is between the two institutions).

New emerging actors:

- Water authorities (municipalities): have newly a great power to change management rules in a more environmentally friendly way around water based on the amendment of the Water law (the right to define restrictions in the protection zones of water resources and water reservoirs for drinking water).
- The landowners and their associations: are the new strong actor with an impact on agricultural land management. A new form of lease agreement has been established with the right of the landowner to demand good practice on its soil and require a fine in case of deterioration of soil quality. However, most owners are still mainly interested in the amount of rent and do not take into account the bonus of organic farming on its land.
- Owners of biogas stations: have a specific impact on the way of farming. They demand raw materials from agriculture as input to biogas production, where the quantity of pesticides and mineral fertilizers used during cultivation are not important. This influence is not so dominant in Vysočina, because farms must prioritize quantity and quality of feed for their animals.

Regarding the missing actors: institutions on the demand side /consumers, environmental organizations, consultancy for AEFS transition, local administration, own coop dairy and drinking water distribution companies have been identified as missing:

- Consumers: there is a growing demand for more environmentally friendly production methods but in fact, consumers have been idetified as still missing actor in the Czech case study.

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- Environmental NGO: since Vysočina is a production agricultural area and there are not so many protected sites - there are no local envi organizations and the nationals do not operate too much here, therefore, this type of actor has been identified as missing.
- Consultancy for AEFS transition: an availability of consultans has a significant impact on the shift of farming towards more environmentally friendly methods; in CZ technical consultancy missing, counseling on subsidies prevails.
- Local administration: was idetified as an important but missing actor that can support more environmentally friendly ways of farming on a local scale, sustainability is solved in the field of energy savings, waste sorting, health prevention, composting... but not in the agricultural sector.
- Cooperative dairy: the joint processing of at least part of the collected organic milk does not yet exist with the coop, some of the members see it as a weakness. But the question is whether its organic dairy products would find a place on the market (already overcrowded)
- Water companies: in some countries this type of actor plays a decisive role in defining the requirements for farming near to water resources (it also participates in the financing of injury to farmers), in CZ it is not yet involved.

Governance network

Most interactions in the knowledge/information network (Figure 8) involve two major topics, i.e. (i) ethical reasons and available incentives for adopting environmentally sustainable farming practices and (ii) mitigation of farmers' risk aversion, especially producer risk associated with demand fluctuations on both the domestic and export markets.

Kowledge/information flows about the first topic involves the direct communication between the cooperative Czech Organic Milk and farmers. The cooperative regularly publishes its activities at various conferences and meetings and motivates conventional farms to convert to ODF. The coop dissemination activity aims at sharing information about its members and processing facilities. Besides, the PRO-BIO Association promotes ODF as a sustainable way of farming, targeting farmers, dairies, the retail sector, and policy makers, as well as farmers' unions. The PRO-BIO Association is convinced that the main motivation for transition to ODF is the premium price on organic milk sales.

The second flow covers the exchange of information on OF and its extension in the Vysočina region in connection with the stricter management rules in the protection zones of drinking water reservoirs, which are the largest here. There is a working group "water tank Želivka" mapping barriers to the transition of local farms to OF (most of them with dairy farming and intensive) and a pilot project was launched in 2019, where farms around the reservoir could voluntarily commit to further reduce pesticides and fertilizers use for three years, the loss of production is compensated. At the end of the year, a meeting at the Ministry of Agriculture is prepared and barriers to the transition to OF in these locations will be discussed. The results of the discussion could provide suggestions on how to adjust the conditions of OF measures for the new RDP. Discussions are attended by: all 4 agricultural associations with MoA + MoE, water authorities (municipalities) + river basin administrators (state institutions).

From the perspective of good/services/works (figure 9) - again, there are two types of goods/services:

- Flow of organic milk from farms through sales organizations to dairies and shops, they are specific goods "with a story" and each entity in the chain by promoting the goods trying to develop OF. The creation of background data and OF market analysis, as well as a coordination of projects supporting OF development is considered as a work.
  In addition, such flows also include positive outputs of the farming systems such as the imporvemnet of water quality (for river basins) and soil structure (for landowners).

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- Flow includes mainly the work of agricultural associations, both for MoA (i.e. participation in working groups for soil, water and landscape that discussed and prepared new nature-friendly measures), and for farmers (services and consultancy within membership fees). An important position in the preparation of new measures is played by ÚZEI (provides background materials and analyses on the topic of organic farming for the MoA) and SZIF (except the payments of subsidies provides rules for national OF projects + national campaign for OF, subsidies for sales organizations).

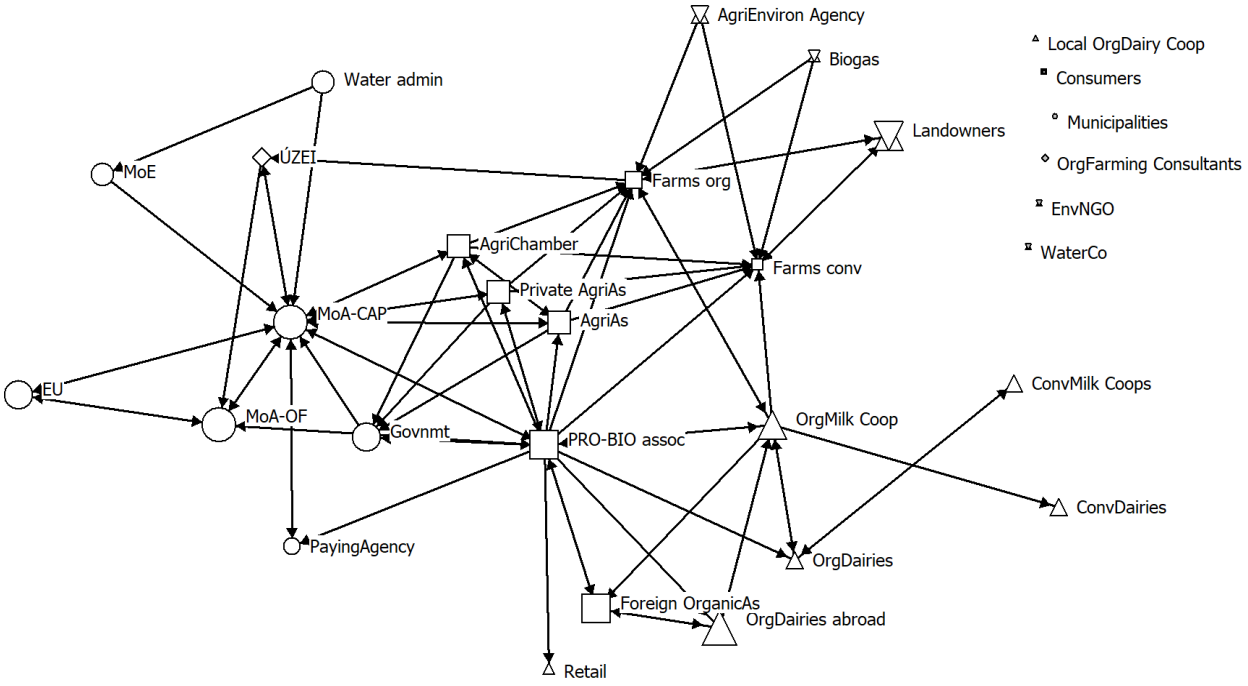

Figure 8. Knowledge and information exchanges in the CZ case study

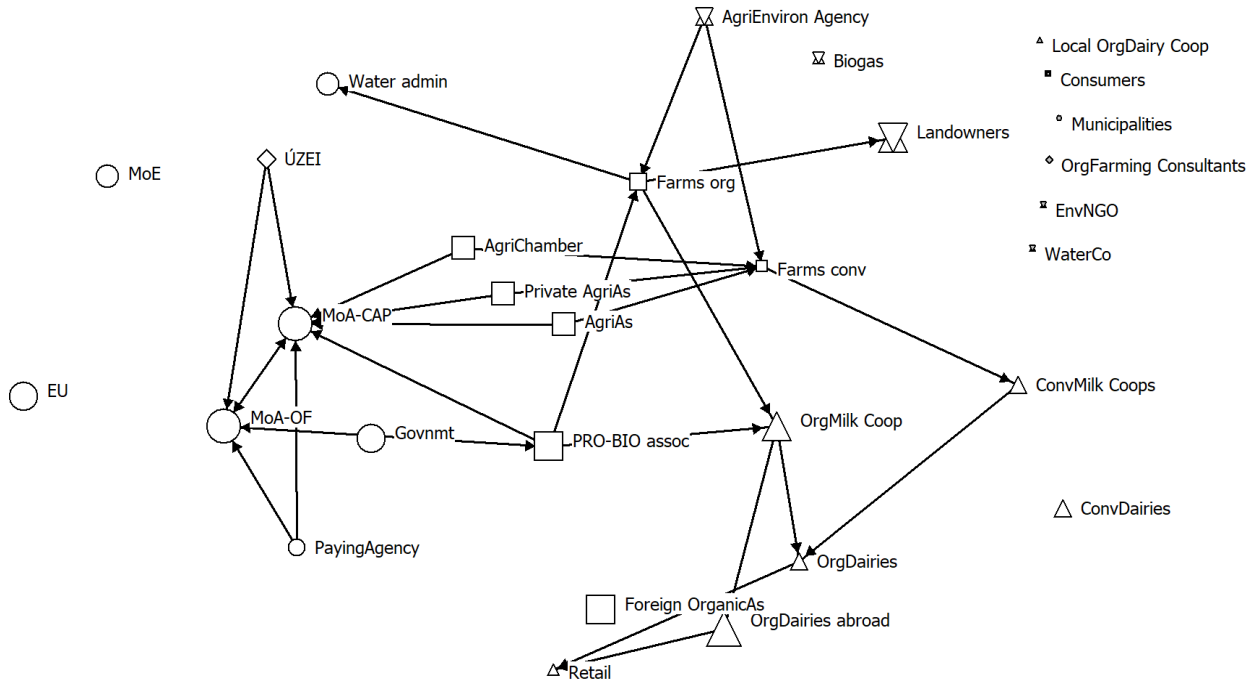

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Figure 9. Goods and services exchanges in the CZ case study

With regard to the decision making mechanisms, all experts agreed that in the Czech Republic, there is relative fixed system from top to down, where the MoA has a dominant position and the change of farming can be enforced either by motivation (subsidies) or by restrictions (regulations, laws and penalties).

In both cases (subsidies or regulation), it is necessary to prepare documents and supporting arguments from agricultural unions precisely and submit to the responsible department at the MoA. Before that, it is advisable to contact the MoA service organizations such as ÚZEI, SZIF, research institutes and discuss the intended change in advance. It is ideal to discuss the proposed measure / change with all three main unions (AK, ZS, ASZ). In the end, it may be that a well-intented proposal will change beyond recognition after reminders and adjustments. The whole process takes 2-3, sometimes 5 years. In the meantime, the original reason for the proposal may change…

Certainly it would be possible and probably appropriate to deal the situation/dilemma through greater involvement / better communication of existing actors, complementing the identified missing ones:

- greater involvement of actors at local level - what the coop Czech Organic Milk really needs and what the region can offer and lobby (possibilities of local represenatives of agrarian unions, ZERA, missing local administration). The network for the design, discussion and approval of any measure is set up and clearly given, no significant change in procedures can be foreseen. Thanks to the EU policy and budget (CAP) almost all changes and innovations are agreed with MoA at national level and through discussion with main agrarian unions.
- closer communication between organic and conventional farms - neutral negotiations on the gradual shift of agriculture towards more environmentally friendly techniques (role of local represenatives of agrarian unions supported by consultancy for AEFS transition that still lacking in CZ (there is mainly discussions between MoA and agrarian unions at national level).
- from the organic milk market perspective – there is a sufficient supply concentrated in the coop Czech Organic Milk, unfortunately there is no real demand in CZ. Now it is necessary to work on promotion and sales, the question is whether the PRO-BIO Association lobby at national level is enough ... whether local consumers can be activated somehow?

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4. DE - DEVELOPING STRATEGIES FOR AGRO-ECOLOGICAL TRANSITIONS IN ARABLE FARMING SYSTEMS IN NIENBURG COUNTY, LOWER SAXONY

UNISECO Partner: Thünen Institute of Farm Economics

Authors: *Gerald Schwarz, Johannes Carolus*

SNA Option: 2 (4 interviews followed by one workshop)

KEY DILEMMA: HOW TO INTEGRATE AGRO-ECOLOGICAL PRACTICES ON ARABLE LAND IN HIGHLY MARKET-ORIENTED FARMING SYSTEMS TO REDUCE BIODIVERSITY LOSS AND WATER POLLUTION THREATS WITHOUT SIGNIFICANT NEGATIVE IMPACTS ON THE ECONOMIC VIABILITY OF FARMS?

The case study

The case study area is an intensive agricultural area with particular sustainability issues regarding biodiversity loss and water pollution threats, and comprises 83,100 hectares and approximately 1,500 farms. The area is adjacent to intensive livestock regions with severe issues in manure management and impacts on land (rental) prices[4]. The German case study provides an example for the analysis of what is required to initiate a transition process to agro-ecological farming in cases of highly market-oriented farming with low level of agro-ecological innovation. Farmers participate in relevant measures supported under the RDP, but with a relatively low uptake of dark green agri-environmental measures. Therefore, the experience with strong agro-ecological practices such as intercropping, agroforestry and integrated biodiversity is very limited. However, some experience exists with flowering strips and protection strips for wild herps, extensive field margins, cover crops, nutrient management and organic farming. The level of cooperation is relatively low, but multi-actor platforms for biodiversity-friendly farming exist, on which this case study builds. In the complex social network of actors that influence the key dilemma the main controversies concern the consequences of agro-ecological practices on the economic viability of farms and conflicts through different perceptions and opinions about the property rights of agricultural land use and its implication for public good provision.

Figure 10. Localisation of the case study area in Germany

[4] Polaschegg, M. (2018) Landwirtschaftlicher Fachbeitrag zum Regionalen Raumordnungsprogramm des Landkreises Nienburg / Weser. Landwirtschaftskammer Niedersachsen.

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Actors

The social network consists of numerous actors. These actors can be classified into six main types of actors that can contribute to addressing the key dilemma increasing and improving the implementation of agro-ecological practices in the Nienburg Area. At the center of the network are the final decision-makers of farm and land management, the farmers. Their decision-making on adopting agro-ecological practices is influenced by the information flow and contractual arrangements with, and rules provided by, the other five types of actors. These include value chain actors from land owners and plant breeders to retailers and consumers, actors providing advice and promoting capacity building, NGOs and local community associations representing environmental concerns and interests of specific groups, and local and regional administration and authorities responsible for the policy implementation and monitoring of policy measures and the legal framework of agricultural land management. In addition, regional media, sich as radio stations and local and regional press, have been identified, although with limited influence. The different actors are listed in Table 4 as well as their influence on the identified dilemma.

Table 4. The actors of the DE case study with an influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Regional agricultural ministry and their approval and control authorities - Lower Nature Protection Authority and other county administrations - Local administration (municipality level) - County Association Water Management	Reg Min Auth (5) LNPA (3) Local admin (4) CAWM (4)
	**Farmers and farming organisations**	- Farmers - Landvolk (farmers union)	Farmers (5) Farmers union (4)
	**Agri-food value chain**	- Land owners - Plant breeding companies (seed producers) - Contractors and machinery rings - Agricultural traders - Retailers	Land owners (5) Plant breeding (1) Contr. & rings (3) Agri-traders (2) Retailers (5)
	**NGOs, civic society organisations, local community representatives**	- NABU (environmental NGO) - BUND (environmental NGO) - Hunter organisation	Env org N (3) Env org B (3) Hunters (2)
	**Science, innovation, advisory, capacity building**	- Chamber of Agriculture - advisory service - Private advisory firms - Agricultural professional school - Intermediary (biodiversity champion) who brings together information, knowledge and evidence from different actors	Agric-chambers (4) Priv Adv (3) Agri-school (4) Biodiv champion*
	**Consumers**	- Consumers	Consumers (5)
	**Media**	- Regional media	Regional media (1)

*missing actor

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Farmers are the direct decision-maker on the adoption of agro-ecological practices and have thus a high influence score. Their goals are largely driven by economic interests to generate income from a viable farm business. Some farmers consider agro-ecological aspects and question their current practices to reduce negative biodiversity and water quality impacts. Agro-ecological practices are adopted on specific parts of the farm if and where such practices fit best with the business plan of the farm. A key aspect is a remuneration of the provision of environmental benefits and ecosystem services that would support an internalisation of biodiversity benefits into the farm business plans. Negative experiences with a high level of bureaucracy of the CAP payment system, detailed monitoring at a level of a square meter and perceived high risks of financial penalties have negatively impacted on their willingness to sign up to agri-environmental measures supporting the adoption of agro-ecological practices. Instead interest is developing to learn more about, and consequently trial initiatives outside the CAP framework.

Regional agricultural **ministry** and their approval and control authorities are a very influential actor that is responsible for the Rural Development Programme in Lower Saxony including the approval and control of measure implementation. It can within the national and European policy framework and regulations design policy measures promoting agro-ecological practices and adjust rules and criteria of their implementation. The local office of the approval and control authorities were not identified as actors with a separate and individual influence but included under the heading of the ministry, as these only fulfil and follow instructions of the regional ministry.

Increased scarcity for agricultural land use due to non-agricultural land use and demand from intensive livestock systems in adjacent areas in combination with a relatively high share of rented land on the farms (more than 60%) highlight the dependency of farmers on good relationships with **land owners** and thus the influential role of land owners for agro-ecological transitions. Land owners have the control over the conditions of land rental agreements with farmers. The main goal of land owners is often to secure the economic value of the agricultural land. They can restrict what farmers can grow and how they manage the land. The adoption of agro-ecological practices that would reduce the economic value of the agricultural land can be excluded from the rental agreement or farmers do not implement agro-ecological practices due to the perceived risk that land owners are not willing to renew the rental contract. On the other hand, agricultural land is inherited by the next generation of land owners who in some cases live in cities and towns and potentially have different attitudes towards promoting agro-ecological transitions and incorporating sustainability criteria into land rental agreements. It needs to be further examined to what extent this provides a mechanism to integrate the adoption of certain agro-ecological practices in rental agreements between land owners and farmers.

Consumers have the possibility to assert large influence on the adoption of agro-ecological practices through increased demand for products with have been produced with agro-ecological farming practices. This would require visibility of agro-ecological practices on the products in the shelves at the **retailers** or increased direct marketing on farms or farmer markets in towns and cities. The higher demand for “agro-ecological products” would be transmitted through the supply chain and ultimately impacting on the farmers’ decisions to adopt agro-ecological practices. Other value chain actors such as **plant breeding companies** and **agricultural traders** have less influence on the decision-making of farmers than retailers and supermarkets. However, there were different views expressed on the influence of the different value chain actors during the interviews and workshops. And the consideration of required adjustments in the supply chain (e.g. at seed producers and processors) is an important factor for the co-construction of management strategies for agro-ecological transitions.

Changing consumer expectations and growing awareness of the need for addressing biodiversity loss provide a possible scenario for changing purchase decisions of consumers. Under the concept “Together Growing” (“Zusammen wachsen”) representatives of **County administrations and local communities** are currently preparing the piloting of a regional label for locally produced agricultural products. This cooperation indicates an awareness for specific local (environmental) quality aspects that has been highlighted in MAP discussions as a potential strategy to also support the adoption of agro-ecological practices.

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County administrations such the Lower Nature Protection Authority have the role and goal to ensure that protected habitats and species on and adjacent to agricultural land are not deteriorated and managed according to the relevant laws and regulations. They can assign a protection status to agricultural land that has reached a certain environmental quality, so that the status and character of that particular piece of land can't be altered by agricultural land use. The **County Association Water Management** is responsible for the management of the water bodies and measures in the Water Framework Directive and is well connected with farmers throughout the case study area cooperating in the management of water protection strips. **Local administration and municipalities** are involved in the decisions on allowing farm expansions (e.g. new and bigger livestock sheds) and are responsible for the management of community owned land. Farmers often maintain good relationships with representatives of the local administration and municipalities (e.g. for issues in relation to livestock husbandry and also for direct sales if farmers have a farm shop). While current activities of local administration and municipalities in promoting and integrating agricultural and nature protection interests and land uses are often limited, they could play a much bigger role. If funds from the second pillar would be allocated to local municipalities they could quickly and efficiently implement local agro-ecological programmes and initiatives as they are well connected with farmers, **contractors** and other local actor.

Local branches of **environmental NGOs** raise awareness about environmental issues in relation to agricultural land management and try to convince farmers to take into account environmental problems. They finance campaigns and small-scale measures through donations and implement in some cases specific environmental initiatives and measures together with local village associations devoted to the maintenance of local traditions and characteristics.

Only few farmers have own ideas and initiatives how to implement environmental friendly farming practices. Capacity building and targeted advice to farmers are particular important. **Advisory services** (of the Chamber of Agriculture and private advisory companies) are often the initiator in developing ideas and concepts for the implementation of agro-ecological practices. In particular the specific biodiversity and water protection advisory services provided by the Chamber of Agriculture have a high potential to further promote agro-ecological transitions. They pay particular attention to the farmers' point of view in environmentally friendly farming and attempt to integrate the economic interests of farmers with the requirements of successfully achieving biodiversity and water protection benefits. They are trusted advisors with long-term experiences in the cooperation with farmers and have access to a large network of farms.

But capacity building of environmental friendly land management and agro-ecological farming needs to be strengthened at an early stage in the education of future farmers. **Agricultural schools** are a key actor to teach and raise awareness of the importance of the adoption of agro-ecological practices.

Other actors of the social network have less influence on addressing the key dilemma. To some extent **regional media** such as local press and regional / local radio stations can raise awareness and disseminate information on the benefits of agro-ecological farming changing the perception of the need for agro-ecological transitions.

Governance network

There is a complex network of information flows in this case study (Figure 11), while there are less flows of goods and services which are centred around the farmers (Figure 12).

There three main types of flows of goods and services:

- **Economic exchanges of inputs and products** along the value chain from the land owners, plant breeding to the farmers and further on to traders, retailers and consumers
- **Public subsidies** mainly from the Ministry and county administration to farmers

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- **Other services** such as advice and guidance, e.g., from the advisory services, local and county administrations and the farmers union to farmers as well as contracting between contractors and machinery rings and farmers and local administration

The main flows of information and knowledge are directed to and from the farmers. The network map in Figure 11 also visualises the important role of the advisory services of the Chamber of Agriculture as an information hub and indicates the active role of a number of other actors (such as the local administration, country administration, farmers union and environmental NGOs) in the exchange of information and knowledge. Examples of important information streams and knowledge exchange are:

- Farmers provide information and knowledge on the specific characteristics and needs to actors with whom they have economic interactions (e.g. land owners, plant breeders, traders etc.)
- Farmers provide information and knowledge on the specific characteristics, needs and issues as well as personal motivations and ideas to advisory services
- Advisory services provide information and knowledge on the adoption of agro-ecological practices to farmers and as well as on the benefits and barriers of, and the required conditions for, the adoption of such practices to other actors in the network.
- Administrations and authorities at various levels disseminate information about public support towards agroecology.
- Environmental organisations disseminate information and promote an information exchange with farmers and local communities on the need and benefits of agro-ecological practices.

In the complex social network of actors that influence the key dilemma the main controversies concern the consequences of agro-ecological practices on the economic viability of farms and conflicts through different perceptions and opinions about the property rights of agricultural land use and its implication for public good provision (references to „green expropriation" are made when land is designated a protective status.). Trust between farmers and actors who are, or will in the future, collaborate in the transition to agro-ecological farming is particular important. While the level of trust between the advisory services and farmers is often high, lack of trust is an issue in the context of the implementation and monitoring of policy measures such as agri-environmental measures. A trusted **intermediary actor** with a particular focus on biodiversity is missing in the current network, who brings together the information, knowledge and evidence from different actors fostering cooperation towards a transition to agro-ecological farming.

Decision-making processes for the adoption of agro-ecological practices take place at the level of the individual farmer. As shown by the network this decision-making process by the individual farmers is influenced by information, knowledge and decisions of a range of different actors in the network. The decision-making process of farmers on adopting agro-ecological practices is also driven by their understanding of nature and nature protection and its integration in farm business aspects. It is here interesting to note that activities in adopting agro-ecological practices outside the formal agri-environmental measures and CAP support were emphasised in the discussions. This is in line with findings of Stupak et al. (2019)[5] who highlight that producers in this case study area doubt the positive nature-related effects of some agri-environmental and greening measures whose design does not correspond to central aspects of their understanding of nature – farmers prefer implementing measures they have designed on their own initiative to participation in agri-environmental measures.

[5] Stupak, N., Sanders, J. and Heinrich, B. (2019) The Role of Farmers' Understanding of Nature in Shaping their Uptake of Nature Protection Measures. *Ecological Economics*, 157, 301-311. https://doi.org/10.1016/j.ecolecon.2018.11.022

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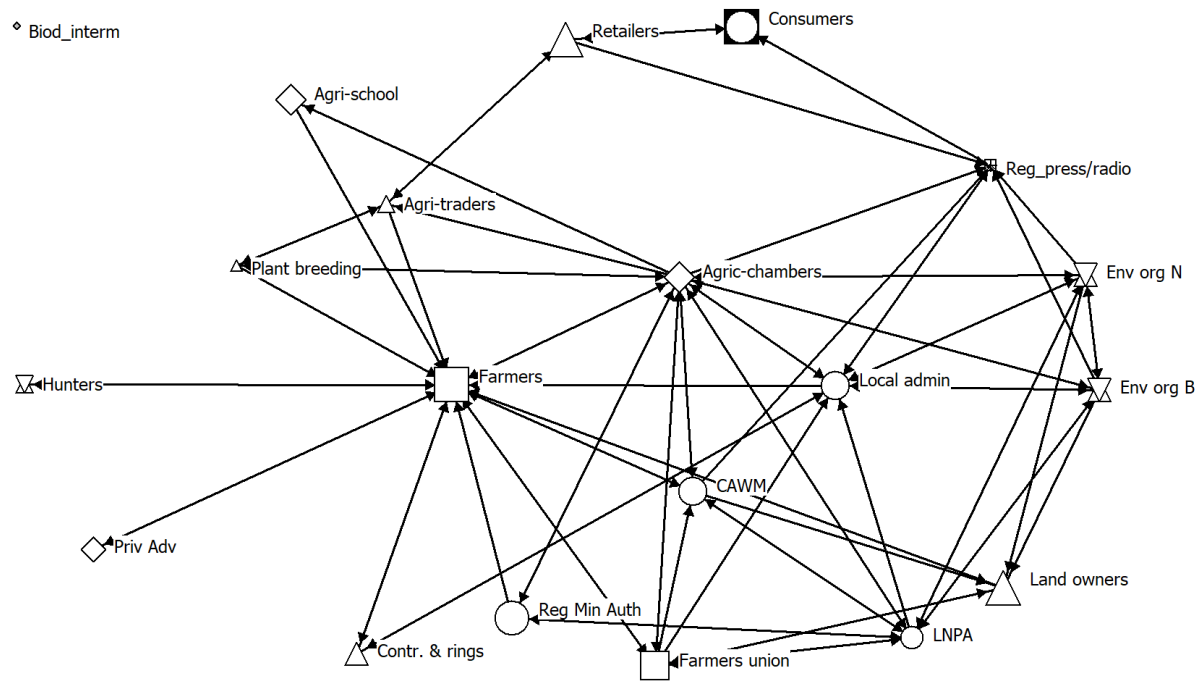

Figure 11. Knowledge and information flows in the DE case study

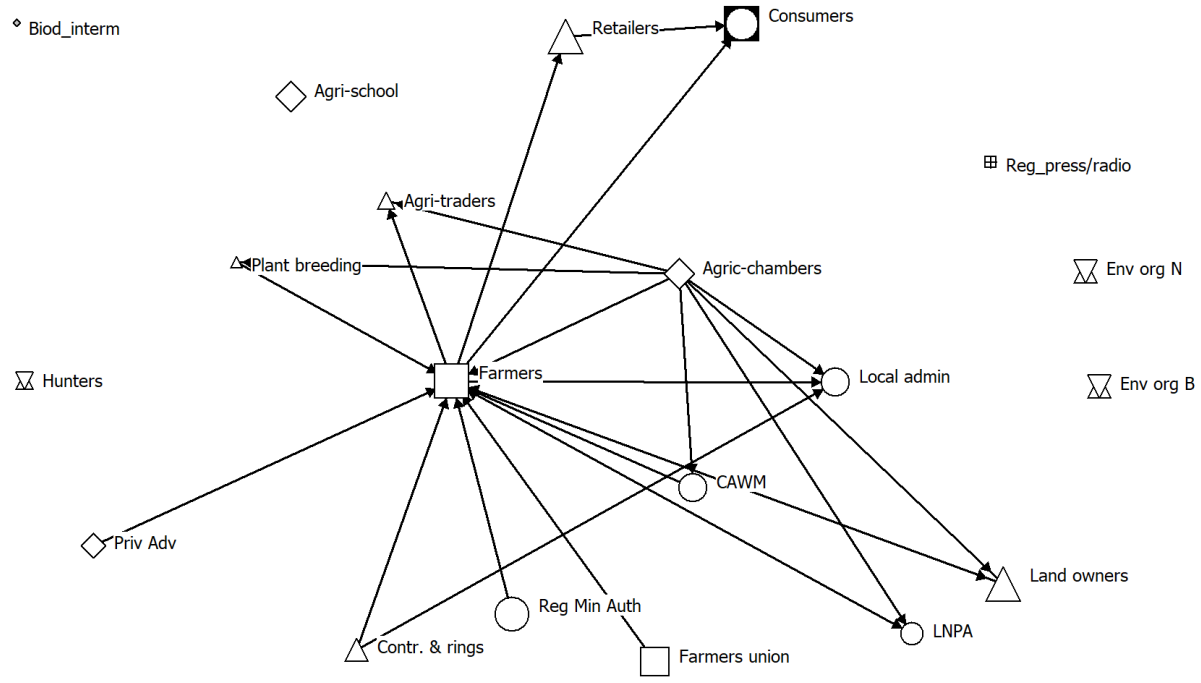

Figure 12. Goods and services exchanges in the DE case study

The decision-making process for designing policy incentives is mainly determined by the agricultural ministry and their approval and control authorities. A bigger role for the decision-making process of policy support was suggested for local actors, e.g. that local municipalities have the budget and can decide on the implementation on policy measures. Interest of the involved actors has emerged in the interviews and workshops to consider, and potentially pilot, local bottom up initiatives independent from public support through the CAP. In such cases new decision-making processes would need to be developed and accustomed to. Such local initiatives will be further explore in the next stages of the case study to reflect, if

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the impact of measures promoting the adoption of agro-ecological practices could be increased by strengthening bottom-up stakeholder involvement in the RDP planning and implementation processes and fostering the participation of local land managers and state and non-state environmental actors[6].

[6] Zilans, A., Schwarz, G., Veidemane, K., Osbeck, M., Tonderski, A., Olsson, O. (2019) Enabling policy innovations promoting multiple ecosystem benefits: lessons learnt from case studies in the Baltic Sea Region. *Water Policy*, 21 (3), 546-564. https://doi.org/10.2166/wp.2019.054

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5. ES - AGRO-ECOLOGICAL FARMING SYSTEMS IN THE BASQUE COUNTRY AND NAVARRA

UNISECO Partner: GAN

Authors: *Uxue Iragui Yoldi, Sandra Elía Hurtado*

SNA Option: 3 (7 interviews)

KEY DILEMMA: HOW TO REDUCE THE FRAGILITY OF AGRO-ECOLOGICAL FARMS WHILE MAINTAINING THE SOCIAL, ECONOMIC AND ENVIRONMENTAL SUSTAINABILITY?

The case study

This case study gathers a holistic view of agro-ecological farming systems, and is inspired on the farms that are part of the EHKO association, which is present in the areas of the Basque Country and Navarra. These farms include a wide range of production types, but all of them share the objectives of promoting agro-ecology, being organic systems, with diversification of crops and additional environmental practices, commercialization at local level with short marketing channels, principles of solidarity economy, and being locally based and small sized rural farms. EHKO emerged when agro-ecological farmers and other figures (such as final consumers and actors whose goal is oriented towards developing an agro-ecological food system) felt that they lost the battle of other relevant actors of the network (mainly the public sector, public advisors and farmers unions) making moves towards agro-ecological transition. Creating the association and sharing experiences in a farmer to farmer approach and to a wider public is creating a movement around agro-ecology in different administrative regions of the north of Spain and south of France.

Figure 13. The CS area. NUTS 2 boundaries in Spain. In yellow, the regions of the Basque Country (left) and Navarra (right). Source: Instituto Geográfico Nacional (IGN, 2019) and Google Earth.

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The network focuses on actors that have an influence on reducing the fragility of agro-ecological farms. This is the dilemma that farmers of the case study wanted to address in UNISECO. In this case farmers are already in a farming system redesign and are already at an agro-ecological stage. However those farms consider themselves as “fragile”. Reducing the fragility of agro-ecological farmers is crucial to encourage agro-ecological transition among farmers in conventional farming systems or in the transition pathway.

Actors

A total of 13 actors have been included in the NET-MAP, and 2 missing actors (see table 5 below).

In the first place, there is a relation of trust and collaboration between agro-ecological farmers themselves, which have common objectives in their farming system model that goes beyond their mere economic profitability. This generates an important basis of predisposition and potential to work together in the same direction for their goals.

There is a relation of trust among the actors who share common objectives in the field of agro-ecology, all of which are motivated by trying to promote a change in the food system model. Their common objectives go beyond economic factors, and are more related to personal beliefs and principles, the search for sustainability, maintain the local culture, and the feeling of belonging to an ecosystem and an environment that must be cared for and protected.

There is a very important and consolidated relation between the agro-ecological farmers and consumers associations. There is an existing synergy, sympathy and faithfulness among both actors. The strong relation and common goals between both actors is the driving force behind the agro-ecological food system.

Actors involved in the value chain and private business often share the objectives of agro-ecologic farmers, but they can get out of them if they see the viability of their companies at risk.

The actors related to public institutions have overall different objectives, and do not generate great confidence in the previous group of actors, since the lines of action that can boost agro-ecology can vary depending on the party in power, both regionally and at municipality scale. However, there has been some approach in recent years, and there is a predisposition for collaboration.

The main missing actors who could play an important role in the network are cooperatives and research centres. Cooperatives could be the link between farmers and the rest of the actors, mainly in terms of relations of goods and services. However today they act more as a transformation entity and they do not respond to the agro-ecological model, they follow an industrialized model. The volume of organic products is too low to make this sector interesting and profitable for cooperatives. On the other hand, research centres could carry on studies that support the benefits of agro-ecological farming compared to conventional agriculture, and they could have an impact in increasing consumer awareness. But at the moment they are focused on other areas financed by the conventional agribusiness.

The fundamental conflict is the future model that the different actors want for the food system. The administration is mainly focused on the conventional model, the big industry and the big distribution, a scenario in which agro-ecological farms do not fit in. Agro-ecological farms find a place in the local context where there is a more direct relationship with the primary sector. This is partly due to the disconnection of the current society from the primary sector. The discourse focused on strengthening the primary sector and the food model in another direction does not reach people because there is a current uprooting from the rural world. This generates a conflict especially between regional governments (and public companies), and the actors whose main objective is the commitment to agro-ecology.

Legislation is another conflictive aspect. The administration has the concept that some produce, others transform and others commercialize. For this reason, the transformation and commercialization initiatives of small farms clash with the regulations of the administration. Producers encounter bureaucratic obstacles

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and little flexibility in legislation towards small-scale projects, since these are not contemplated in the regulations. The application of sanitary rules and the difficulties to develop short marketing channels such as direct sales are some of the main examples.

Table 5. The actors of ES case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Governments of the regions of the Basque Country and Navarra (NUTS 2) - Public companies involved in the sector of agriculture - City councils of the regions of the Basque Country and Navarra (LAU 2)	Regional govnmt (5) Public comp (3) Local govnmt (3)
	**Farmers and farming organisations**	- Agro-ecological farmers - Farmers unions of the regions of the Basque Country and Navarra	AE farmers (4) Farmers unions (3)
	**Agri-food value chain**	- Local value chain companies of organic products - End user companies of organic products (local caterers, groceries and others) - Cooperatives	Value chain (2) End user (4) Coop*
	**NGOs, civic society organisations, local community representatives**	- Regional cross-border association of agro-ecological farmers and citizens - Environmental and food related NGOs	EHKO (4) Env org (2)
	**Science, innovation, advisory, capacity building**	- Certification bodies for organic agriculture - Private consultants and advisory companies in the agro-ecological sector - Education centres (schools and universities) with agricultural training - Research centres	Certific bodies (3) Consult&advis (3) Educ centres (3) Research*
	**Consumers**	- Local consumer associations of organic products	Cons assoc (4)
	**Media**	-	

*missing actors

One aspect of controversy is that the food industry in general needs large volumes of organic products to make their market profitable. However, agro-ecological producers are not always able to guarantee the volumes and demands of production, and this is leading to an increase in the number of importing companies of organic products, which move away from agro-ecological principles. Agro-ecological producers need more flexibility in the value chain, requiring less quantity and more product diversity. This can be a conflict if agro-ecology wants to be brought to a larger audience, which is accustomed to obtaining any product at any time of the year. The lack of infrastructure and companies in the transformation of agro-ecological products is also a bottleneck for agro-ecological transition.

Another controversial issue is the rise of bio-industry, in which large agribusiness companies are adapting to new trends in food consumption habits as there is a greater social awareness. Agro-ecological farmers are trying to differentiate themselves from global bio-industrial producers, but it can be difficult because small farmers have to compete with large companies that have a great capacity to carry out eco-marketing

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and greenwashing campaigns. Large companies appropriate the general message of agro-ecology, they seem to be agents that promote it when the reality is different and this can confuse final consumers.

Conflicts between consumers and agro-ecological producers may occur because the former may consider the price of agro-ecological products excessive. This situation creates an abyss between the potential consumer population of agro-ecological products and farmers.

The definition of agro-ecology is a controversial issue. There may be conflicts between agro-ecological producers who want to carry out the entire value chain and remain in a local marketing scale, and agro-ecological producers who decide to produce and leave the transformation, distribution and marketing to other companies. There may be disagreements between the farmers themselves considering that they are not working for the same way of understanding agro-ecology.

Governance network

Information and knowledge mainly flows from agro-ecological farmers to the public sector and other advisors (Figure 14). For many years, local and organic farmers have learned to manage their farms in the field of agro-ecology thanks to their own effort and persistence. They have implemented experiments of trial and error in their land and at their own risk, being exposed to vulnerability. The share of experiences from farmer to farmer has been very important to support each other and collaborate together in different projects. Thanks to these experiences, farmers have been able to find ways to produce in a more sustainable and profitable way, and they have learned lessons that they can now share and transmit to other actors of the network. In recent years the public sector and other actors have started to take steps forward on the agro-ecological sector, and in that context agro-ecological farmers represent the figure with the most experienced level of information and knowledge.

The main flows of goods and services (Figure 15) within the agro-ecological development are taking place among actors of the private sector of the agri-food value chain. Market initiatives are driven by the rise in demand of agro-ecological products by final consumers. Consumer awareness has increased in the last years, and the rise in demand of local and organic products is contributing to strengthen the whole production and business fabric. The private sector is finding a niche for agro-ecology in the market, the flows among farmers, actors involved in the value chain, and consumers, causes a great impact on reducing the fragility of farmers. However, a committed support of the public sector would help to overcome some of the barriers that the market is finding. The public sector has a very high capacity and the required resources to generate almost immediate important changes, but up to date they are taking very few initiatives. They may have the feeling of taking steps that are helping to develop agro-ecology, but they are not reaching the producer and the industrial environment efficiently. Public initiatives carried out at municipality level have shown to be more effective, favoring the development of agro-ecology for example with various public tenders that favor this group of producers over conventional production, which is contributing to empower agro-ecological farmers.

On one hand the main actors of the network in the decision-making process are agro-ecological farmers and actors who bring the products to the final consumer (such as end user companies and consumer associations), since the link between producers and consumers is the main engine of the system. Agro-ecological farmers have the ability to decide on their production model and where they want to place themselves. However, they are very conditioned by the behavior and power of other actors. Consumers' demand pushes agro-ecological production and industry, since private companies see a niche market and this could increase the business fabric in the agri-food value chain. However the amount of companies in the value chain is small. Due to this, farmers suffer the risk of relying on a single transformer or a distributor, and if that company closes (temporarily or permanently), it can leave the farmer in a complicated situation because there is no business fabric outside the conventional sector. On the other hand there are main actors in the public sector, such as regional and local governments. Regional governments have the tools and the budget to carry out initiatives that favor the empowerment of agro-

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ecological farms. There have been recent initiatives that indicate there is an increase to support agro-ecological farmers and projects. However they tend to be motivated to fill in gaps that part of society and the EU are demanding, but there are no measures that are truly transformative and that are supporting another economic model other than the current one. Regional governments are the ones with the competences, where decisions are made and legislation is designed and approved. The design and implementation of public policies could create changes quickly and at large scale, but the resources are not being used effectively and act in a slow and inefficient manner. Public companies are in direct contact with farmers and they have the capacity to influence the government, but generally their line of action is given by regional governments.

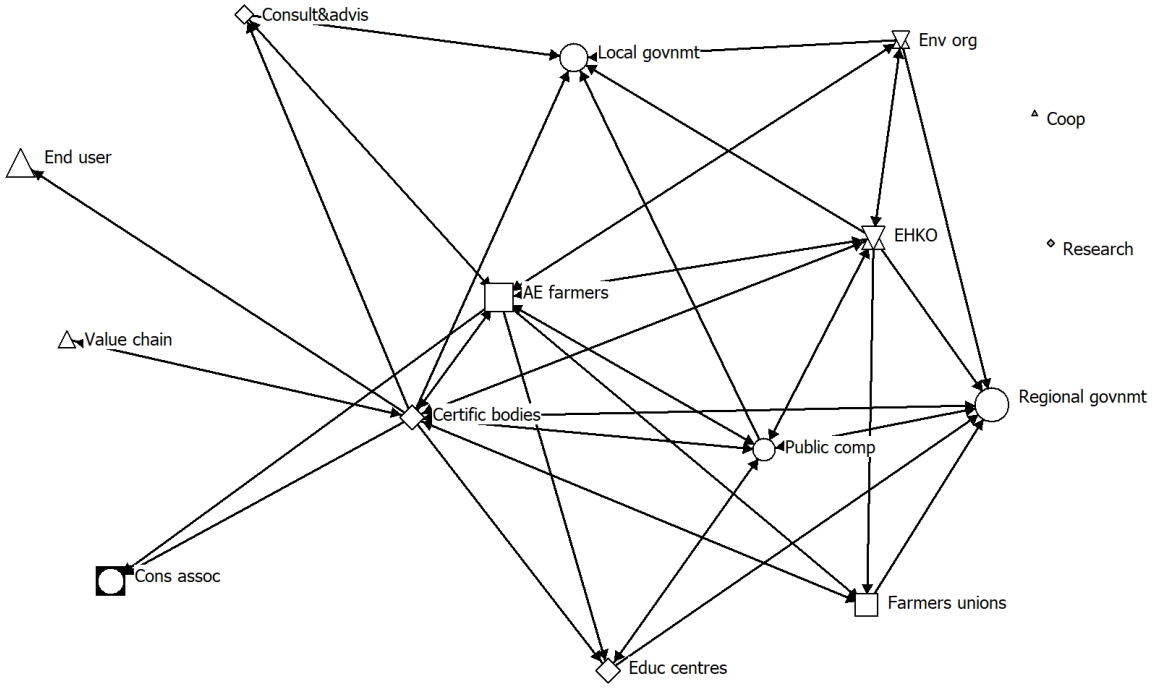

Figure 14. Knowledge and information flows in the ES case study

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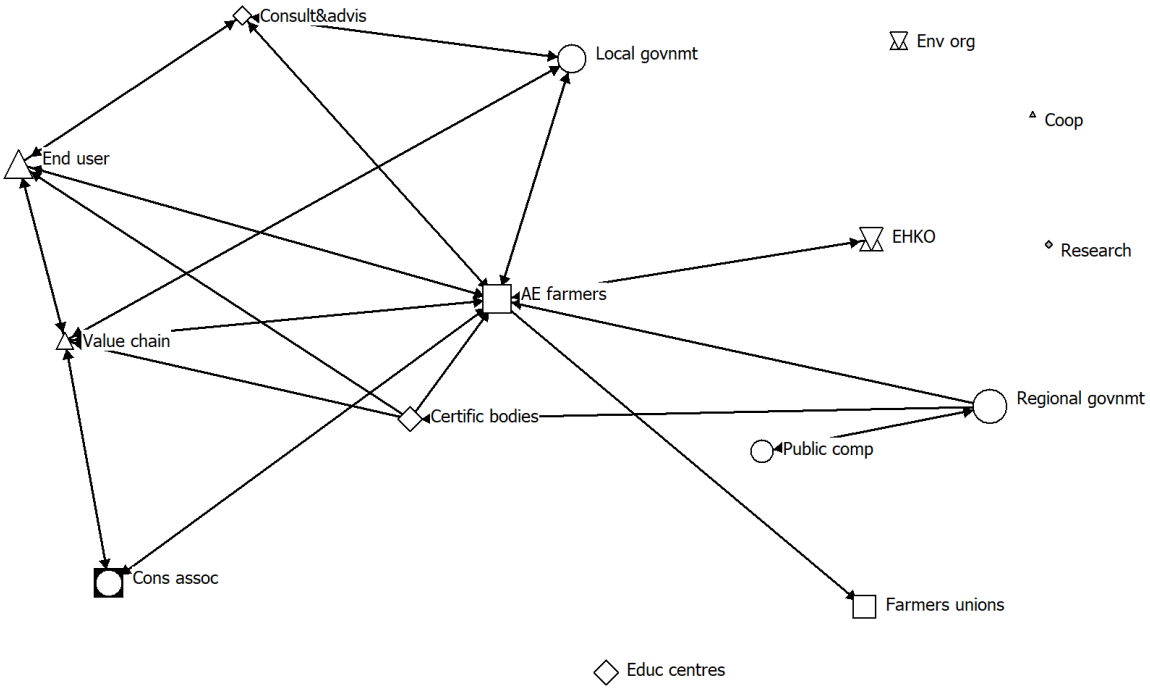

Figure 15. Goods and services exchanges in the ES case study

Municipalities are implementing more effective initiatives and they are seen as a key piece to develop projects that are really reducing agro-ecological farmers' fragility. City councils have a close relationship with farmers and they share common goals with them in regards of maintaining the rural population. City councils are developing initiatives at municipality level to supply organic and local food in public canteens (such as nurseries, schools and elderly residences) and they are also carrying out actions which are contributing to raise awareness of consumers. Farmers are receiving these initiatives positively.

A number of actors have the capacity to influence the decision making of other actors, they invigorate the sector and movement of agro-ecology by offering advice and information, they help to look for solutions to the barriers in the development of agro-ecology and they open the door to collaboration among different actors (such as consulting companies and private consultants, certification bodies and EHKO).

Other actors have the capacity to reach society and the conventional food model and have the potential to attract new farmers or new consumers towards the agro-ecological sector (farmers unions, education centres and environmental and food related NGOs). Farmers unions are also relevant because they can play a role in the decision-making of their affiliates, who listen and trust their guidance, and make agro-ecology better known to famers of a wide range of farming systems, including conventional systems.

The public sector should have objectives aimed at a commitment to the agro-ecological system, understanding the current food system and its effects on the environment, health and social aspects. There should be a promotion of favorable public policies that are committed to agro-ecological projects, help new members of the agricultural sector to start working from an agro-ecological base, help the transition to agro-ecology to those already installed, and make positive discrimination policies towards small-scale projects with the aim of promoting change. Governments should work on adapting health regulations to take into account small farms that want to start projects to transform their product.

Campaigns to increase consumer awareness would help to give more information and encourage this type of consumption model so that the population understands the benefits that it has throughout society.

Policies for the distribution and purchase of public land should facilitate the installation of farms with a small productive level. For example at municipality level by certifying the mountains of public utility and part of the communal arable land in organic production, so as not to have to be performing the conversion periods continuously.

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Administrations should design public procurements of food that act as effective tools for the promotion of local and organic productions. There are examples going on in several municipalities, but it should be strengthened and implemented at a higher level and in more public canteens.

Producers need to associate and create coordination structures to be able to offer consumers a more complete and varied option of local and organic products. They can get to do a collective planning of both production and marketing. This would help private companies to more easily stock up on agro-ecological products and reduce farms' fragility. The union between producers strengthens their own continuity and the progress of different agro-ecological projects. The exchange of information and services is essential to reinforce their experiences.

It is necessary to build or improve appropriate transformation and marketing channels for agro-ecological productions, for example by recovering the network of regional slaughterhouses that used to exist in the Basque Country. Transformation centres in common are also very interesting, they serve as a pilot centre where farmers can test and put into practice the transformation of their products without making much individual investment.

There is a need to promote the concept of agro-ecology as a value, and knowing all the implications it has. The unity in the speeches by all the actors would favorably reinforce the positive effects of the consumption of agro-ecological products.

The implementation of regulated courses in universities and agricultural schools as specific training and not as a complement to agricultural training would prepare specialized personnel in the entire value chain of the agricultural sector: production, transformation and technical advice. Additionally primary schools and colleges have a very great pedagogical value, so the messages they give influence society.

A general system sustainability approach (environmental, social and economic) is addressed by the farmers of the case study. Innovations enabling the transitioning to agro-ecological farming are here not only technological, but also social and institutional. The actors mentioned by stakeholders of the Basque Country and Navarra have been similar in both regions, and even though differences might exist among both areas, the main links and conflicts of the network to address the dilemma are related. Relationships are already established so there is the ability to improve with actions and communication. There are commercial and information relations but there are missing forums to work towards common goals.

In recent years the public sector and other actors have taken steps forward on the agro-ecological sector, and farmers are open to collaborate but at the same time they are cautious because the strategic lines of the institutions depend on the ruling political party at a specific time, which can change if there is a political shift. Market initiatives are marked by the rise in demand for agro-ecological products by final consumers, who are pushing the increase in production and strengthening the business fabric.

The impulse to agro-ecology should not be done by targeting individual responses, but collective ones. Promoting an individual response model is a beginning, but it is insufficient. Policy initiatives which foment agro-ecology must be implemented for both farmers and consumers, and support should be given by the public sector, both at regional and municipality levels.

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6. FI - PLANNING A DAIRY SECTOR DRIVEN BIO-PRODUCT PLANT IN NIVALA

UNISECO Partner: LUKE

Authors: Jarkko Pyysiäinen, Jyrki Aakkula, Janne Helin, Pasi Rikkonen

SNA Option: 3 (8 actors interviewed, 5 actors in individual interviews and 3 actors in 1 group interview)

KEY DILEMMA: HOW TO REDUCE HARMFUL CLIMATE, SOIL AND WATER IMPACTS OF DAIRY FARMING IN NIVALA REGION WITHOUT SACRIFICING ECONOMIC VIABILITY OF THE DAIRY SECTOR, BY MEANS OF ENVISIONING AND IMPLEMENTING A MULTIPURPOSE BIO-PRODUCT PLANT ALONG THE LINES OF CIRCULAR BIOECONOMY, WITH THE AIM OF PRODUCING BIOENERGY AND ORGANIC FERTILIZERS FROM MANURE

The case study

This case study involves dairy production on grass silage which is relevant for several EU level sustainability issues (climate change mitigation, nutrient losses, energy saving). The farms are planning to implement circular nutrient flows under the umbrella of a farmers' dairy cooperative providing manure nutrient separation technology and bio-product plant investment using manure collected from farms in the region. Capacity in cooperation is high, which is expressed by farmers' interest in the project; in addition, participation of other actors in the region (e.g. municipalities, centre of economic development, transport and environment) is considered to be substantial. Technological and institutional innovations will be a valuable source of lessons in the farming transformation process. The case study involves an area covering about 16,000 hectares of agricultural land in Nivala region.

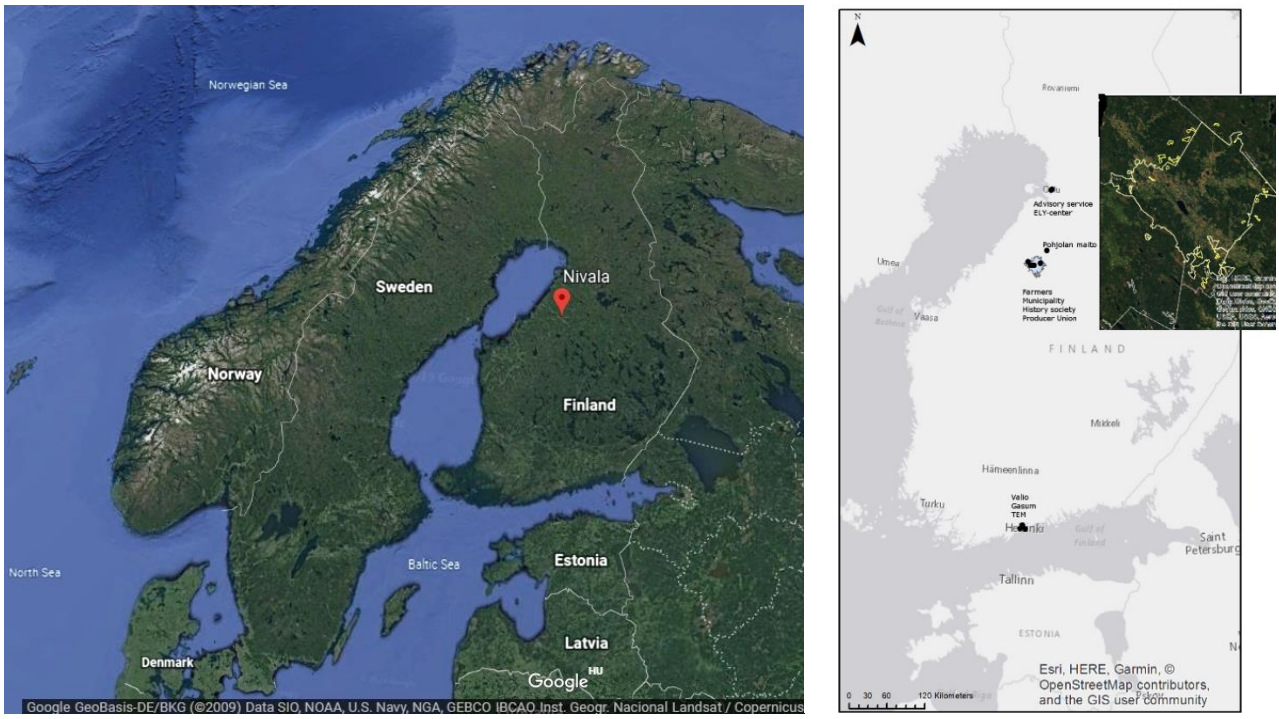

Figure 16. The case study area in Finland

The agro-ecological transition of dairy farming in the Nivala region is expected to be catalysed, and eventually realised, by the development of the bio-product plant. The plant is envisioned to serve several functions: the overall aim is to produce bioenergy and organic fertilizers from the manure of dairy farms

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(and possibly other bio-waste) and to circulate the sustainable energy and fertilizer products back to users without burdening the environment with emissions. The general agro-ecological goal, and ideal consequence, would thus be the reduction of harmful climate, water and soil impacts of dairy farming, without sacrificing the economic viability of the dairy sector.

Actors

Due to the multifunctional nature of the envisioned bio-product plant, there are several actor groups influencing and influenced by the planning and construction of the envisioned bio-product plant. The most important groups of actors influencing and influenced by the process can be divided into four main categories as follows:

- **Farms and farmers.** Local dairy farms (and especially dairy farms affiliated with the dairy cooperative via its local dairy branch) are portrayed as key actors, since they serve as the suppliers of critical raw materials, i.e. manure, for the production process of the bio-product plant, as well as one important target group for one of the key products produced by the bio-product plant, i.e., organic fertilizers. A key motivation of the dairy farmers participating in the bio-product plant planning process is to ensure their future possibilities to invest in milk production without being forced to acquire more agricultural land for manure spreading purposes. Furthermore, also other types of farms, beyond those affiliated with the dairy cooperative and even beyond the dairy sector, serve as important potential suppliers of raw materials (especially manure but possibly also other biomasses) and as potential targets for the distribution and selling of organic fertilizers. An important additional group of actors is the group of independent contractors (who may also be farmers themselves), especially in terms of machine contracting regarding manure handling, logistics and distribution. The independent contractors have so far played an important role in the management of the manure economy in the region, and they have also been actively discussing the plans and contracting opportunities associated with the envisioned bio-product plant. Taken together, the goals of the farms vis-à-vis the envisioned plant are typically described as related to identification and realization of effective and feasible ways to handle the manure economy of their farms, as well as to realization of viable and effective ways to cultivate the land and improve its quality, e.g., via the use of novel organic fertilizers, in order to keep their farming economically profitable and environmentally feasible.
- **Agri-food value chain actors.** Key actors involved in the visioning, planning and possibly also construction of the envisioned bio-product plant include the dairy cooperative, who originally initiated the planning of the bio-product plant in Nivala, and the energy company, who joined the project more recently to consolidate the overall concept of the plant (especially around biogas and biofuels), after the initial plans did not prove feasible enough. The dairy cooperative is a long-term, established actor in and around the local dairy farming sector, and majority of local dairy farms are affiliated with the dairy cooperative, via its local dairy branch (that also represents these farms under the national corporate level of the cooperative). The cooperative form also means that the farms affiliated with the dairy in fact own the dairy cooperative; however, due to its status and size as an industrial player in the national and international food business, a single farm cannot, of course, have much say in the decision-making of the cooperative. The energy company, in turn, is a key player on the Finnish energy sector, especially in the natural gas and biogas business. It was invited to join the planning and envisioning of the bio-product plant, in order to make the overall concept more solid and feasible. Consequently, after the energy company came on board, the bio-product plant now holds a potential to become even more multifunctional in terms of its products and environmental impacts (i.e., the agro-ecological transition associated with local dairy farming): along with the energy company, the potential products (and impacts) of the plant include bio-energy products (e.g., biogas for traffic use), organic fertilizers for farms, and possibility of various organic niche fertilizer products for wider markets; the last point could also involve an additional

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commercial actor whose role would be the processing and selling of niche fertilizer products. Both the dairy cooperative and the energy company are seen as potential investors, constructors and operators of the bio-product plant; correspondingly, both actors also share similar overarching goals, that is, planning, building and realization of the multifunctional bio-product plant so that its operational and business concepts are solid, viable and feasible.

Table 6. The actors of FI case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- The city of Nivala (incl. major local administrative functions) - Regional Centre for Economic Development, Transport and the Environment (e.g., environmental permission processes) - Regional State Administrative Agency - Ministry of Economic Affairs and Employment	NivalaCity (4) Reg.Econ.Centre (4) Reg.Adm.Agency (5) Min.OfEcon (3)
	**Farmers and farming organisations**	- Local branch of the dairy cooperative (representing local dairy farms) - Farms in Nivalal region affiliated with DairyCo - Farms in Nivala region not affiliated with the dairy cooperative	LocalDairy (4) Farms+DairyCo (5) Farms-DairyCo (4)
	**Agri-food value chain**	- Energy & gas company - Dairy cooperative (the corporate functions) - Suppliers of other biomasses - Contractor (manure & fertilizer logistics & assistance in the operation of the bioproduct plant)	EnergyCo (4) DairyCo (5) BiomassSuppl. (3) Contractor (4)
	**NGOs, civic society organisations, local community representatives**	- The inhabitants of the municipality of Nivala	Inhabitants (3)
	**Science, innovation, advisory, capacity building**	- Natural resources institute Finland - LUKE - Local advisory centre - Local technology & competence development center	Research (3) Advisory (2) TechCentre (3)
	**Consumers**	-	
	**Media**		

*missing actors

- **Authorities and administration** (at various levels). On the side of public authorities and administration, several actors at various governance levels are closely involved in and influencing the process – and, by implication, the pursued agro-ecological transition. The city of Nivala, including its major local administrative functions, such as, the department of rural affairs, is an important local level actor. It is involved as a key communication link between local actors

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(including the inhabitants of Nivala), and between local actors and actors beyond the local arena; it is involved in issues related to land use and planning, as well as in facilitation of interactions between other key actors. On the regional level, the Regional Centre for Economic Development, Transport and the Environment, is the authority that evaluates the environmental impacts associated with projects such as the bio-product plant (and also channels regionally allocated aids for various development projects), whereas Regional State Administrative Agency is the authority that decides on the environmental licenses of many larger-scale projects. On the national level, the Ministry of Economic Affairs and Employment is viewed as playing a critical role as the authority that that evaluates and decides on the investment subsidy decisions granted for large-scale initiatives on the energy sector, such as the bio-product plant. Many actors acknowledge the investment subsidies as a critical factor, upon which the fate of the envisioned plant crucially depends.

- **Science, innovation and advisory.** Some actors also emphasized the roles of scientific, innovation and advisory activities in and for the project. The local advisory centre has been involved on farm-level planning concerning the management of manure flows and has also assisted farmers and contractors in the development of farm and business strategies. The local technology and competence development centre has provided assistance for farms (and contractors) in the development and application of novel technology and competence training. Natural resources institute Finland (Luke) has been involved in the network via research activities concerning the prospects and development of the bio-product plant initiative.

Governance network

Currently the interactions among actors have been structured according to the types of materials, goods and services exchanged within the regionally anchored network of conventional dairy production. Farmers have produced and delivered milk for the dairy cooperative, via the local branch of the cooperative, and contractors have assisted farmers in the management and distribution of manure. In addition, some farmers have cooperated with other farms in search for viable solutions to manage and exploit manure flows, as well as with the advisory and technology centres in order to identify and realize more advanced technological and business solutions to handle the issue.

However, the idea and vision of the bio-product plant, with the aim of managing local manure and fertilizer flows ecologically along the principles of circular economy, promises to considerably change the flows of goods, materials, services, information and knowledge among the actors in the regional network. New types of goods and need for novel services would emerge (notably novel organic fertilizer products, bioenergy products and need for novel logistical and technological solutions concerning the distribution of manure and organic fertilizers). Because of the large size and complexity of the network around the envisioned bio-product plant, a lot of communication, negotiation and lobbying between different actors is described as already taking place among the actors of the network. And a lot of communication and negotiation between actors is expected to be required in the near future, in order to build common understanding, trust, commitment and knowledge base for successful collaboration. Important information flows are portrayed as taking place between the dairy cooperative, the energy company, local farms and farmers (in particular dairy farms), independent contractors and various public sector authorities (notably the administration of the city of Nivala, regional economic and administrative agencies, and the Ministry of Economic Affairs and Employment).

The interactions and relations between various actors in the network are commonly described as functioning rather well; the overall goals of the network are perceived rather similarly by key actors. However, interactions also involve considerable unpredictability and uncertainty, because the network formation is only in its early stages and some important decisions (e.g., concerning investments in the building of the plant) are yet to be made. For instance, some farmers have voiced suspicions of the risk that the additional value generated by the plant may end up to other players and farmers would remain on the

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losing side. The goals of the network are also commonly viewed as quite ambitious and involving a voluminous and diverse flow of potential future goods and materials (manure, fertilizers, bioenergy and biofuels) among a diverse pool of actors and stakeholders (across several sectors), which renders the governance of the network a challenging task.

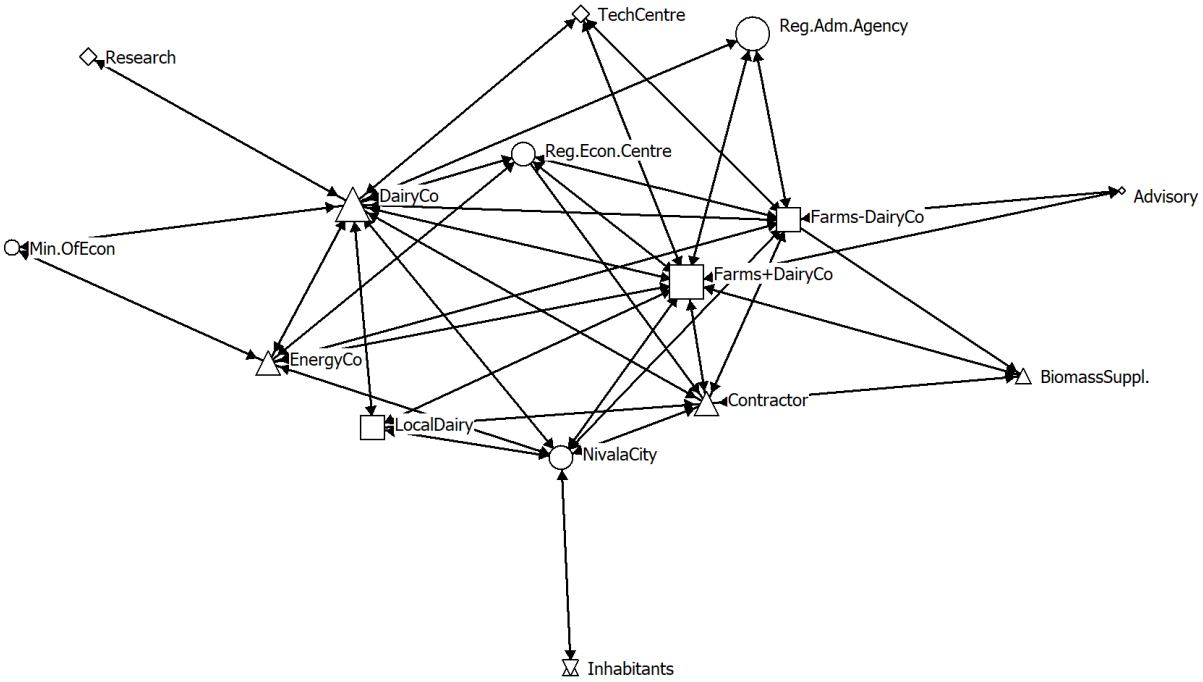

Figure 17. Knowledge and information flows in FI case study

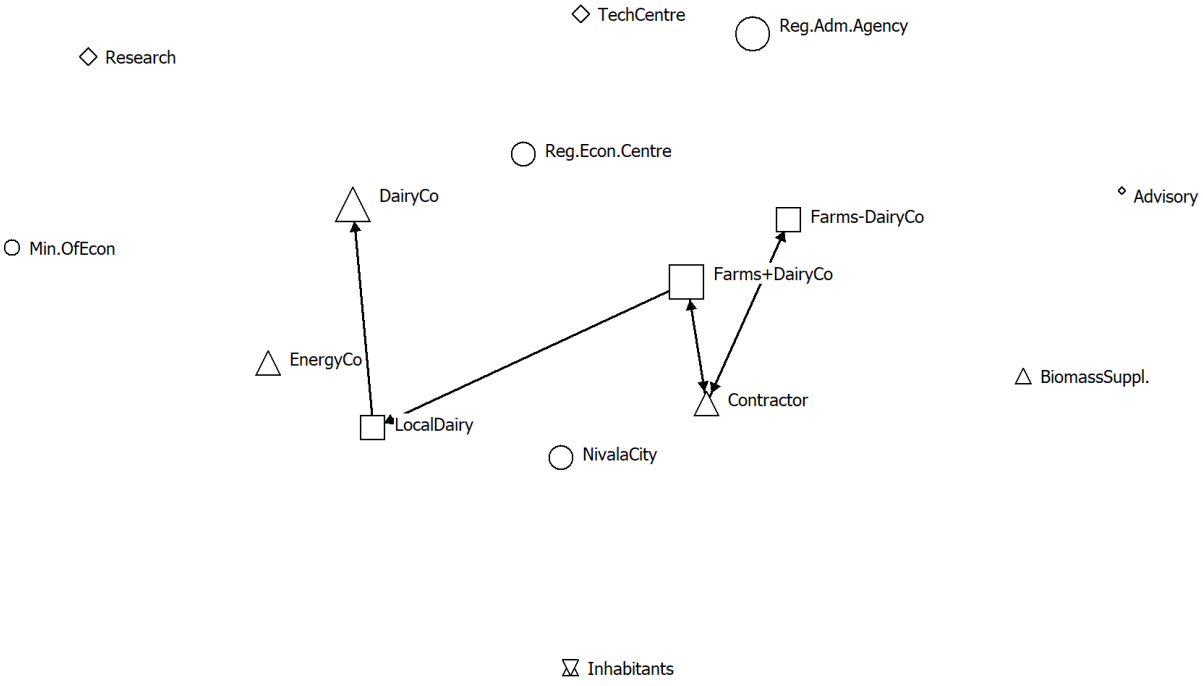

Figure 18. Goods and services exchanges in FI case study

Originally the initial plan was to build the bio-product plant by the dairy cooperative, around its operations and networks, but since the initial plan did not prove feasible, also the energy company was taken on board to consolidate the overall concept and process. Subsequently, the decision-making process has been much

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concentrated around, and dependent on, these two actors and their efforts to identify and develop a sufficiently viable, robust and profitable concept for the realization of the plant. In this respect the decision-making process is also described as crucially depending on the decisions of public authorities, and especially on the terms of investment subsidies for building the plant, which are processed and decided by the Ministry of Economic Affairs and Employment. Another, highly critical factor concerns the perceptions and decisions to be made by local farms and farmers, in particular, whether they perceive it reasonable and profitable to commit to the process as suppliers of manure and potential receivers of organic fertilizers. Other important decisions to be made by public authorities include the obligatory environmental permits for the plant, which are to be evaluated and processed by the Regional Centre for Economic Development, and potentially to be decided by the Regional State Administrative Agency. Some complication was already experienced in the project in the previous phase, when the dairy cooperative initiated the environmental permit process, but some local inhabitants filed a complaint about the possible environmental impacts of the plant. The permit application was then drawn back by the dairy cooperative and the idea to build the plant in the planned location was abandoned. Subsequently, a search for a better location for the plant in Nivala has been going on (also with the help of the administration of the Nivala city), and it would then be the task of the constructor of the plant to initiate the environmental permit process anew, once the decision about planning and investment has been made.

In general, a critical issue for the network and its management (with regard to the agro-ecological transition via the planning of the bio-product plant) seems to concern the commitment of key actors to the process. Currently two nationally large industrial actors play central roles in the formation of the network, which is otherwise strongly anchored in the local arena and actors of the Nivala region. The recent involvement of the energy company in the bio-product plant planning process seems to somewhat reduce the interest of dairy farmers who have participated in the planning process from the beginning. Some dairy farmers may fear to lose their influence if the bio-product plant will be possessed and operated by other instance than the dairy coop company that they are members of. Indeed, some farmers have voiced suspicions of the risk that farms may end up being losers in the manure and fertilizer transactions and, at worst, the costs of the bio-product plant could trickle down to farmers (e.g., in the form of logistical costs or gate-fees), whereas the value added in the process would be collected by other players. In this respect, there is a risk that the actors operating at national level may remain too distant from the interests and acute perspectives prevailing at the local level (in contrast to planning processes that would be initiated more bottom-up); without a mediating and deeply rooted common understanding of mutual benefits and thresholds of acceptability, a widely shared commitment may be difficult to build.

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7. FR - CONNECTING CUMAS TO FOSTER THE ADOPTION OF AGROECOLOGICAL PRACTICES FOR VITICULTURE IN AUVERGNE RHONE ALPES

UNISECO Partner: ISARA

Authors: *Audrey Vincent, Philippe Fleury, Emmanuel Guisepelli*

SNA Option: 2 (7 interviews followed by one workshop)

KEY DILEMMA: HOW TO REDUCE DEPENDENCY ON EXTERNAL FERTILISERS AND TO REDUCE PESTICIDES USE (ESPECIALLY GLYPHOSATE) THROUGH AGRO-ECOLOGICAL PRACTICES INCREASING SOIL ECOLOGICAL SERVICES (SOIL BIOLOGY) WHILE MAINTAINING THE ECONOMIC VIABILITY OF FARMS?

The case study

This case study is a network based case study involving several French farm machinery cooperatives (CUMAs) aiming at working together (figure 1). An innovative aspect of the case study is the aim to interconnect different territorial groups. This network is starting. Depending on the area and on individual choices, farmers sell their grapes to cooperatives while other do on-farm wine processing and direct sale. The farming practices are currently rather conventional. Locally some farmers are already implementing agroecological practices but the majority of farmers intend to start implementing agro-ecological practices such as using green manure to reduce external fertiliser use and using combined cropping to reduce pesticides use (wine shrubs and other crops).

Farmers are already part of a local CUMA and the establishment of an inter-territorial network aims to facilitate the process. This network was launched by the regional federation of CUMAs which will act as an extension service and facilitators to farmers involved in the CUMAs. The level of cooperation between farmers at local level is very high and should help the process.

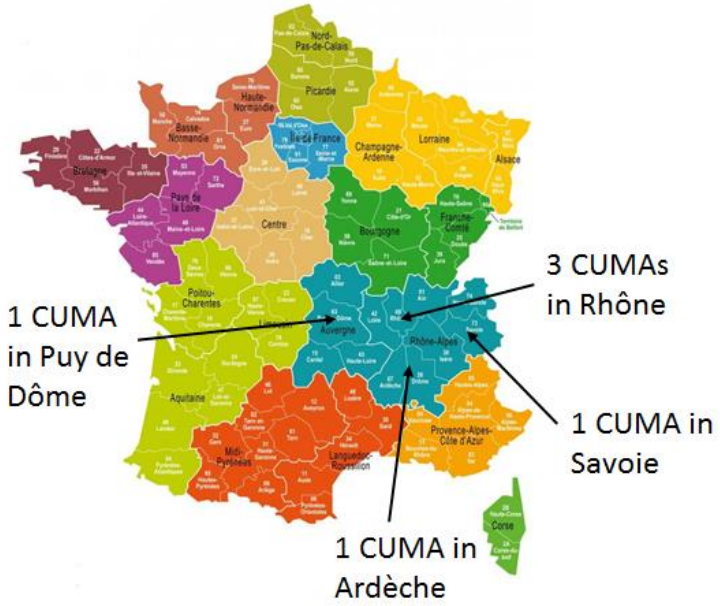

Figure 19. Localisation of the CUMAs being part of the network

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Actors

There are four main groups of actors influencing or influenced by the agro-ecological transition of viticulture: public actors, value chain actors, farming sector and environmental organisations).

Table 7. The actors of FR case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Municipalities - Rural districts - Département (Local govnt) - Region (Local govnt) - Departmental (DDT) or Regional delegation (DRAAF) of Ministry of agriculture and CAP - Water Agency	Municipalities (3) Rural districts (3) Département (3) Region (4) State (5) Water Agency (2)
	**Farmers and farming organisations**	- Departmental Federation of CUMA - Regional Federation of CUMA - National Federation of CUMA - Organic farmers Federation (local FNAB) - CUMA - Farmers Union - Chamber of Agriculture (departmental and regional levels) - Atelier Paysan (Cooperative for machineries' self building)	DF CUMA (2) RF CUMA (2) NF CUMA (2) OF Federation (2) CUMA (3) Farmers union (4) Chamber of Agri (1) Atelier Paysan (3)
	**Agri-food value chain**	- Wine Federation/Union - Wine Processors (Cooperative or Private Company) - farming Inputs providers (Cooperative or Private Company) - Wholesalers and Retailers - Farmers Cooperatives federation (Coop de France)*	Wine Federation (2) Wine Processors (2) Inputs providers (1) Wholesale&Retail* Coop Federation*
	**NGOs, civic society organisations, local community representatives**	- Environmental Association (including management association such as syndicat de rivière)	Environment Asso (2)
	**Science, innovation, advisory, capacity building**	- Research and University - Education and Training centers - Accountancy firm - Farming machinery dealership - Technical institutes	Research&Univ (2) Education&Training (2) Accountancy firm (2) Machinery dealership (2) Tech Institute*
	**Consumers**	- Consumers /Citizens	Consum/Citizens (3)
	**Media**		

*missing actors

1. Public actors: State, Region, EU, Department, Rural districts and Municipalities, that can through policy actions (or regulations) bring agroecology on the agenda and bring actors to deal with it.

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They are the most influential actors, especially State representatives at regional level and the region who are both designing and implementing policy tools and subsidies which bring farmers to take into account the agroecological challenge. Goals of these actors could be specified as follows:

a. State representatives are in charge of implementing the agro-ecology national plan. They set up some policy actions and tools for that and work with different actors at regional level to implement them. They provide financial support to farmers.

b. Region (regional government) is in charge of the RDP (Rural Development Program). So it also manages policy actions and tools related to agroecology and its implementation. It provides also financial support to farmers or farming organisations.

c. Department (departmental government): it co-finances some policy measures/support.

d. Rural districts and municipalities: some of them are willing to work on agricultural issues and try to launch actions targeted towards local farmers.

2. Value chain actors (cooperatives/companies collecting agricultural row material, processors, indirectly also customers, (+federation for products' promotion…), who have requirements related to the market demand. They can have requirements in favour of agroecological practices or, at the contrary, towards productivity increases requiring more pesticides or fertilizers. Some of them are starting to consider environmental issues, as there is a growing demand from consumers for more environmentally friendly production methods. For this purpose, some wine processors are introducing environmental certification schemes. Agroecological issues remain a low concern in marketing strategies but the market for French wines is a quality market based on geographical indications (PDO etc) in which it is now possible to include agroecological requirements.

3. Farming sector (farmers, CUMA, actors from the extension services such as chambers of agriculture, RF (Regional Federation) and DF (Departmental Federation) of CUMAs. In this sector there are different types of actors acting towards changes in agricultural practices:

a. Departmental federation of CUMAs aims at accompanying CUMAs (and farmers) who want to invest in new machineries. They support them to apply for financial support (offered by policy tools). This is an occasion to talk about agroecology, to offer training related to agroecological challenges as farmers' representatives and staffs of the DF, RF, and National federations are convinced that agroecology is an upcoming challenge for farmers and for farming.

b. Regional federation of CUMAs organises training sessions (for farmers) related to agroecology. There are also in contact with pubic actors, especially State representatives and the Regional government to conceive and implement an agroecology evaluation grid, used for different policy tools.

c. CUMAs: In Auvergne Rhône-Alpes region, CUMAs applying for public financial support to invest in new machineries need to show that they do consider environmental issues (or that they will do so in the future). This requirement may be a reason for them to consider the agroecological challenge (for example by following a training session on this issue). Collective dynamics and local exchanges between farmers of the same or other CUMA are also of strong importance in agricultural practices changes.

d. Farmers: the points of view of farmers on the agro-ecological challenge in viticulture vary. Some of them (still a minority) think that this is an up-coming challenge that they need to take into account for their global farm strategy. This need for change is due to increasing consumers and citizens demands for more environmentally friendly practices and it is also seen as a way to anticipate upcoming regulatory changes (such as the likely ban of some pesticides in the future). They start a process of questioning their current practices to consider how they could change them. The challenges they want to work on are often

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related to improving soil fertility. The majority of farmers are not really willing or planning to work on improving their farming practices yet. For them, the main challenges are to ensure the economic viability of their farm on the short run (rather than considering long run challenges) and to face with uncertainties due to climate change and increasing meteorological hazards.

e. Chambers of agriculture (both at regional and departmental levels): are generalist extension services. As national and regional public policies have put agroecology on the agenda, they are considering it but they are cautiously promoting it especially for strong agroecology. The main reason for that is that it's not a popular concept amongst farmers (whom may see it as a criticism of their current farming system and practices). Consequently, chambers of agriculture are carefully considering it not to upset the farmers community.

4. Environmental organisations, such as water agency or local NGOs, which try to push actors to take into account environmental problems. Water agency: They want to support transition of farmers and of the whole value chains towards more agro-ecological practices (in order to reduce water pollution by agricultural inputs). They co-finance some policy support on watersheds with water quality problems.

Finally, we have also to mention the secondary roles of research and education centres, which disseminate the results of research projects and organise training sessions mainly for agricultural advisers and sometimes for farmers dedicated to agroecology or to implement innovative practices.

Customers/citizens that influences farmers and agriculture at two levels: firstly, there is a growing demand from consumers for more environmentally friendly practices, especially for lower pesticide uses. This demand transits via the supply chains. Secondly, the neighbours of farmers have also a role, they do not hesitate to criticise some practices (sometimes strongly as for the use of pesticides) and to engage a dialogue with farmers to discuss good and bad practices.

Governance network

In this case study there are numerous flows of knowledge and information (Figure 20) and less flows of goods and services (Figure 21).

The flows of goods are of two types:

- public subsidies mainly from State, Region (including EU funds) and secondarily Water Agency, for farmers, CUMAs and extension services (Chambers of agriculture, federation of CUMAs);
- economic exchanges of products along the value chain from the farmers to the consumers.

The flows of information include communication and training activities, extension and advises and also social dialogue:

- Public actors disseminate information about public support towards agroecology;
- in value chains, cooperatives, companies collecting agricultural row material and processors ask for quality standards (PDO or private standards) including sometimes agroecological requirements;
- Environmental organisations make recommendations, advises and also develop exchanges with farmers and agricultural advisers to implement more agroecological practices;
- Research and education centres disseminate the results of their research and organise training sessions mainly for agricultural advisers and sometimes for farmers. They are dedicated to agroecology or to implement innovative practices.

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In this complex network the main controversial matter that we observe concerns the consequences of agroecological and environmental practices on agricultural productivity. We face not only conflicts of interest between agricultural and supply chains actors and other actors. We also observe a conflict of legitimacy: for farmers and in general for agricultural actors it is up to them to decide how to practice farming and not to environmental NGOs or to the society (including public institutions).

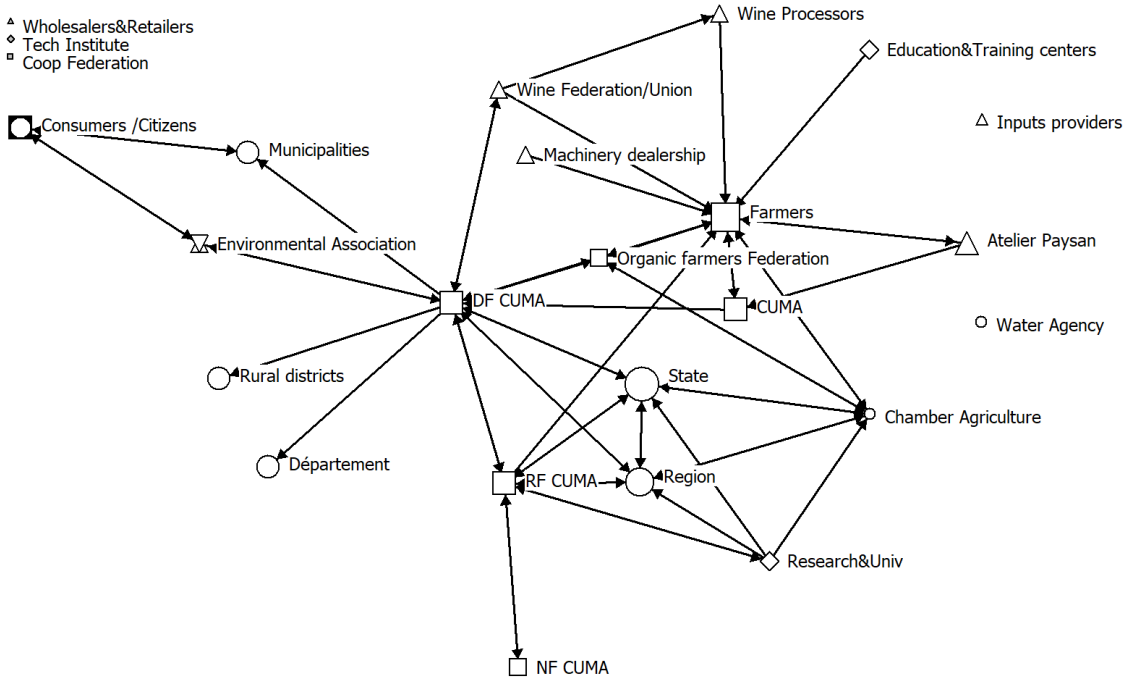

Figure 20. Knowledge and information flows in the FR case study

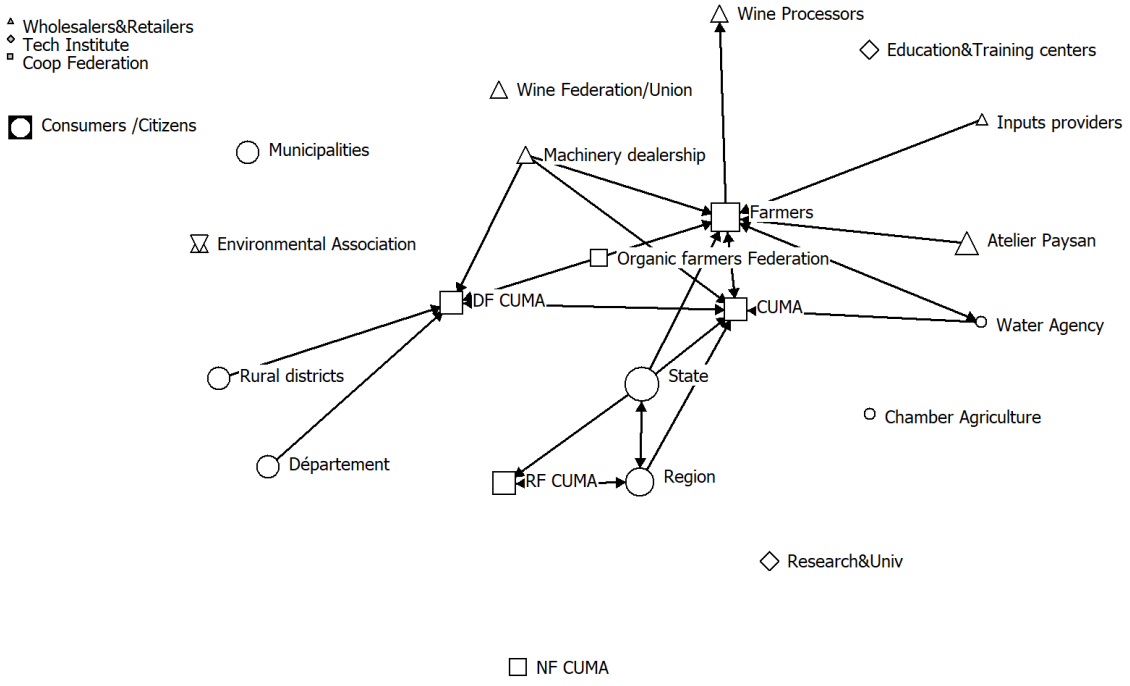

Figure 21. Goods and services exchanges in the FR case study

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There is no formal decision-making process in a unique and formalised governance organ. But there are rather several decision making processes. The most formalised "decision making processes" are the following ones:

- Within the RF of CUMA, it was decided to actively work on the agro-ecological transition and to launch a regional network about agroecology in viticulture. The purpose is to connect several CUMAs willing to work on this issue to foster the transfer of Innovation, knowledge and experience;
- For the implementation of policy measures, especially the GIEE labelling (Groupement d'Interêt Economique et Environnemental, Economic and Environmental Interest Group); the measure 04 of RDP related to investment support etc, the decision making process is more formalised. There is a regional committee, where the different public authorities (State representatives at regional level, Region…) and agricultural actors (RF and/or DF of CUMAs, chambers of agriculture, Union of farmers' cooperatives etc…) gather to evaluate the proposals submitted by farmers' groups (for ex to be labelled GIEE, or benefit from financial support through measure 04 of RDP etc). In order to proceed with this evaluation, an evaluation grid has been collectively elaborated and approved;
- the local level both at the individual level of each farmer and at the collective level of CUMA is very important: farmers decide to change or not their practices for individuals reasons and are also influenced by collective discussions and experiments.

This social network is complex with numerous actors. We identified a large set of actors and we cannot say that some actors are missing, however environmental actors and citizens remain little present in the decision making processes. Several actors also mentioned that relations and connection with the education centers should be strengthen (to really include agro-ecology in the training/education programs of the young generation).

The decision making processes are sectorial with some gaps between decisions related to marketing strategies on one side, public support towards agroecology on the other side and finally on the side of local dynamics. It seems unrealistic to envisage a unique governance organ due to the diversity of factors to handle (both related to the supply chain and the local territory), but an efficient improvement could be to create some links between these issues.

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8. GR - PEACH FRUITS FOR CONSUMPTION AND PROCESSING IN IMATHIA

UNISECO Partner: Agricultural University of Athens (AUA)

Authors: *Alexandra Smyrniotopoulou, George Vlahos*

SNA Option: 2 (3 interviews followed by a workshop)

KEY DILEMMA: HOW TO SUSTAIN THE LONG-TERM ECONOMIC VIABILITY OF FARMS WHILST PROTECTING THE NATURAL RESOURCES? HOW TO PROTECT BIODIVERSITY AND WATER QUALITY IN ORCHARDS WHILST ALSO IMPROVING COMPETITIVENESS AND MARKET ACCESS?

The case study

The case study area is located in the Regional Unit of Imathia (NUTS 3), in Northern Greece. An environmental sustainability issue is the high pressure on natural resources due to pesticide use resulting in biodiversity loss and deterioration of water quality. On the other hand, economic sustainability is closely dependent on the production of low to zero pesticide fruit in a highly competitive market environment.

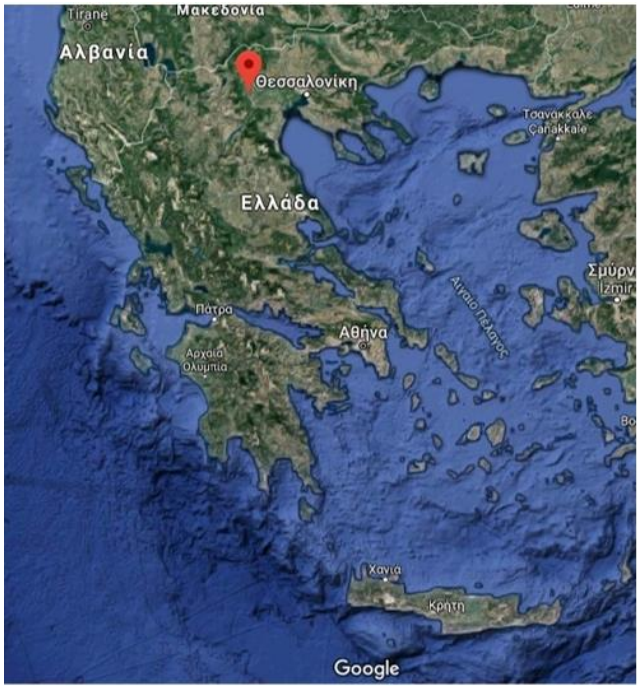

Figure 22. Localisation of GR case study: Imathia

The dominant farm production type is permanent crops, fruit orchards, mainly peach trees both for fresh fruit production and canning. There are approximately 20,000 hectares of peach orchards. Out of them, 60% are cultivated under Integrated Crop Management methods, applying fertiliser, pesticide and irrigation control. Moreover, a collective agri-environmental measure of insect sexual confusion methods for pest control is implemented in 6,000 hectares of peach orchards. Due to the implementation of these schemes, local co-operatives and producers' groups have strengthened their position in the area.

Greece is among the five largest canned peach producers in the world. The area of Imathia is one of the two main production areas of peaches in Greece, both for fresh fruit production and processing.

In the case study area we focus on two agro-ecological practices:

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- Integrated Crop Management methods, applying fertiliser, pesticide and irrigation control,
- Insect sexual confusion methods for pest control.

Actors

The key identified actors involved in the canned fruit sector are the **fruit processing industries**, mainly canning industries, and the **Union of fruit canning industries** that represents their interests. The Union aims to promote the sector of canned peaches in the market, mainly to third countries. In order to secure and improve the quality of the final canned products, the Union communicates to peach producers the standards that fresh fruits should comply with and what production practices they should follow (e.g. thinning out fruit and harvesting at the right stage), so that industries receive fresh fruits of good quality and size. Moreover, the Union establishes a fixed price for delivering fresh fruit to canning industries, regardless of the products' quality.

Table 8. The actors of GR case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Central government and local authorities - Legal and institutional framework - Public extension services	Public sector (2) Pub law* Pub_extension*
	**Farmers and farming organisations**	- Local agricultural cooperatives and Producer Groups - Individual farmers or farmers who are involved in small Producer Groups -	Ag.Coop (4) Individuals (1)
	**Agri-food value chain**	- Union of fruit canning industries - Fruit processing industries - Unauthorised receiving units of fresh fruits for canning - Chain of intermediaries - Large retailers and supermarket chains - Central fruit wholesale market	Union (2) Industries (2) Un.Rec.Units (0) Intermediaries (1) Supermarkets (2) Wholesale_mkt*
	**NGOs, civic society organisations, local community representatives**	-	-
	**Science, innovation, advisory, capacity building**	- Agronomists-consultants - Agronomists owners or workers in a supply agricultural store - Research institutions and universities	Consultants (4) Merchants (2) Research&Univ*
	**Consumers**	-	-
	**Media**	-	-

*missing actors

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Although the canned fruit sector seems relatively well organised and represented by the Union, when it comes to operations, canning industries, eventually, act individually and not all of them focus on the quality and certification of canned fruit products. Given that the production of canned peaches depends on the volume each industry receives, there is a strong competition among the canning industries and some of them sacrifice quality for quantity. The canning industries receive fresh fruits mainly from powerful **agricultural cooperatives/Producer Groups (PGs)**, or **farmers** who act **individually** or **are organised into small PGs**. The fruit canning industries, co-operative or private, have also established official receiving points of fresh fruit for canning. On the other hand, due to strong competition, agents of canning industries set up **unauthorised receiving points of fresh fruits for canning** in which actors involved, gain revenues with immediate exchange of cash, without providing official invoices, thus avoiding taxation and operating illegally in a network of the black market. Needless to say, the unauthorised receiving points of fresh fruit for canning receive and distribute large quantities of fresh fruit, paying no attention to quality standards.

Apart from the canned fruit sector, the well-established and organised agricultural cooperatives/PGs hold a prominent position also in the fresh fruit sector. In general, strong agricultural cooperatives/PGs aim to produce, distribute and export high and standard quality products that satisfy consumers' demand, trying to ensure production in a safe environment as well as to continuously improve the quality of their products. However, it seems that only few agricultural cooperatives/PGs (less than ten) operate with these terms in the area.

On the other hand, there is a group of individual farmers or farmers involved in small PGs, typically conventional, aiming at producing and selling their products, fruit for consumption and/or processing, just to secure a short term (annual) revenue. Most of them are not interested in or even aware of policies and initiatives related to agro-ecology and do not have any long-term farm planning. The majority of these actors give the year's produce to the first middleman who makes an appealing offer.

A chain of **intermediaries** consisting of traders, wholesalers, distributors and any kind of middlemen of fresh fruit, approach individual and isolated farmers and/or small PGs and purchase their products, connecting them with the market. In most cases, economic transactions taking place are deemed as illegal (payments in cash without proper invoicing and documentation), while a certain level of product quality is not considered a prerequisite.

Two different types of local agronomists can be identified within the network, the private agronomists who consult and provide advisory services to farmers and on the other side, the agronomists-merchants who sell agricultural supplies (seeds, fertilizers and pesticides).

Agronomists-consultants advise farmers on how to tackle farming issues in an environmentally friendly approach, they collaborate with the agricultural cooperatives/PGs as well as they actively communicate and promote innovation initiatives. They distribute farming guidelines and directions to agricultural cooperatives/PGs in order to inform their members e.g. for the use of appropriate spraying equipment during insecticide applications as well as the type of insecticide, correct dosage, keeping track of the Pre-Harvest Interval, etc.).

The role of **agronomists-merchants** who work in an agricultural supply store is generally to provide farmers with inputs, mainly fertilisers and plant protection products, in order to produce, maximize and protect their crop yield. They supply the members of the agricultural cooperatives/PGs, active in agroecological farming, with agricultural inputs according to the guidelines of agronomists-consultants. For the majority of the individual farmers, they also play the role of advisors, as they give them consulting services for the farming business. Nevertheless, certain of these agronomists act only as merchants, who seek only profit by increasing the volume of their sales, by selling more products to customers.

The **large retailers and supermarket chains** play a prominent role in the area, as they buy and distribute major quantities of local fresh fruit to domestic and foreign markets. These large supermarket chains demand products certified in accordance with quality and safety standards, conducting strict controls in

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order to guarantee that the products fulfil the requirements. For this reason, they seek to collaborate with large agricultural cooperatives/PGs that adopt environmentally friendly farming practices.

The **public sector** is considered an important actor in the network as an agri-environmental measure for applying insects' confusion methods for controlling pests is financed and supported under the Greek RDP 2014-2020. In spite of this public support, the central government and local authorities seem to have a sceptical stance on innovative incentives. That is why participants agreed that the presence of public sector is limited in the network and it should reassess its role. Thus, **a legal and institutional framework** should be developed in order to establish strong and powerful agricultural cooperatives/PGs, provide protection against underground economy and promote agro-ecological practices and green infrastructure projects. Moreover, the public sector should also advance its role as advisor providing **public extension services** in order to guide and inform farmers about farming methods as well as the market conditions.

Among the other missing actors, the **central fruit wholesale markets** were also mentioned, as they have the ability to promote and distribute quality products grown under environmentally friendly farming practices that will command different pricing. Finally, the **research institutions and universities** should have an active role and contribute to innovation and new technologies in agricultural production. Agronomists who have knowledge and competence in modern pomology and in advanced management practices should be present and close to farmers.

Governance network

In the canned fruit sector, the industries receive fresh products for canning from the members of agricultural cooperatives/PGs (in case the cooperative doesn't have its own factory), from individual farmers, but also from the unauthorised receiving units, as it is very important for industries to maximise seasonally the quantity of raw material processed. For some industries the quality of raw material is not a prerequisite, as they produce canned peaches of inferior quality or fruit juice. If a farmer has fresh products of inferior quality, he/she will still sell his/her produce and will obtain the same price with a farmer who delivers fruits of higher quality. Thus, farmers are not motivated to add value to their products by applying agro-ecological farming practices, since the canning industries offers a unique fixed price to all fruit growers. Consequently, industries, along with the Union that represents them, do not seem to establish trust relationships with its suppliers.

Individual farmers may behave opportunistically and be more prone to participate in the underground economy, since taxation discourages them from reporting transactions. Thus, most of them collaborate with actors who pay in cash avoiding taxes (unauthorised receiving units and intermediaries). A small number of individual farmers receive public support, while their connection with the market is through the agronomists-merchants, who provide them with agricultural supplies and advice.

On the contrary, the members of large agricultural cooperatives/PGs are obliged to deliver and distribute their produce through the supply chain of cooperatives with all legal and internal requirements. The majority receive public support to adopt agro-ecological farming practices. They buy agricultural supplies from agronomists-merchants, but only after prior communication with consultants, who provide them with accurate and updated advice on the specifics of adoption of environmentally friendly farming practices and how to improve their competitiveness in the market sector. A climate of collaboration has been built among the agronomists-consultants and the strong and powerful agricultural cooperatives/PGs aiming at promoting the implementation of environmentally friendly practices in the production process and establishing the quality and safety standards in the agri-food sector.

Supermarkets are only connected with the agricultural cooperatives/PGs, which can honour contractual agreements supplying them with traceable and certified fresh products.

The actors who are directly involved in the decision-making process related to the key challenge, i.e. to eliminate the use of chemical pesticides in permanent crops and produce pesticide-free products of high

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quality are mainly the agronomists-consultants and the strong and powerful agricultural cooperatives/PGs. The small group of agronomists-consultants along with a few pioneer representatives of agricultural cooperatives/PGs played a vital role in implementing the measure of sexual confusion methods for controlling pests in the current Greek RDP. The agronomists-consultants are fully aware of the increasing demand for food safety and quality. Knowing that there are consumers who look for eco-friendly products, they support agro-ecological farming activities, since products free of chemical residues are more competitive than their counterparts.

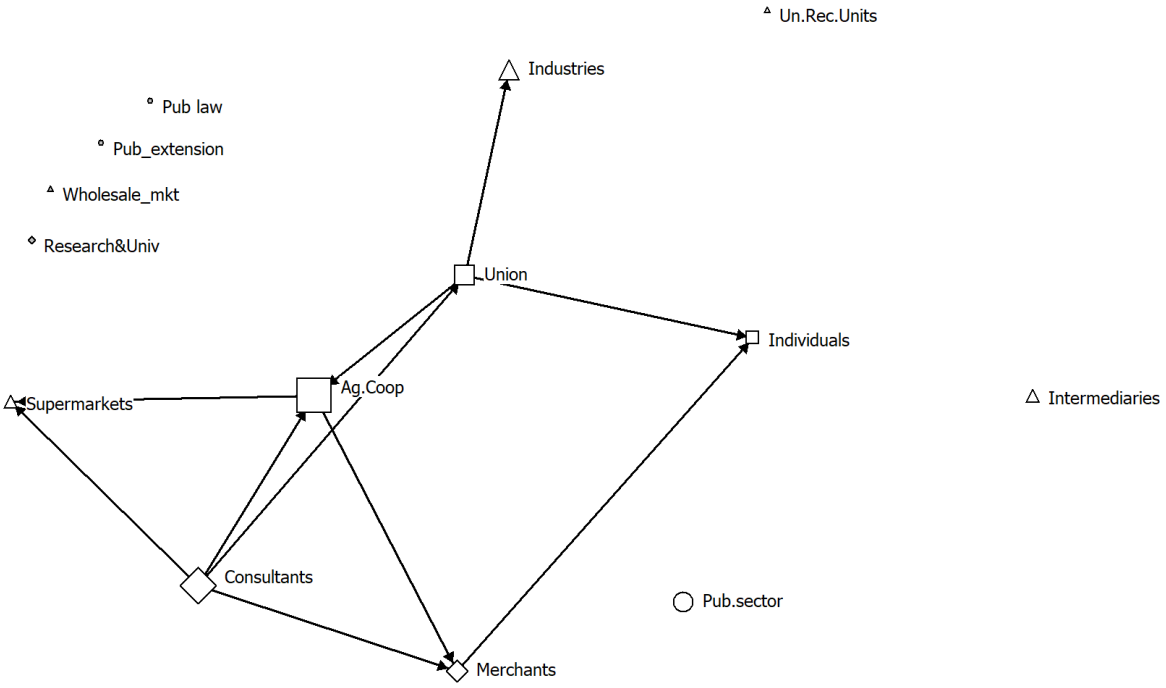

Figure 23. Knowledge and information flows in the GR case study

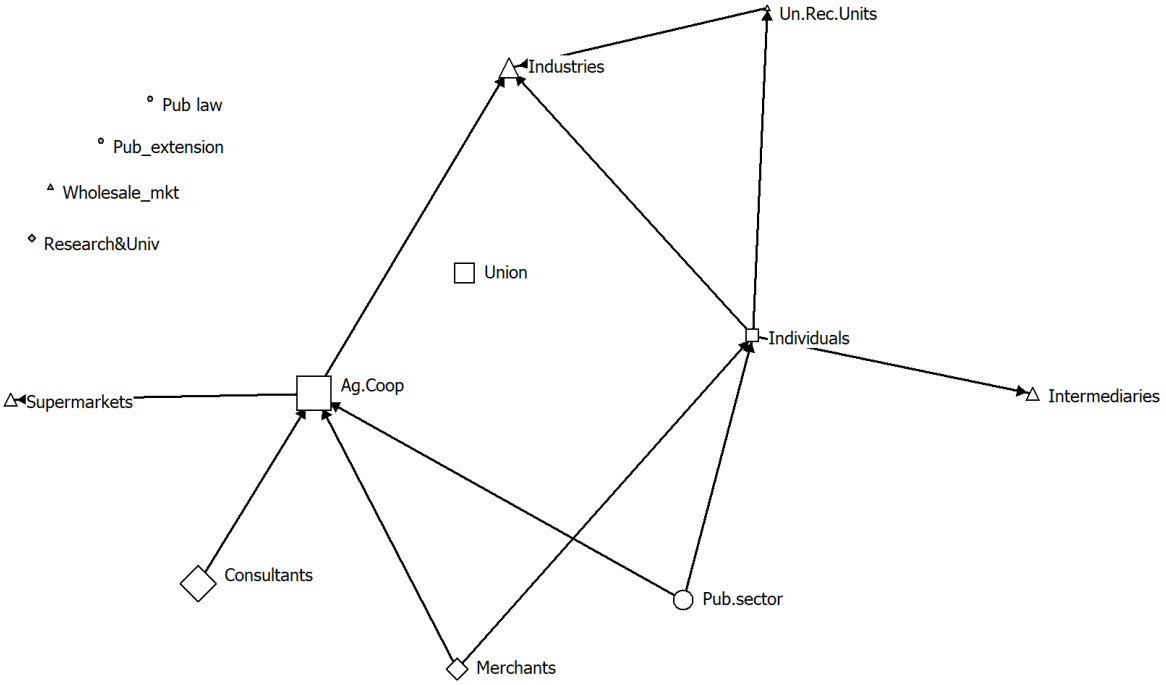

Figure 24. Goods and services exchanges in the GR case study

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After the initial negative stance of the agronomist-suppliers of agricultural inputs, they understood the significance of documented sustainable use of resources and products of higher quality, for the improvement of the competitiveness of their local agricultural sector. Thus, most of them are now in close contact with agronomists-consultants and collaborate with the members of the agricultural cooperatives/PGs, who apply environmentally friendly farming practices.

Although there are policy measures managed by the public sector, local public authorities seem unable to influence farmers towards implementing the existing agri-environmental policy schemes.

In the canned fruit sector, the Union encourages its members (i.e. the canning industries) to receive raw peaches from orchards in which agro-ecological farming practices are implemented (i.e. the RDP measure of insect sexual confusion methods for pest control and the Integrated Farming Standards). Nevertheless, it cannot impose any rule on them, since compliance with instructions and internal guidelines is strictly on a voluntary basis. Thus, not all of the fruit processing industries are actively engaged in collaborating with producers who apply agro-ecological farming practices and receiving fresh products that meet the quality and safety standards.

The supermarket chains have only recently started to involve in the decision-making process, informing the agronomists-consultants and the agricultural cooperatives/PGs about an initiative for the protection of bees.

Concerning the other actors (unauthorised receiving points of fresh fruits for canning, individual farmers, intermediaries), it seems that they are not interested in promoting any policy and market incentives related to agro-ecology, as they focus on the market segment of conventional fruits, irrespective of the quality.

It seems that the network is weak, thus it should be restructured and the actors who are involved in should reconsider their attitude towards food quality in order to be competitive in the marketplace. Based on the influence score for each actor, participants seem to agree that the actors who have the highest power to support agro-ecological farming practices producing high quality, competitive goods are the strong agricultural cooperative/PGs along with the agronomists-consultants. Such initiatives are much easier to be adopted by strong and large agricultural cooperatives/PGs, run by pioneer leaders who are open in innovation and can motivate and influence others. In general, most of the farmers adopt innovative agricultural practices only if they are convinced for their benefit and understand that the change has a positive impact on their farm. Thus, farmers should be motivated in order to adopt new farming methods and produce in a more sustainable way. For this reason, the role of agronomists-consultants is crucial, as they are the ones who can properly advise farmers, spread the innovation as well as transfer the knowledge.

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9. HU - SOIL CONSERVATION FARMING

UNISECO Partner: GEO

Authors: *Katalin Balázs and Alfréd Szilágyi*

SNA Option: 3 (11 interviews with 15 actors)

KEY DILEMMA: HOW TO INTEGRATE AGRO-ECOLOGICAL PRACTICES ON ARABLE LAND IN HIGHLY MARKET-ORIENTED ARABLE FARMING SYSTEMS TO MAINTAIN AND IMPROVE SOIL QUALITY WITHOUT SIGNIFICANT NEGATIVE IMPACTS ON THE ECONOMIC VIABILITY OF FARMS?

The case study

This case study explores the network of actors in Hungary related to the topic of soil conservation farming. From a land use perspective of the 9,303 thousand ha total area of the country 5,309 thousand ha is utilized by agriculture of which 4,317 thousand hectares are occupied by arable lands[7] . From an economic perspective: market oriented arable farming systems are dominant. Agro-ecological conditions for crop production in Hungary are generally considered to be good. However, water shortage during the growing season, climate adaptation and, in particular, deterioration of soils poses increasing environmental challenges to farmers.

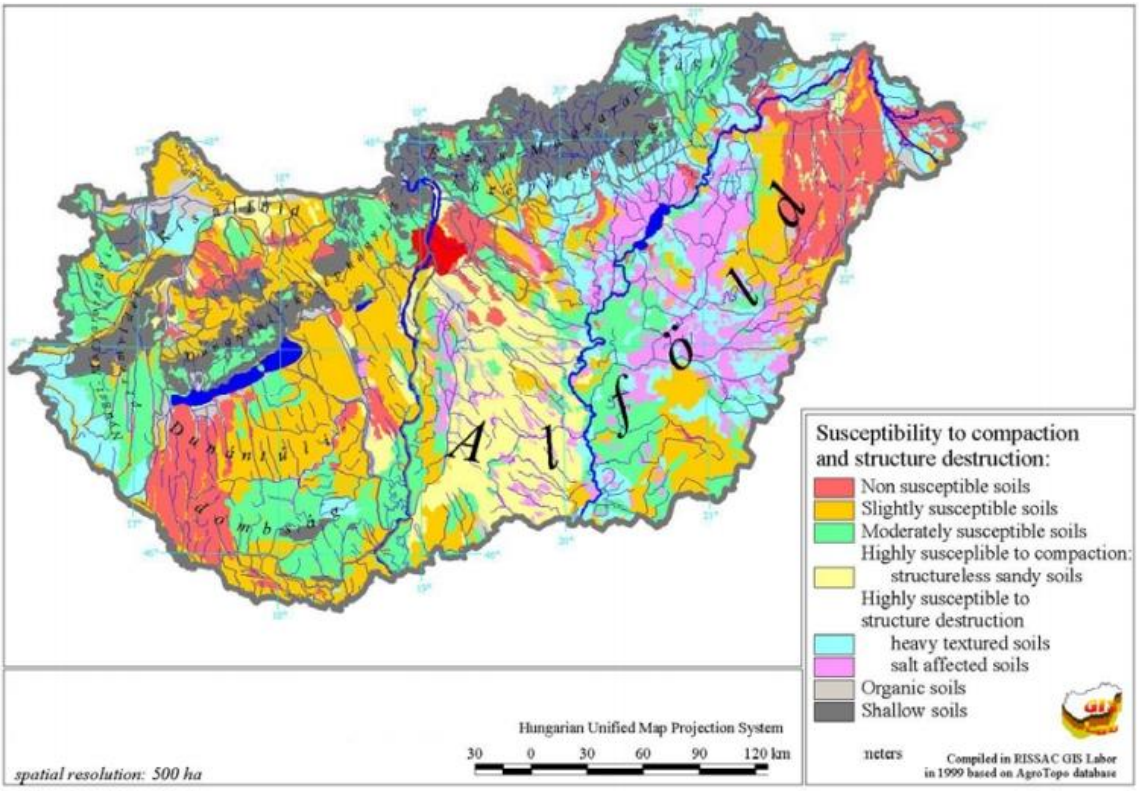

Figure 25. Susceptibility of soils in Hungary[8]

[7] HU Central Statistical Office: Tables (STADAT) - Time series of annual data – Agriculture; Use of land area by land-use categories and by legal forms

[8] Várallyay Gy. Soil Survey and Soil Monitoring in Hungary. EUROPEAN SOIL BUREAU RESEARCH REPORT NO. 9

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

The dominance of – in many cases short-sighted – economic aspects in farming pose a threat of long-term deterioration of the ecological requirements to farming and the natural environment. Agri-environmental measures launched to tackle such problems are not proved to be effective in maintaining and improving the environmental quality of agricultural areas. It has become apparent that new solutions are needed that can induce real impacts in handling environmental/ecological challenges.

Research into agro-ecological practices embedded into market-based activities are trying to find solutions for the question: how economic (profit bearing) activities are possible in agriculture so that they are also in line with the natural conditions and make best use of opportunities ensured by the environment.

Soil is an important basis for the production of both private and public goods. Adopting soil conservation farming practices are considered as a first step for market oriented arable farming systems towards transition to agro-ecological farming systems. Maintaining the qualities of soil and retaining water in soils effectively are major resource for agricultural production and promoting soil health shall represent inherent and immediate economic interest for farmers. By adopting soil conservation farming practices and coupled soil tillage operations the overall operational costs can be reduced while water can be retained, soil biota supported and CO2 emissions substantially lowered.

Currently, potential key barriers for the generic uptake of soil conservation practices among farmers and this first step to agro-ecological transition include lack of knowledge and openness to alternative practices and technologies, low farmer attitudes towards agro-ecological farming, low social capital, lack of capital, credit and bank guarantees for investment in specific machinery, lack of specific agro-ecological advisory services, soil as natural resource with underrepresented social/institutional value.

Actors

Actors in the HU case study and their influence on the identified dilemma are summarised in Table 9.

Authorities consider the EU and themselves as the most relevant actors with the highest impact in the topic. Their objectives are to administer and control if EU and national legislations are kept. The Chamber of Agriculture has a special status: being a farmers' interest group it should evolve and operate independently, however, in Hungary due to the low level of social capital this organisation is established by law and operated centrally linked to the Ministry of Agriculture. Other interviewees outside this category also consider that authorities and administration would be important but currently they are characterised by inadequate pool of knowledge and enough strong links with practice to fulfil their original roles. Authorities and administration are determined by politics. Their public awareness raising role would be important but is currently weak.

The generic objective of farmers is focusing on economic goals: to keep the agri-food value chain operational. All interviewees considered Farmers to be central in the decision taking about conservation agriculture. Farmers are overwhelmed with business offers of different products; any relations are based purely on economic aspects. All interviewees considered Farmers to be central in the decision taking about conservation agriculture. Soil conservation tillage increased fairly in the last decade. The main factors that encouraged the adoption of conservation tillage practices – both fully and partially – were the extreme dry seasons and the economic pressures[9].

The generic objective of the agri-food-value chain actors is focusing on economic goals: to keep the agri-food value chain operational. Input manufacturers and providers (incl. integrators) have great influence on farmers decision taking through their product-oriented promotion, technology provision, related advisory and field days. There is lack of independent professional advisory services and databases for benchmarking.

[9] Birkás, M. el al. Review of soil tillage history and new challenges in Hungary. Hungarian Geographical Bulletin 66 (2017) (1) 55–64. DOI: 10.15201/hungeobull.66.1.6

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

Table 9. Actors in the HU case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- EU, support schemes - Ministry of Agriculture - HU Chamber of Agriculture - NÉBIH and other authorities	EU (3) MoA (4) AgriChamber (2) FoodSafetyAuth (1)
	**Farmers and farming organisations**	- Innovative farmers - Conventional farmers	InnovFarmers (4) Farmers (5)
	**Agri-food value chain**	- Large agro-companies - Small innovative agro-companies - Wholesale buyers, sellers - Skilled labour - Banks, insurance companies	LargeAgribusCo (4) SmallAgribusCo (3) Wholesalers&Retailers (1) SkilledWorkers (0) Banks, insurance companies*
	**NGOs, civic society organisations, local community representatives**	- NGOs	NGOs (3)
	**Science, innovation, advisory, capacity building**	- Research - Agricultural education - Advisory - Soil Monitoring System for Hungary (TIM), to provide data - Professional and practical network to promote good soil condition - Extension system (as in the US) - Demonstration farms (large scale experiments/trials)	Research (3) AgriEducation (2) FarmAdvisory (2) SoilMonitoringSys* SoilQuality Platform* ExtensionSys* DemonstFarms*
	**Consumers**	- Consumers - Conscious consumer*	Consumers (1) ConcernedConsumers*
	**Media**	- Media	Media (1)

*missing actors

Theoretically the role of NGOs and civic organisations are related to the topic in concern would be to 1) raise public awareness about the unsustainability of current food systems based on industrialized agriculture 2) link consumers with the other actors, to convey consumers' interest and opinion directly to stakeholders in production, and exert pressure on these actors even through politics. In fact, only a few organisations were mentioned by the interviewees. In practice these organisations have little or no weight in terms of influence.

Science, innovation, advisory, capacity building should 1) educate appropriate experts and professionals 2) conduct basic and applied research to give a scientific basis for professionalism. In fact, 1) the structure of courses does not serve practical needs, 2) universities and academic research institutions are not independent from politics, they do not have the means and equipment to fulfil their roles. Their public awareness raising role would be important but is currently weak.

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Consumers' role in theory is to undertake the ultimate value assessment being a final actor in the value chain, and through their consciousness exert pressure on production actors in the value chain to orient them to fulfil consumer needs.

In practice, partly due to low social capital consumers in general are not conscious in Hungary, interests are unorganised, biased by commercials of large food processing companies/agribusiness industry. As a result, individual consumers are isolated from each other and other actors in the value chain (esp. farmers) cannot see the unorganised interest of consumers.

Media influence all actors in the form of commercial ads. Most generic media set people against agriculture (ref. to topics of methane, uncontrolled use of chemicals) Its awareness raising role would be important both in the generic and professional media. It could link the public with producers. Social media (Facebook) is also mentioned as a meeting point for innovative farmers of the topic. There is no echo in the media about conservation agriculture.

Missing actors and factors mentioned by the interviewees can be categorised around:

- raising awareness among farmers and knowledge exchange
    - real-life demonstration farms
- better provision of independent information, data and advice to farmers
    - soil information system
    - association of agricultural advisers
- narrowing the science-practice gap by
    - creating an independent professional and practical network to promote good soil condition
    - establishing extension services (as in the US), practice-oriented advisory coupled with research
    - multidisciplinary studies about the economic feasibility of conservation agriculture practices to providing convincing evidence for farmers to adopt
- improve education and training
    - skilled/good labour
- government initiatives for capital schemes for farmers to invest in specific agricultural machinery and tools related to conservation agriculture
    - bank, insurance companies to elaborate capital schemes for tools
- public awareness raising
    - environmental education in schools +about the importance of soils
      demanding consumers to become more conscious about the choice of healthy food and not be biased by commercial ads and the lock-in of cheap food

Governance network

Information and knowledge flow from the public sector to farmers is weak. After the socialist regime ended farmers wish to manage their lands alone, the level of cooperation and trust is rather low. Having experienced increasingly extreme weather features some innovative farmers implement reduced tillage experiments of trial and error in their land either at their own risk, being exposed to vulnerability, or financed by agro-industry companies' greenwashing programmes (seed trials, chemicals large scale trials). Despite low cooperation intentions, sharing experiences from farmer to farmer is very important, farming operations of neighbours and of flagship farmers in the region are followed carefully.

The long-term maintenance of soil fertility, soil organic matter, soil structure and soil health require knowledge intensive farming practices and decisions to be taken at farm level. Farmers are considered to be central actors in taking the decisions of implementing conservation tillage practices based on the information and knowledge accessible to them.

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The main flows of goods and services in relation to soil conservation farming are mainly taking place among actors of the private sector of the agri-food value chain.

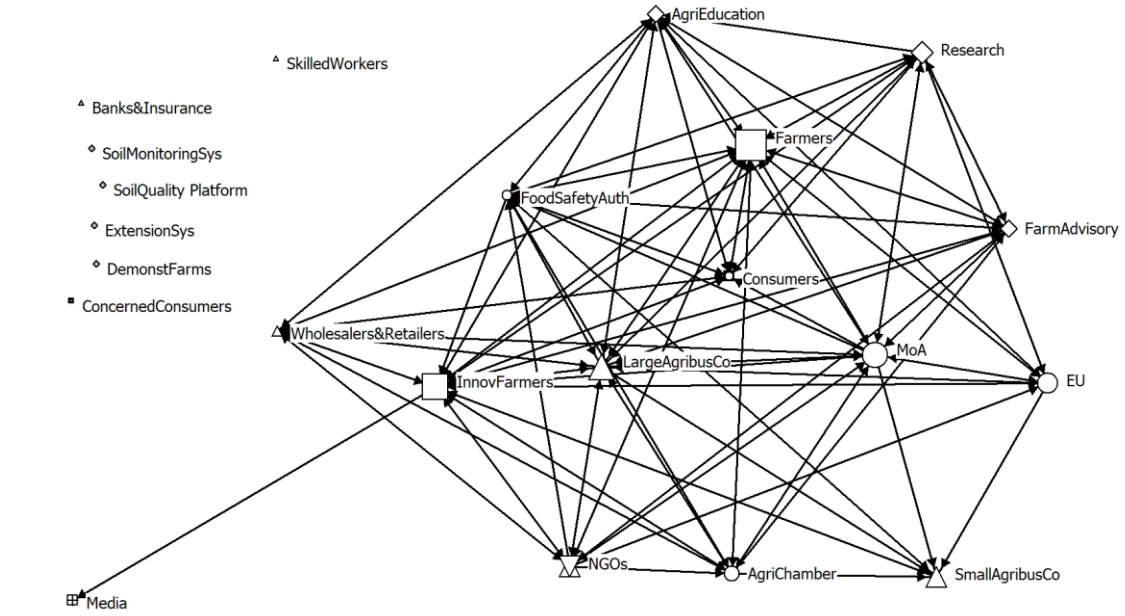

Figure 26. Knowledge and information flows in the HU case study

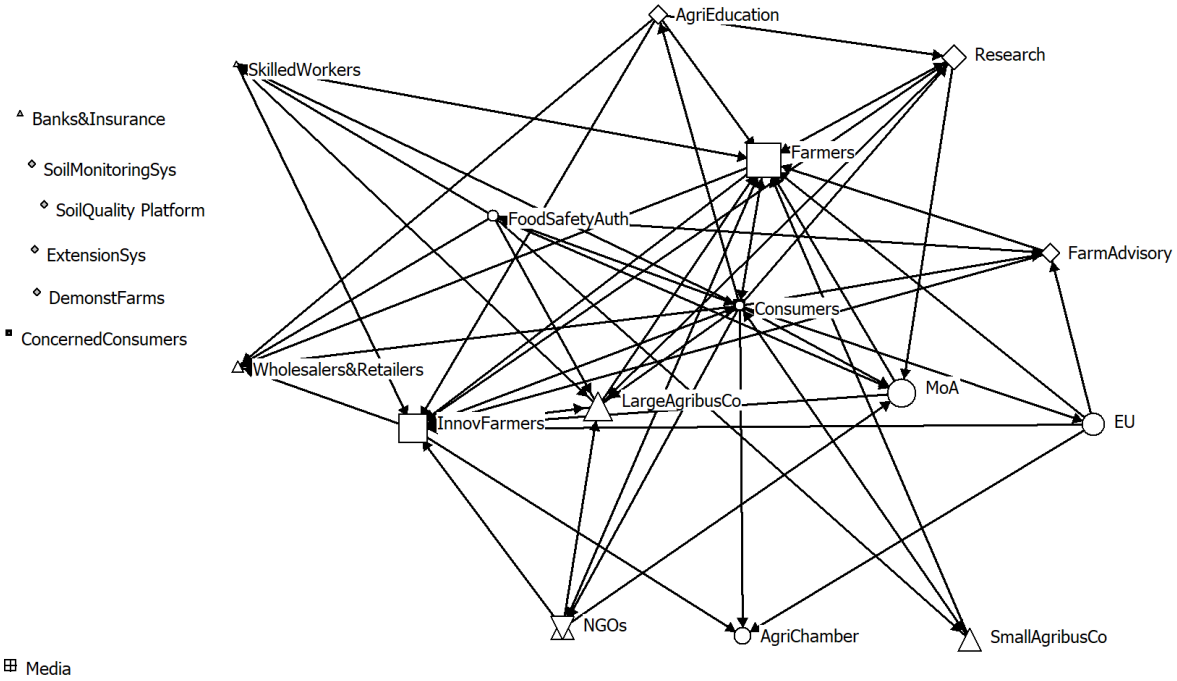

Figure 27. Goods and services exchanges in the HU case study

The flows of goods, services, knowledge and information related to soil conservation farming are generally considered to be weak and highly fragmented in Hungary. In the following we discuss flows of goods, services, knowledge and information related to soil conservation farming by main actor types.

Although Law CXXIX. of 2007 gives a generic frame for the protection of the quantity and quality of soils there no generic government programme (e.g. agri-environmental-climate scheme) or incentives are being implemented for the whole territory of the country that would encourage farmers to adopt conservation tillage practices specific to their area and needs to meet their long-term interests in maintaining and improving this partially renewable resource. Soil as a resource with a slow and long-term responding ability

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for changes, and soil conservation is not considered truly important by the authorities to implement practical measures until it becomes part of the society's agenda. It is against the short-term political interests to impose "unnecessary" restrictions on farmers.

The codes of Good Agricultural and Environmental Conditions (GAEC) in Hungary contain the minimum standards related to soil conservation as set out by the EU.

The Soil Information and Monitoring System (TIM) system was set up in 1992 (based on the scientific methodology elaborated by the Research Institute of Soils and Agrochemical Sciences (RISSAC/TAKI) of the Hungarian Academy of Sciences together with the Ministry of Agriculture) to provide the objective assessment of trends in quality changes of soils in Hungary (based on soil samples taken from 1200 representative points across the country every 3 or 6 years depending on the respective soil parameter) to support authorities in implementing related legislation. TIM is operated by the Agri-environment Protection Directorate of the National Food Safety Authority (NÉBIH). Although the TIM database is accessible to anyone without a fee, since it does not differentiate results by land use forms therefore it is not suitable to act as source of reference information for farmers directly.

Conventional grain farmers just as most farmers are non-risk takers in general, locked in by the value-chain (no capital and capacity to diversify activities), but they rigorously follow what practices the neighbour or flagship farmers in the region undertake, and if considered to be successful they are open to adopting it.

Soil conservation is not considered truly important by farmers until soil becomes a constrained factor for production. Climate change is however does perceived by in the form of increasing number of extreme weather events (e.g. dry winters, warmer summers, drought, shorter growing season in terms of water availability, sudden large quantities of precipitations causing erosion) that turns them towards seeking for practices other than the conventional plough tillage systems. Adopters of conservation tillage generally come from the younger generation or recent entrants to farming without the classic agriculture background who are hungry for knowledge.

Some agro-industry suppliers see a good business opportunity to sell specific products, mainly machinery related to conservation agriculture.

Business offers related to services or products (with biased interpretation of scientific basis) find their way most easily to farmers when associated with advisory services. Several interviewees, however, mentioned the need for a network of independent advisors who could help farmers without business bias in objectively judging what is best for their situation and choosing between the various business offers, products.

Agro-chemical companies finance field trials at farms to support their agenda, to boost the sales of their produce. In exceptional cases such field trials focus on comparative study of ploughing versus conservation tillage practices and related chemical applications to underpin the strict EU rules of documentation necessary for authorizing the application of certain chemicals.

No market incentive specific for soil conservation exist from the side of wholesale buyers, integrators as it is not immediate attention for their short-term profit making.

Interviewees identified several categories of farmers based on the degree of their interest and openness towards conservation farming practices (including innovative types: as farmers with responsible views, innovative foreign farmers with advisory from abroad, seed producing farmers and organic farmers with generally higher wealth of knowledge, to less innovative including observers, farmers with usual conventional practices). Organic farmers are a specific group as seen by conventional farmers.

Some small business initiatives dealing with cover crops and importing conservation agriculture knowledge from overseas are known to an increasing number of mid-size arable farmers who seek solutions for the perceived climate change events.

There are some relevant organisations who indirectly are relevant to the topic of soil conservation. This topic is however not explicit on their agendas as they main focus is on other themes (e.g. GOSZ, MAGOSZ:

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lobby groups for better agricultural produce prices and support schemes, WWF: focus is on nature conservation, Greenpeace: focus on agriculture critiques and not solutions). Organic farmers are movements are a specific group somewhat mutually isolated from conventional farmers. Cooperation between NGOs and/or civic society organisations related to the topic of soil conservation is not characteristic neither at a national nor local scale.

The information and knowledge flow from science to farmers is weak, somewhat dependent on personal acquaintances on a case-by-case basis. Science has its own language which is needed to be interpreted to farmers. Ideally this should be done by the National Chamber of Agriculture (NAK) who registers the list of independent advisors. The operation of this advisory network however is rather weak and easily biased by business interests of agricultural input providers.

The structure of higher education is recently increasingly becoming production focussed that supports the generic political agenda of agricultural intensification and the European trends of land concentration.

The Ministry of Agriculture has recently launched an initiative “AKIS: Agricultural Knowledge Information Systems” together with the NAK to improve the research cooperation between agricultural scientific institutions mainly to attract more EU research funding related to agriculture to Hungary.

Consumers in practice have no direct linkages to soil conservation with regard to grains, oil and protein crops production from conventional agriculture, as these produce reach consumers in a processed form through a long supply chain of 3-5 actors. There is no relevant labelling scheme nor price premium exist.

Interviewees generally reported a low social capital and low levels of trust in the system. Collaboration and reciprocity among farmers are hardly non-existent. Larger farmers do provide machinery (e.g. harvesting) work as a service to smaller farmers. Cooperation for selling is a difficult thing.

Advisors of integrators or agro-chemical input companies can maintain a good relationship with farmers keeping them in the trap of the technology and discount prices on input materials.

Generic conflicts virtually can occur at any point of the identified network. Famers can be in conflict with the authorities (keeping laws, rules and requirements for support measures). There are competition conflicts within the other main types of actors (e.g. within science: scientists compete with each other for funds, agro-input providers and integrators compete for business) and also between them (e.g. regenerative agriculture movement is considered by scientists not to be scientific enough with filtered or biased information).

At farm level the ultimate decision in mowing forward adopting and implementing conservation farming lies with farmers. The factors of decision making involves realizing that problems with yield and production practices may be related to changing climate, seeking for solutions, realizing that water retention in soils, hence maintaining soil structure and health is key to the future of production. Seeking for solutions primarily starts with watching what the neighbour or flagship farmers in the region do (e.g. using earlier varieties, use of different and specific agrotechnics). Adoption of practices are strongly cost sensitive. Changing varieties is easier whereas a decision regarding investment in specific machinery (e.g. reduced tillage, strip-cultivation, precision agriculture) is dependent on the farm size and capital available. Adopting conservation tillage practices requires money, knowledge, ambition and time, factors that not many farmers have.

Money could be provided through investment schemes to specific machinery. Machinery change support schemes are not well though over by the authorities but rather is seen as a political tool to provide generic support farmers. The interviewee of the machinery manufacturer told that as a result, in recent years farmers either bought additional conventional machinery or changed a large share of relatively young conventional machinery and tools unnecessarily as it was supported by the scheme.

At national level more cooperation would be needed within and between authorities and science to serve the practical needs of the sector in terms of climate mitigation and preparation for the transition to agroecology in the long run. Lack of skilled agricultural employees with specific knowledge (e.g. precision

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agriculture) is a big problem. Innovations and digitalisation of the agricultural sector precedes the structure and contents quality of agricultural education both at secondary and higher levels due to old structures in courses and topics, as well as, lack of capital for demonstration and training.

Farmers need to be encouraged by the government to participate in research projects. When the research bears immediate benefits (e.g. agrotechnics) to them it is somewhat easier to involve them.

Soil is a partially renewable resource, and its regeneration rate is very long. Soil and water shall be of immediate interests as natural production factors to farmers to be maintained in a sustainable manner. Soils are a source of both private and public goods. If the private good provision function of soils for farming (i.e. production) is well maintained by farmers with knowledge intensive practices then it can become a good basis for maintaining the co-production of public goods, as well as opening up perspectives of adopting further practices and moving towards deeper agroecology. Farmers, however, need knowledge and advisory support to accompany them along the systemic change, as well as scientific evidences to underpin the economic viability of such practices. The network needs to be improved from many segments in terms of building trust (e.g. real-life demo farms) and supporting change (e.g. capital investments). Both top-down and bottom-up initiatives have their roles in making this systemic change. In terms of the value-chain the importance of unbiased consumer/health education and awareness raising is highlighted.

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10. IT - CHIANTI BIODISTRICT

UNISECO Partner: CREA

Authors: *Oriana Gava, Andrea Povellato and Francesco Vanni*

SNA Option: 3 (4 interviews followed by a workshop)

KEY DILEMMA: HOW TO PROMOTE CROPPING SYSTEM DIVERSIFICATION IN A HIGHLY SPECIALISED AND MARKET-ORIENTED WINEGROWING AREA VIA THE ADOPTION OF AGRO-ECOLOGICAL PRACTICES, TO INCREASE BIODIVERSITY AND IMPROVE LANDSCAPE MANAGEMENT WHILE MAINTAINING THE PROFITABILITY OF FARMING THROUGH LOCAL VALUE CHAINS.

The case study

The case study (CS) area is Chianti Classico, a highly specialised and market-oriented winegrowing area in Tuscany. Chianti Classico covers ca. 71,800 ha owing to the administrative jurisdictions (NUTS 3 areas) of Florence (30,400 ha) and Siena (41,400 ha), and includes eight municipalities. Nearly 40% of that surface (28,000 ha) is used for agri-food production, especially wine, with vineyards covering around 10,000 ha, most of whcih are organically managed.

Figure 28. Chianti area in Tuscany

The CS area and Chianti Biodistrict (BD) share the geographical boundaries. A biodistrict is a geographical area where farmers, citizens, tourist operators, associations and public authorities formalise an agreement for the sustainable management of local resources, based on production and consumption of organic food[10]. The creation of the BD allowed the adoption and diffusion of key agro-ecological practices in winegrowing, such as e.g. , inter-row grassing, selection of local varieties, maintenance of seminatural features, as well as the use of organic fertilisers and pesticides and green manure, among others. Despite that, the CS faces the critical challenge of increasing the diversification of the cropping system, to increase biodiversity and improve landscape quality. A possible way towards addressing this challenge is supporting

[10] The Biodistrict / Eco-region initiative has been proposed at European level by INNER (http://www.ecoregion.info/) and led at Italian level by AIAB, an association of organic producers.

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the revitalisation of under-utilised agricultural areas, notably via the restoration of abandoned olive groves, the recovery of arable cropping and pasture land, and the development of the related local value chains. The latter could also increase the resilience of the local farming system, by reducing the dependence on the export of a single product, i.e. wine.

To address the challenge, the BD should act towards reverting a trend where specialised vineyards (and to a less extent olive trees) have replaced the traditional diversified and multifunctional farming system on the most fertile and suitable areas, thereby leading to the abandonment land, with consequent woody plant encroachment. This trend has started after the World War II, due to the orientation of governance objectives towards the production of value-added commodities (mainly olive oil and wine), while almost ignoring the provision of public goods by diversified farming systems, such as soil erosion prevention, water run-off control and biodiversity conservation. During the 1980s and the 1990s, the high profitability of vineyards greatly influenced farmers' decision making towards the plantation of new vineyards and the levelling of terraces and hill slopes to facilitate agricultural mechanisation[11]. Traditionally, olive tree cropping had complemented winegrowing in most farms in the CS area, where olive groves had significantly contributed to farmers' income, especially in marginal areas. In 1985, an exceptionally severe frost seriously damaged olive groves, which speeded up the specialisation of a large share of permanent cropland into intensive vineyard. The specialisation process involved non-winegrowers as well, thereby reducing the level of diversification of most farms and increasing land abandonment in the CS area. This significantly contributed to the current Chianti landscape and to its international popularity, turning into one of the key drivers of the great diffusion of agritourism and rural tourism, both of which helped the economic development of the CS area, by increasing the value added of agricultural products and creating jobs.

More recently, local stakeholders of the BD have recognised the need for a new governance model, based on integrated agro-ecosystem functioning, having acknowledged the environmental impacts resulting from the loss of agro-biodiversity, soil removal, and the use of chemicals, and the need to keep the economic performance of firms. The improvement of the integration between tourism and farming is the core of the promoted governance model. The shared objective of BD stakeholders is promoting a more diversified cropping system through the adoption and diffusion of agro-ecological practices and principles among CS farms. This should allow increasing agro-biodiversity and improving landscape management, while maintaining the profitability of local farming system. This approach should ensure the effective provision of private and public goods and services, at the same time.

The existence of the BD and the promotion of an innovative governance model make the CS an interesting example of transition towards an agro-ecological farming system, with a decrease in external inputs and an increase in the provision of ecosystem services.

Actors

Chianti Biodistrict is an alliance of several local stakeholders, currently led by a group of farmers that aims at promoting an innovative grassroots movement for allowing the diffusion of organic farming principles and originating a new governance model structured towards the agro-ecological principles. The key actor of this movement is the **Biodistrict Organising Committee** (hereinafter "Biodistrict"), the core of which is a group of local farmers with a strong commitment towards organic principles and practices, who adopt a territorial approach for conceiving and developing organic farming. The Biodistrict promotes events and initiatives for disseminating knowledge about organic farming and for introducing organic food in public and private sector canteens, as well as for raising environmental awareness in the public. The latter includes information campaigns about e.g. the ban on herbicides in public areas and municipal roads, the

[11] Simoncini, R. (2011) Governance objectives and instruments, ecosystem management and biodiversity conservation: the Chianti case study. *Regional Environmental Change* 11(1), 29-44.

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separate waste collection and the use of biodegradable materials in public events. The rationale behind the creation of the Biodistrict and the activities it promotes explain the relevance of this actor in the governance network.

The area is characterised by the presence of several winegrowers' associations (even more that one per municipality) that are particularly important for the rural vitality of the area, e.g. by promoting and organising local fairs and wine culture events locally. Despite that, spreading the principles of organic farming is the mission of just few of those associations, the most active and influent of which is the **Winegrowers' Union of Panzano**. Panzano is a small village characterised by a high concentration of organic farmers that have been involved in the development of the BD since the beginning and, above all, that are still very active in finding the solution to the case study dilemma, namely conciliating the specialisation on wine production with the adoption of agroecological methods and principles.

Table 10. The actors of IT case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Municipalities within the bio-district - Tuscany Region - Chianti Biodistrict (Organising Committee)	Municipalities (2) Local govnmt (2) Biodistrict (4)
	**Farmers and**	- Winegrowers' Union of Panzano - Organic farmers - Conventional farmers - Farmers Unions	WinegUn Panzano (3) Organ farm (4) Conv farm (2) Farmers Unions*
	**Agri-food value chain**	- Local shops and restaurants	Cater&grocer (1)
	**NGOs, civic society organisations, local community representatives**	- Environmental associations and organic agriculture associations - Consortium of Chianti Classico Wine - Agri-tourism associations and tour operatories	Envir&organic as. (3) Cons ChianClas (1) Tourist ass*
	**Science, innovation, advisory, capacity building**	- University and research centres - Company specialised in consulting for organic farming - Agronomist specialised in consulting for organic farming - Other consultants, including oenologists - Third party certification bodies for organic agriculture	Research&Univ (2) SPEVIS (5) Mazzilli (5) Consultants (1) Certific bodies (2)
	**Consumers**	- Consumers and consumers associations	Consumers*
	**Media**		

*missing actors

All interviewees agreed mentioned **Ruggero Mazzilli**, i.e. a private farm consultant specialised on organic viticulture, among the actors who significantly contributed to the creation and development of the Biodistrict and the related initiatives. The large influence score of Mazzilli on the key dilemma is due to his networking ability, which adds to his deep knowledge of organic winegrowing. The role of the actor **SPEVIS**

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(*Stazione sperimentale per la viticoltura* - Experimental research station for sustainable viticulture) is somewhat similar to that of Mazzilli. SPEVIS is a farm consultancy company that studies and disseminates knowledge about the most advanced cultivation techniques for managing organic vineyards. SPEVIS collaborates very frequently with BD as well as with local universities and research centres.

The **Chianti Classico Consortium** (hereinafter Consortium) is another important actor of the network. The Consortium is a powerful organisation that represents the interests of almost all wine producers of the CS area (nearly 96% DOCG farmers), with the overarching objectives of promoting, protecting and adding value to the Chianti Classico denomination of origin. This actor is one of the principal representatives of the institutional organisations in Italy and in the EU in the grape-growing and winemaking sector. The Consortium is internally organised into different departments performing its official tasks: safeguarding the denomination, valorising the brand and providing a variety of services to its members[12].

Amongst the public administrations, the interviewees agreed on the importance of **regional government**. Indeed, the development of a BD coherent with the agroecological principles is highly dependent on the regulatory framework and on the financial support settled by the regional administration. The support ensured through the Rural Development Programme (RDP) to organic farming and territorial projects aimed at spreading agroecological practices were considered of vital importance. The rather low influence score of Tuscany Region on the key dilemma was mainly due to the perception of stakeholders that the regional administration is not adequately supporting the organic sector in the area.

Finally, **municipalities of Chianti Classico** are other important stakeholders that are contributing to the territorial development of organic farming in the area. Municipalities are amongst the signatories of the BD and potentially they could have the important function of communicating the key initiatives to citizens and above all raising their awareness on the sustainability challenges that the local farming system is facing. Although there are some mayors that show an increasing interest on the BD activities, currently not all mayors have showed the same attitude towards the BD initiative and there are still important differences amongst municipalities. The challenge here is to overcome local interests and setting a common agenda with a clear and shared vision regarding the strategies to be pursued for the (sustainable) rural development of the area, and the BD should play an important role in unifying the different local agendas.

Governance network

The Chianti is an area characterised by a rather complex institutional context. The area is also characterised by the coexistence of different social and economic dynamics, which sometimes are in conflict with one other with regard to the key dilemma but also more in general regarding the use of local resources[13].

The network of actors involved in the key dilemma in this case study is under development, since the BD is still in the process of developing and extending the information and knowledge connections for the main actions relevant for the key dilemma (figure 29). As expected, the centrality of the BD in the knowledge and information flows is substituted by the single organic farms in the goods and services flows (figure 30), since currently the exchanges of inputs and the selling strategies are mainly occurring at farm level. Nevertheless, it may be argued that the existing relations are quite structured and well defined in both types of flows.

The identified networks are not characterised by strong conflicts, but when looking in greater details on how the relations are shaped (in terms of types and quality of connections) regarding the subject under study (agroecological transition), a completely different approach can be observed between two groups: the large conventional producers and the small-medium organic farmers (represented by the BD).

[12] https://www.chianticlassico.com/

[13] Brunori, G. and Rossi, A. (2007). Differentiating countryside: Social representations and governance patterns in rural areas with high social density: The case of Chianti, Italy. *Journal of Rural Studies*, 23(2), 183-205.

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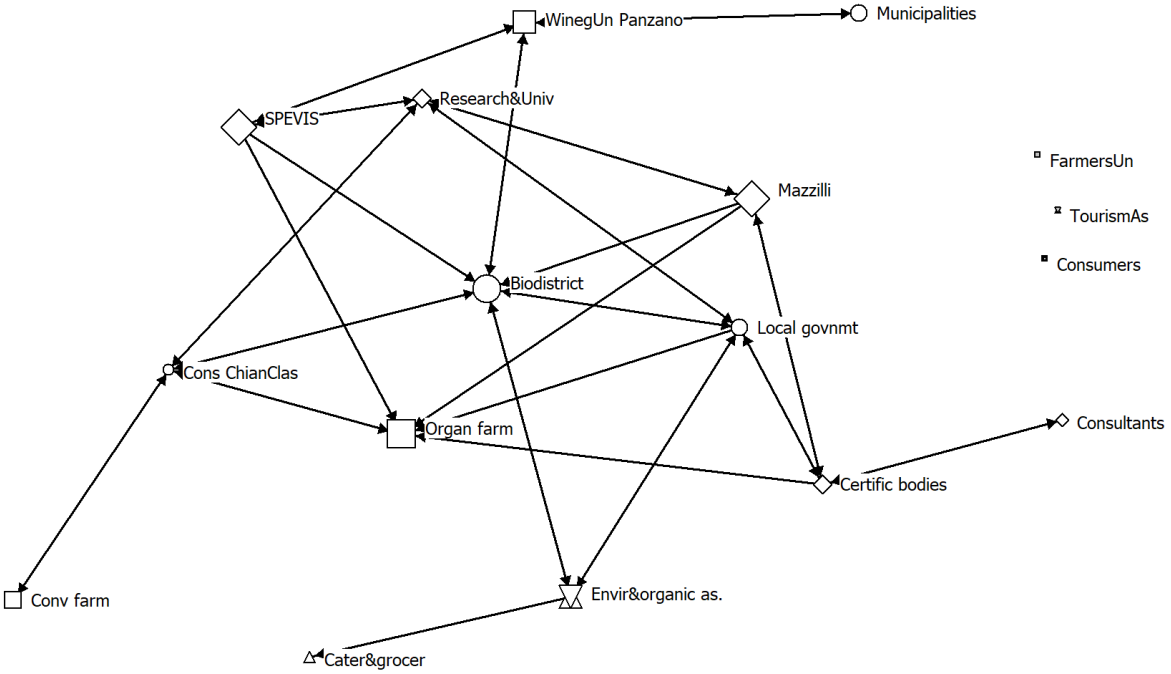

Figure 29. Knowledge and information flows in the IT case study

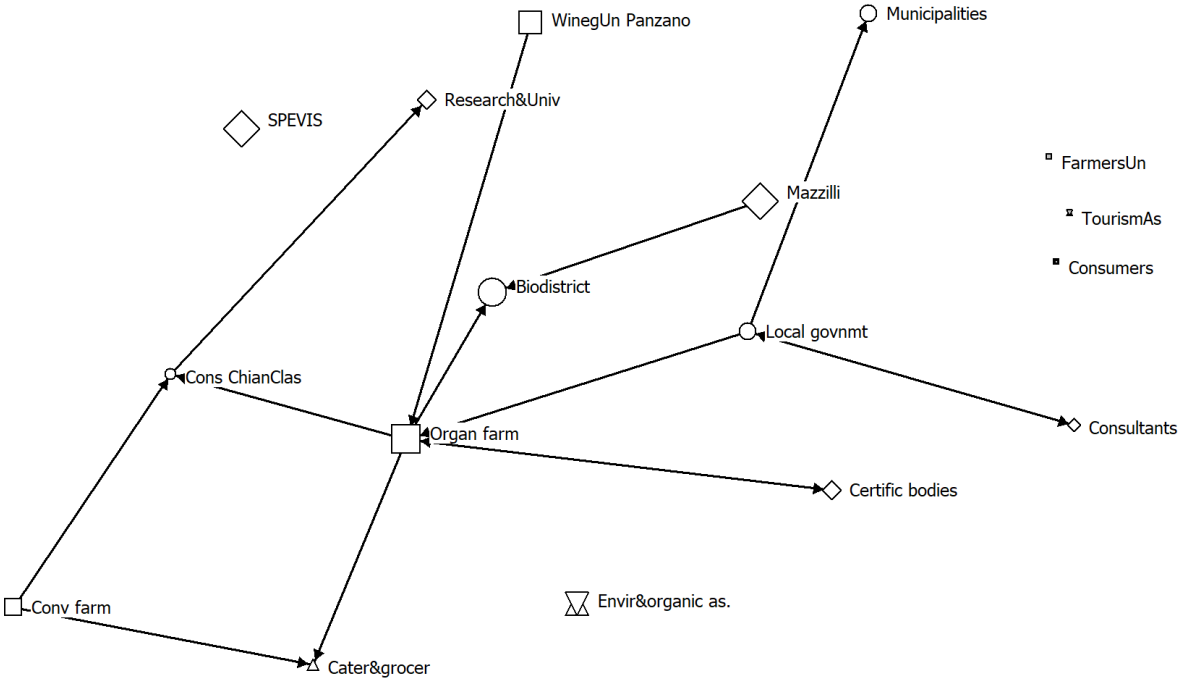

Figure 30. Goods and services exchanges in the IT case study

Large conventional farmers seem more reluctant regarding the spreading of organic methods in the territory, since they believe that there are valid alternatives to improve the overall sustainability of the local farming system, such as precision farming and other innovative and low impact techniques. Furthermore, such large and powerful farms have a strong political power and still play a relevant role in the area: i.e., the economic power is still an important requisite within the decision-making process of the Consortium, and then in shaping its overall strategy. Organic farmers, on the opposite, see the adoption of organic principles - and in many cases also innovative practices that go well beyond the organic methods –

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as well as the diversification objectives as a key strategy to better address the emerging social, economic and environmental issues characterising the local farming system. At this regard it may be argued that the local network should be enlarged by the presence of actors that could better link the vision of such two distinguished groups.

With regard to the collaboration amongst stakeholders, the data collected provided some insights on the current trust and reciprocity relations amongst actors and, above all, on how local network could further develop to better address the key dilemma.

Firstly, the BD and more in general the local organic farming sector is experiencing an increasing support from local administrations, in particular from municipalities and, to some extent, from the Consortium. Nevertheless, the key initiatives for the dilemma (e.g. pesticides ban, organic food procurement for school catering services, platforms for valorisations and marketing of products, etc.) are still fragmented. A greater involvement and coordination of local strategies settled by municipalities could result in a better integration amongst key activities and sectors (e.g., amongst farming and tourism), otherwise there is the risk that small initiatives and local interests will prevail on territorial and coordinated strategies and on collective interests. BD should concentrate its efforts in stimulating the cooperation amongst local authorities and in developing this common vision.

Secondly, this high fragmentation was observed not only concerning municipalities but also for local farms organisations. The valorisation of local wine might be an effective strategy to communicate the local features of the product, as well as its link to the local features. However, the exaggerated attachment to local products can result in a serious bottleneck for addressing the key dilemma, but also more in general for the overall development of the CS area.

Relevant drivers that could push towards a stronger collaboration and aggregation in the area could be developed by the Consortium, but although this actor is very powerful, it was considered not enough influential in pushing towards a real system redesign inspired by agroecological principles. This is partly due to its main role, which is focused on wine marketing strategies and by the influence of the largest large conventional farms, as highlighted above. At the same time, this is also due to its large dimension and its complex (and slow) decision-making process. The Consortium needs to mediate different and often contrasting positions and this usually results on taking quite conservative actions and strategies and Consortium has been traditionally reluctant to discuss the environmental practices to be adopted, by emphasising the entrepreneurs' freedom to modernise their farms[14]. Nevertheless, recently a president with a very focused vision on organic farming was elected and an increasing attention towards organic farming and in general sustainability issues seems to have increased consistently compared to the past. It is worth to mention that, compared to similar bodies that are mainly managed by big industries and processing companies, in the case of Consortium of Chianti Classico there is a strong representation (and influence) of local farmers.

From a regulatory perspective, the design and implementation of the regional law on rural districts (approved in 2004) and the regional law on biodistricts (under approval) can make a big difference on the way the territory may deal with the identified dilemma.

The possibility to create rural districts was settled in 2001 by the Italian Agricultural Act (decree 228 of 6th April 2001). Rural districts were defined as 'local production systems characterised by a homogeneous historical and territorial identity due to the integration among agriculture and other local activities and to the production of very specific goods or services, coherent with natural and territorial traditions and vocations'. The regional law on rural districts was approved in 2004 (Law 21/2004) features for rural districts and the characteristics of the process for their establishment. The law presents the rural district not as an additional institution, but as an instrument of consultation and co-ordination: districts should demonstrate strong territorial homogeneity and specificities linked to cultural, natural and economic assets,

[14] Brunori, G. and Rossi, A. (2007).

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as well as the adoption of a strategic plan concerning the will of local communities to pursue common goals and to integrate activities and resources[15]. The Rural district of Chianti has been established in 2017 with the overall objective of promoting shared interventions for the economic and social development of the area by consolidating synergies amongst the key public and private actors.

While the rural districts involve broader perspective on local development, regional government is also in the process of approving a regional law to better regulate biodistricts. The legislative proposal, as stated in the introductory part, aims at "promoting the development of cultivation, breeding, processing and marketing of organic food products based on district model applied to a territory where the local production system is strongly oriented towards organic farming". The regional government can legally acknowledge biodistricts if they have at least 30% of the land cultivated with the organic method, a minimum number of 3 producers, and at least one third of the municipalities in the district territory. Chianti Biodistrict already fulfils such requirements by including 6 municipalities (out of 8) and above all, by working on farming methods that go beyond organic certification requirements promoting a necessary cultural growth toward agroecology. The project has grown from a bottom-up movement, thanks to a partnership amongst organic farmers, advisors and Chianti's local administrations.

At this regard, local stakeholders emphasised the need for increasing BD relationships with other marginal actors in the network and for creating relationships with missing actors. In the first case they mainly refer to the relation of BD with environmental NGOs but also with local shops and restaurants. NGOs may play an important role in communicating to local citizens the sustainability challenges that the local farming system is facing and especially the role of organic farming. Local shops and restaurants, through a better valorisation and communication of local products different from wine, may also represent strategic actors to affectively address the agroecological transition of the area through the activation of short supply chains.

Finally, the majority of stakeholders agreed on the need to involve missing actors. Amongst them an important role could be played by formal and structured agricultural organisations, that so far have not played any relevant role in relation to the challenge. Although such organisations have an important influence and they are active in lobbying activities at both national and regional level, their role is mainly administrative, and they have not developed any practical and policy action to accelerate the agroecological transition process in the area.

[15] Brunori, G. and Rossi, A. (2007).

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11. LT - SMALL SCALE DAIRY FARMERS AND CHEESEMAKERS

UNISECO Partner: BEF LT

Authors: *Gražvydas Jegelevičius, Elvyra Mikšytė*

SNA Option: 2 (3 interviews followed by ba workshop)

KEY DILEMMA: HOW TO MAINTAIN AND ENCOURAGE EXTENSIVE MANAGEMENT (GRAZING) OF GRASSLAND HABITATS? HOW TO BECOME (OR REMAIN) COMPETITIVE IN THE MARKET WITHOUT INTENSIFYING THE FARMING PRACTICE?

The case study

Dairy sector in Lithuania comprises of raw dairy producers, middle-men that collect milk from producers (around 60 companies) and over 20 dairy processing companies with 5 of them accounting for around 95% of production.

To show tendencies of the Lithuanian milk sector, it is worth noting that number of farms has sharply declined from ~165 thousand in 2005 to ~25 thousand in 2017 while the average farm size has increased from 2,7 cows in 2005 to approximately 9 cows per farm as of 2018. This decline represents small farms mainly. Since 1995 the number of milk cows in the country has decreased by around 2,5 times. And as of 2017 it is around 250 thousand. The effectiveness, i.e. the amount of milk from a single cow has been increasing as the average farm size increased, but the amount of milk produced per citizen has been slightly decreasing. Now only 5% of dairy farmers keep slightly above 50% of all cows and account for 70% raw milk production. The increasing of the farm size has its typical associated drawbacks related to intensification and ecological pressures as well as changing farming practices from grazing to growing fodder for cattle kept indoors in larger farms.

Milk producers that are of major interest to the investigation not only produce raw dairy but also further production, namely cheese or other products and are involved in direct selling their own produce. This group is chosen as a good example of improving value chain. In these farms, not only cows are kept for dairy production but also sheep, goats. The artisan cheese products are becoming more and more popular in the market. Besides growth of the direct selling market, there is a possibility to grow the market by selling these products in restaurants and street food producers. However, some of them find that it is not always easy to find customers since the product availability is poor, meaning that farmers who keep, take care of and milk the animals themselves and produce cheeses afterwards are available to customers in the markets only once a week for example. This shows a need for a joint cooperative or other means of improving product availability but not decreasing the profit for farmers. Lastly, the customers do not always understand the real value of the products, for example that purchasing this or that cheese supports the ecosystem of a natural meadow indirectly.

Actors

The network centres around small to medium extensive dairy farms, including organic ones (extensive farms for short) and it encompasses market actors, farmers and their associations, purchasers and processors, municipalities and the government structures, like the Ministry of Agriculture (MoA), Ministry of Environment (MoE), State Food and Veterinary Service and National Land Service, as well as other institutions or services such as Lithuanian Institute of Agrarian Economics, Lithuanian Agriculture Advisory Service and universities.

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Table 11. The actors of LT case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- National Land Service - State Food and Veterinary Service - Municipalities - Chamber of Agriculture - Ministry of Environment - Ministry of agriculture	Nat Land Serv (1) Food&Vet Serv (4) Municipalities (2) Chamber Agri (3) MoE (2) MoA (2)
	**Farmers and farming organisations**	- Extensive farms - Large farms - Lithuanian Milk Producers' Association - Lithuanian association for medium sized dairy farms - Cooperatives producers and dairy processors - Cooperative association "Kooperacijos kelias" (~Cooperation way) - Union of Lithuanian Family farmers*	Extens_farms (5) Large_farms (4) Milk Prod Assoc (2) Med Dairy Assoc (3) Dairy Coop (3) Coop assoc (2) Family Farm Un*
	**Agri-food value chain**	- Large milk processors - Realisation channels - Milk purchasers-resellers - Cooperative "Lietuviško ūkio kokybė" (~Lithuanian farm quality)	Dairies (5) Cater&grocer (3) Milk Traders (2) Coop farm qual. (3)
	**NGOs, civic society organisations, local community representatives**		
	**Science, innovation, advisory, capacity building**	- Lithuanian Institute of agrarian economics - Lithuanian agricultural advisory service - Ekoagros certification body* - Universities*	Instit AgrEcon (2) Advisory Serv (2) Certific body* Agr Uni*
	**Consumers**	- Consumers	Consumers (3)
	**Media**		

Ministry of agriculture (MoA), as the main body responsible for the formulation and implementation of agricultural policy in Lithuania has been somewhat addressing aspects of the dilemma, mostly in the form of initiatives to some degree useful for smaller scale farmers (incl. dairy) and currently talks are taking place regarding short value chains, greening, other new CAP developments, etc. However, as obvious, policy related to dairy farming is more favourable to larger, more intensive and more economically competitive farms and is influenced by more powerful farmers/manufacturers associations rather than extensive farm representatives. Regarding smaller and more extensive farms – several participants during the SNA workshop and interviews stated that more could be done to address the issues regarding dairy farming (e.g. milk prices), and vastly decreasing numbers of farms. Especially during 2018-2019, the farm number have collapsed significantly and a lot of remaining farmers are uncertain about their future. The number of dairy

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farms has been decreasing for 20 years now and the average size was increasing. This is partially due to demographic issues, since the population, especially in the rural areas is decreasing, also, land availability issues (conventional agriculture has been increasing) and smallholders stopping their farming practice (e.g. keepers of 1 cow mainly for own use). In addition, the number of small-medium farms has also been declining and these farms face more difficulties to purchase land than big intensive farms.

Similarly, it was noted that State Food and Veterinary Service have a bit of a negative influence in respect of the dilemma due to the legal requirements being disproportionately more difficult to fulfil for smaller farms.

Ministry of Environment (MoE), however has less direct role relating to the dilemma. The environmental issues caused by conventional agriculture were less severe until recently, as water pollution and soil erosion problems are emerging and are becoming increasingly threatening. The Ministry of Environment collaborates with the Ministry of Agriculture and participates in the process of developing agro-environmental measures.

However, from the group discussions, it was pointed out that extensive or environmentally friendlier farming is not explicitly encouraged and conditions for it are not being sufficient, especially regarding restrictions in the protected areas (e.g. building new buildings, even like shelter for cattle is restricted), where it would be logical to have more extensive/organic farming activities (e.g. extensive grazing would help to maintain natural meadow habitats, could create jobs, tourism, etc.). It's worth noting that State Service for Protected Areas under the Ministry of Environment may also have a significant effect (either positive or negative) on farming in those territories that form around 15% of the total area of the country. What is more, National Land Service was also included during the workshop due to possible transparency issues regarding renting or selling of state land to private people – farmers (land availability issues).

Lithuanian Institute of Agrarian Economics is a scientific body, whose role among other things is to analyse the situation in the dairy sector and regularly release publications. They are also involved in forming agricultural policy to some degree and may actually address the dilemma in government discussions on some occasions.

What is more, some associations whose activities at least partially relate to key study challenge/dilemma (in a sense of representing smaller farms, somewhat more extensive farming practice) can be highlighted, such as **Lithuanian Association of Agricultural Cooperatives** called "Kooperacijos kelias" (Cooperation way), whose one of the functions is to represent various cooperatives in Lithuania, including several dairy cooperatives and thus their members, that are mostly small dairy farms.

Lithuanian Association of Medium-sized Dairy farms also plays a role of representing and advocacy. Although, it was founded relatively recently, its' members of the board have been actively involved in representing small-medium sized dairy farm interests for some time. **Chamber of Agriculture** should also be included, however it's role is ambiguous, since it should represent the interests of all of its members including large intensive farms and smaller extensive family farms, whose views may often be in opposition. But also from more positive side - Chamber of Agriculture was involved in education regarding extensive farming, also in launching a market initiative "Mobile farmer's markets" in collaboration with one particular cooperative "Lietuviško ūkio kokybė" (Lithuanian Farm Quality) that should be distinguished as well.

On the other hand, **large milk processors** (around 20 major in LT total) are also important in this network. It is estimated that 5 largest milk processors process more than half of raw milk produced in Lithuania and do have a major influence on milk prices. It is important to highlight that large milk farms are closely cooperating with milk processors and also having major economic and political influence in the dairy sector through lobbying. However, still a significant part of raw milk produced comes from small farms.

An additional part in the raw milk supply chain are **intermediaries - milk purchasers** - approximately 60 raw milk purchasers operate in the country. More than half are purchasers, some of which call themselves cooperatives, that re-sell raw milk to processors thus deepening the price difference for farmers between average market price and actual purchase price. But such cooperatives may be beneficial to help stabilise milk purchase price for farmers and control the quality of milk to some degree. However, even though

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higher degrees of cooperation in Lithuanian dairy sector are still rare, there are a number of cooperatives involved that purchase milk directly from farmers at competitive prices and further process raw milk and sell it themselves benefiting from short supply chain.

Additional value chain actors were identified as relevant and could be grouped under the actor called **Realisation Channels** some of which have quite reasonable significance, such as markets that are quite popular points of purchase in Lithuania. However, the markets are mostly administered through municipalities and some municipalities may charge quite a significant fee for a stand in a market that is burdensome for smaller farmers.

Supermarkets were also under this actor, since some do have sections of production from organic or smaller scale family farms, but at the same these sections may be misleading since a part of production can be from rather intensive agriculture farms and to be mistakenly thought of or even branded as from family farms. Similalry, restaurants and small shops selling farmers' goods were also be included under Realisation Channels.

Additional selling channels that are being used by farmers, but currently to a smaller degree are schools and kindergartens. This comes about mainly through market incentives of some **Municipalities** and MoA that encourage (facilitate) purchase of local production or organic production through green public procurement practices. During the stakeholder workshop discussions, it was pointed out that with stronger support from MoA and municipalities, schools and kindergartens could be an important channel for organic or local family farmers to sell their production and therefore would have a high influence on the dilemma. At the moment only couple of examples for such practises are available.

Consumers are also considered as a part of the network and do have an influence in the network through purchase decisions. During the workshop, it was discussed that the consumers currently buy mostly from the supermarkets and that makes it difficult for extensive farmers to compete. However, currently some trends can be seen that more and more people are interested in buying local production from local farmers. Nevertheless, there still is potential to make more informed purchase decisions.

Governance network

During the discussions with the interviewees and workshop discussants the knowledge and information flows were laid out (Figure 31). It turned out that quite active information exchanges relating to our dilemma are in a form of discussions and collaboration between the Ministry of Agriculture and most of the actors in our SNA map. These are other government structures, associations, cooperatives, large intensive farms, Agricultural Advisory Service and public institutions. MoA receives statistical information from Agricultural Advisory Service, Food and Veterinary Service, National Land Service and scientific/analytical findings Institute of Agrarian Economics. These information streams include data from small-medium dairy farms also. MoE also receives data from Agricultural Advisory Service. What is more, Institute of Agrarian Economics serves as a source of information regarding socio-economic tendencies in farming (incl. dairy) sector for government institutions, but a lot of this information is also available to public. For these flows to government institutions of state services to happen, obviously the info (various statistical info) from extensive farms flows either directly or through the work of associations, cooperatives and Chamber of Agriculture.

Furthermore, information also flows from large farms or through their representative associations or Chamber of agriculture to government institutions. These flows are important, as they may influence political decision making. Large farms often dedicate significant resources for representation through associations as well as direct participation. Other active information exchanges are happening among municipalities and extensive and intensive farms, public institutions, Chamber of Agriculture, Agricultural Advisory Services. Also, municipalities are making decisions and giving information to markets (see Realisation Channels) which are important actors for extensive farms to sell their production.

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Moreover, Agricultural Advisory Service is also an active actor in information exchanges since it shares (or makes publicly available) with and receives information from farms, and as mentioned before, public institutions and municipalities. Also it's worth noting that Chamber of Agriculture and Agricultural Advisory Service organises various training courses for farmers some of which are important for dilemma (e.g. organic farming courses).

Regarding flows of goods and services (figure 32), sources of services are mostly government organisations, institutions or government services as well as public organisations. Lithuanian Agricultural Advisory Service provides unpaid service and consulting on agricultural practices for all farmers (including small extensive farms), but also cooperatives as well as it can provide paid services, such as accounting, analyses of milk, soil, etc. State Food and Veterinary Service provides services (legal checks and consultation) regarding food and veterinary safety and health to farmers and also cooperatives/ purchasers/ processors but also chemical, biochemical, pathological and other analysis services. Meanwhile Chamber of Agriculture also consults farmers both small and large as well as cooperatives but to a smaller degree. Regarding cooperatives, all kinds of services are provided to their members (such as from helping to obtain inputs, pooling milk from a number of farmers and selling at more competitive price).

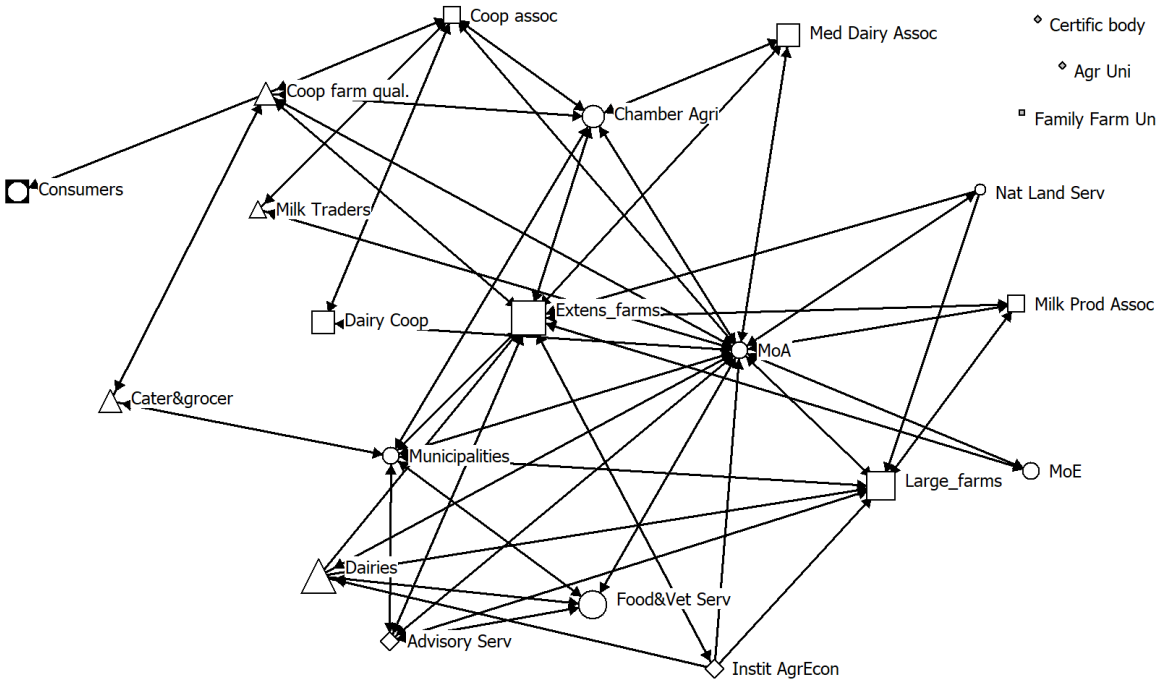

Figure 31. Knowledge and information flows in LT case study

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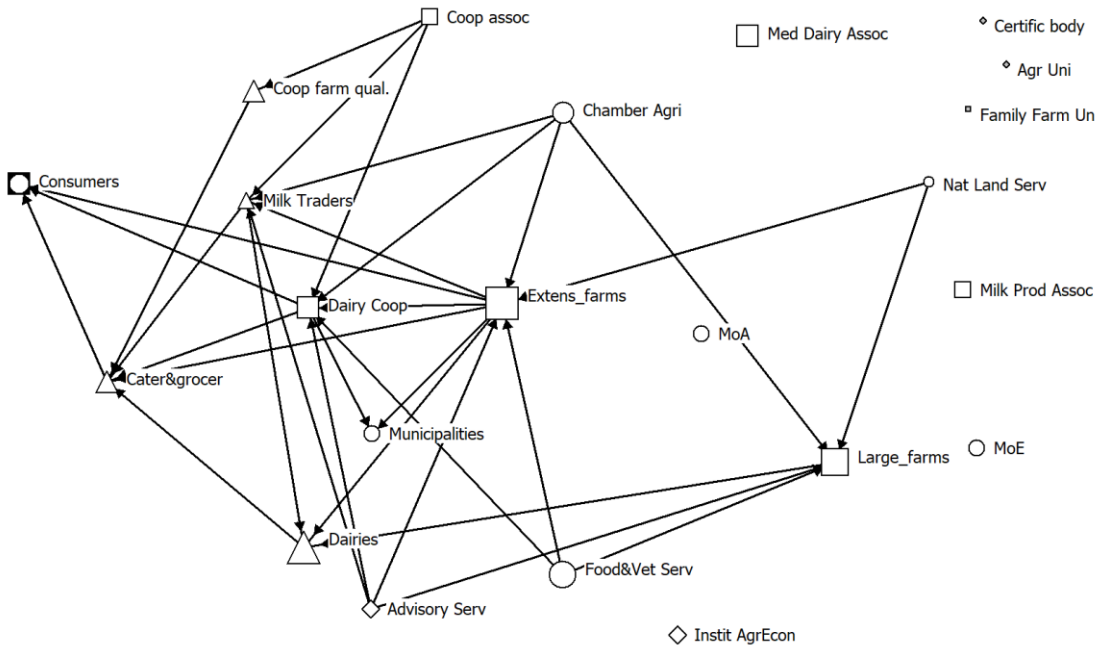

Figure 32. Goods and services exchanges in LT case study

Regarding the flow of goods, one stream of goods flow from extensive farms to consumers through realisations channels. While other farms, which do not process their raw milk sell it to purchasers who then sell it to processors. Other option is to sell to cooperatives for processing and selling to customers through them afterwards (incl. supermarkets/small shops and possibly kindergartens and schools). Another important goods flow is from large farms to purchasers or even directly to processors (thus at more competitive price).

When looking at controversial issues, Chamber of Agriculture – represents interests or intensive dairy farms, but should represent also small-scale extensive farms, according to their official function. The mechanism of their funding was considered faulty by one of the interviewees during SNA, because they run on government funds and thus may represent interests of certain stakeholders in the government (not without relation to dairy industry or large farms) more than actual needs of smaller dairy farms.

For large dairy farms and dairy industry, it is important and they communicate this message that competitiveness (intensity) of dairy sector should increase and small farm should disappear. However, it must be noted, that small-medium farms are very significant taxpayers (sometimes disproportionally) as was stated in the workshop, although this importance does not reflect in agricultural policy priorities.

Another controversial issue is regarding cooperation. The government envisions and sees a need for cooperatives to exists, but the policy needs to be more in alignment with actual situation. That is, that cooperation in Lithuania is in its initial stages of development, thus lower requirements, simplified procedures should exist.

During the interviews and workshop the decision-making mechanism was discussed. Even though the Ministry of Agriculture was identified as the main policy decision maker, it currently does not take many strong initiatives regarding environmental issues (and sustainability in general) in agricultural policy and thus the case study dilemma is not addressed. Except for their financial support for short supply chains and agro-environmental measures supporting extensive grazing practices. However, it was discussed that the ministry has very high potential to do so and should be the main actor addressing the dilemma.

It was also stressed by the interviewees, that The Chamber of Agriculture, as well as various associations and cooperatives also participate in the decision-making process by engaging in meetings and discussions with Ministry of Agriculture, providing suggestions and comments on the ministry's policy and initiative proposals. Furthermore, Institute of Agrarian Economics also has an important role in policy development.

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In addition, there are some lobbying activities, where various associations, Chamber of Agriculture, major milk processors and large farming companies play their part. There is a kind of push-pull relationship between large industrial dairy farms, ministry of agriculture and small-medium farm representatives. To put it simply smaller farms, need for proportional requirements, while large farms lobby for derogations. However, large farms have much higher possibility of better representing own interests. There was even one case, when a former minister of agriculture simplified procedures for certain support schemes, which resulted in large farms gaining. This decision was followed by sanction from EU.

There are other actors participating in the agricultural policy development activities or discussion meetings with the Ministry of Agriculture such as Agricultural Advisory Service, , but they do not actively promote the interests of the extensive farms, while some experts from universities or scientific institutes also participate and advocate for the support for extensive farms.

The discussants and interviewees have identified very few missing actors that could potentially influence the dilemma but do not actively address the dilemma to date. These actors are universities such as Agriculture Academy of Vytautas Magnus University, Lithuanian University of Health Sciences. Also, The Union of Lithuanian Family Farmers has been included, but its influence is not sufficient to make significant currently, but their aims and values represent the interests of small-scale family farmers.

The interviewees and discussants of the SNA workshop were asked to discuss what could be improved in the social network and current situation in order for extensive farms to maintain extensive grazing practices and be able to stay competitive in the market without the need to intensify the farming practices. They have identified several barriers that would need to be overcome in order to improve the conditions for the extensive dairy farms and address the dilemma.

First of all, it was pointed out that even though the government has some focus and some initiatives that align well towards sustainable agriculture, there is a lack of stable and continuous agricultural policy, strong vision, strategic goals and concrete plans to address the issues of and support the development of agroecology. Out of identified actors in the NET-MAP, the Ministry of Agriculture was pointed out as potentially most influential actor, which would need to define such goal and actively seek to implement them. Some focus areas for the Ministry of Agriculture could be to pay more attention to development and support schemes for short supply chains as well as Agricultural Knowledge and Information Systems. As well, during one interview it was said that that it would be beneficial to get experience from foreign countries where extensive dairy/meat farming is more developed.

Second of all, there is a need for stronger and more influential representation of the interests of the extensive dairy farms and sustainable agriculture (agroecology). Currently there are several associations that represent them, however, their representation is not strong enough to weigh down very powerful and effective lobbying and representation of the interests of big intensive farms. Again, the Ministry of Agriculture was pointed out as one actor which could help strengthening the associations. Also, several ways were identified to do so, for instance, there could be initiatives for capacity building but also financially supporting associations' administrative burden so that the resources could be focused on representation activities. Also, the need to support leadership development and empowering the associations to effectively raise awareness and advocate for the interests of the extensive farmers.

Furthermore, it was highlighted by the discussants that there is a need to strengthen formal and informal forms of cooperation among farmers. Even though there are currently many cooperatives which have different functions (dairy production, processing and re-selling), there is a lack of trusted and active cooperatives, which would be transparent and have a good reputation. This results in farmers avoiding to join and cooperate and mistrusting the activities of the cooperatives or farms involved in these cooperatives.

Moreover, it was discussed that currently it is much needed for some actors such as associations or cooperatives to support extensive farms more actively. This could be done by providing advisory, education and knowledge development services, for example, developing leadership and entrepreneurship skills or

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good marketing strategies. Also, to provide additional services for farms such as facilitating a possibility to hire temporary staff so that the farmers would be able to reduce their workload and improve social conditions, by getting the possibility to go on holidays, being able to get a sick-leave when needed, etc.

Finally, the discussants have pointed out the importance for municipalities to strengthen their role in raising awareness and implementing local extensive farm support mechanisms through public procurement.

To conclude, it can be stated that the network currently addresses the dilemma to a small degree only – in a form of market and several policy initiatives. Discussions regarding sustainable farming and new policy/market incentives are taking place more in recent years and even more with new CAP developments with some potential changes in the future. However, there is an urgent need for more favourable policy for extensive dairy farming practices, since environmental conditions during the last two years, on top of socio-economic situation have been the cause of number of small farms declining at unprecedented rates.

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12. LV - ORGANIC DAIRY FARMING

UNISECO Partner: BEF LV

Authors: *Andis Zilans, Kristina Veidemane*

SNA Option: 1 (3 interviews)

KEY DILEMMA: HOW TO INCREASE THE ECONOMIC VIABILITY OF CONVENTIONAL AND ORGANIC, LARGELY GRASS-BASED, DAIRY FARMS WHILE PRESERVING BIODIVERSITY IN GRASSLANDS AND WATER RESOURCE QUALITY? HOW TO ENSURE THAT ALL ORGANIC MILK IS PROCESSED INTO ORGANIC DAIRY PRODUCTS?

The case study

The dairy sector in Latvia is highly fragmented. There are:

- many small dairy farms with a small herd size,
- small number of large farms with a large herd size;
- many competing milk processors (c.a. 50 companies).

Several farm business models exist, but the most typical farm in Latvia is the “family farm”. There are an increasing number of highly modernised farms with market strategies oriented to global markets. Additionally, there are some small and diversified farms involved in direct sales who are developing new value-added niche products largely for the local market.

Dairy sector productivity is increasing, but remains comparatively low due to the fragmented small-scale farming structure. Fragmentation results in weak position of producers in the milk food chain (dominated by big processors and retail chains), and overly high competition in the processing sector - Latvian dairies have excess processing capacity. Although Latvian farmers produce enough milk for local consumption, 40% of milk sold in Latvia is imported due to the regional nature of the dairy market with Estonia and Lithuania. Domestic dairy product consumption is stable although organic dairy product consumption remains low.

Market incentives such as the quality label GREEN SPOON and BORDEAUX SPOON serve to support demand for products (including dairy) meeting higher quality criteria. However, these products do not meet organic food standards. The Latvian organic product label is the property of the Association of Latvian Organic Agriculture, but has low brand recognition and does not receive national support. Some non-formal local quality labels have been developed by individual farmers or groups of farmers in local municipalities or natural areas. Cooperation between small farmers is limited – farmer cooperatives are typically small and ineffective. Generally, good cooperation exists between conventional and organic farmer associations.

The dilemma being considered in the case study is related to the fact that although approximately 10% of milk produced in Latvia is organic only 38% is processed into organic dairy products. There are several reasons for the low percentage of organic milk processed into organic dairy products. The relatively low consumer demand for organic dairy products is a key factor responsible for a low percentage of organic milk processed as organic dairy product. Additionally, organic dairy farms are not distributed evenly across Latvia making milk collection problematic. Furthermore, only seven dairies produce organic dairy products in Latvia, although there are dairies in neighbouring countries (Lithuania, Estonia) that produce organic dairy products. All organic dairies in Latvia, except (Trikatas piens) process both organic and conventional dairy products. Altogether, there are about 50 dairies operating in Latvia. Organic milk produced on organic farms is collected by logistics companies that supply milk directly to dairies or by intermediary logistic companies that buy milk from farmers and sell milk to the highest paying dairies in Latvia or in neighbouring Lithuania and Estonia. The latter approach is intended to ensure farmers receive a higher price for their milk, whether it is conventional or organic milk.

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Farmers (both conventional and organic) can choose to which logistics firm/dairy producer to sell its milk. In some cases, farmers have several choices regarding whom to sell to whereas in other cases there is only one choice. Conventional farmers in most cases have several logistics companies to choose from, whereas organic farms may not have any logistic companies that are willing to buy organic milk either due to the distant location of the farm from the organic dairy and/ or collection of the small amount of organic milk produced by an organic farm is not economically feasible. In the case of organic dairy farms, even if there is a logistics company that can collect its milk separately from conventional milk, if the price offered for milk by a conventional carrier is higher than that offered by the organic milk carrier, the organic dairy farm can choose to sell its organic milk to the conventional carrier. In this case upon delivery of the organic milk to the dairy it will be processed as conventional milk.

In cases where organic milk is collected separately by a carrier, upon delivery of the milk to the dairy that produces both organic and conventional dairy products, the organic milk may nevertheless be processed together with conventional milk. Dairies producing organic dairy products typically purchase only as much organic milk from organic farms that it needs for the production of organic dairy products in a market with limited consumer demand. Typically, the organic dairies sign long-term milk purchase agreements with individual organic farmers or farmers cooperatives to ensure a reliable organic milk supply. The greatest challenge is ensuring that the demand for agro-ecological products continue to grow so that organic dairy producers are able to process all organic milk that is delivered to them. Presently, organic dairy products are insufficiently visible on retail market shelves alongside conventional dairy products. Additionally, retailers significantly differentiate the price between organic and conventional dairy products more so than is justified by the slightly higher production cost of organic dairy products.

The case study is relevant to the transition to agro-ecology in Latvia from the perspective of strengthening and expanding cooperation between relevant actors in the supply chain. To date, farmers have demonstrated good uptake of agro-ecological farming practices. The number of certified organic dairy farming operations has steadily increased and the share of organic milk production has grown. The supply of organic milk has outpaced dairy product production with the resulting dilemma that more than half of the organic milk being processed with conventional milk. This has occurred due to slow growth in consumer demand for organic dairy products. To ensure that existing organic dairy farms remain in operation and conventional farmers continue to transition to organic farming, it is recognized that there is a need to more fully involve all relevant supply chain actors in the process of growing support for organic dairy product consumption and production. This cooperation is particularly relevant in relation to the development of policy and market instruments to foster local consumption of organic dairy products and product innovation for the domestic and export market.

Actors

The actors identified as having a key role in the transition to more agro-ecological farming practices and/or in ensuring that organic milk is processed into organic dairy products are showed in Table 12. Even so, some of the identified key actors, although included in the network, have a largely administrative role (e.g. Ministry of Agriculture, Food and Veterinary Service, State Plant Protection Service, Control bodies NGO “Environmental Quality” and Ltd. Certification and Testing Centre) and do not have much leverage with respect to the resolution of the dilemmas. Consequently, for the sake of clarity in the depiction of the overall governance network (Figures 4 and 5) some of the actors operating under the Ministry of Agriculture are not included in the network diagrams. Alternatively, although organic farmers are key actors with regard to the dilemmas and are included in the network diagrams, their individual influence is rather limited.

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Table 12. The actors of LV case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	Authorities and Administration	- Ministry of Agriculture, Rural Development Support Department - Rural Support Service - Ministry of Agriculture, Veterinary and Food Department, Biotechnology and Quality Section - Ministry of Environment	Agri Min (5) Rural Sup Serv (5) Agri Min AE (4) Env Min (3)
	Farmers and farming organisations	- Latvian Agricultural Organization Cooperation Council - Farmers Parliament - Association of Latvian Organic Agriculture - Organic/ Conventional Dairy Product Producers/ Producer Associations - Organic Farmers	Farmers Council (4) Farmers Parlia (4) Org Farmers Ass (4) Producers (3) Org farmers (2)
	Agri-food value chain	- Milk Logistics Companies - Major retail/ supermarket chains*	Logistics (3) Supermarkets*
	NGOs, civic society organisations, local community representatives	- NGOs - Environmental	Env Org (3)
	Science, innovation, advisory, capacity building	- Organic Farming Certification Bodies - Rural Consultation and Training Centre - Agricultural University of Latvia	Certific Bodies (1) Consult&Train (3) Agri U (3)
	Consumers	- Consumer Organisations	Consumers*
	Media	-	-

*missing actors

Governance network

With respect to the network dilemma, the knowledge and information exchanges (Figure 33) between network actors are well developed as illustrated by the dense web of links. Several actors stand out as being focal points in the network in terms of their influence and number of links with other actors. The Ministry of Agriculture Rural Development Support Department and the Rural Support Service are most influential with respect to the overall direction of agricultural and rural development policy and support payments in Latvia, including for agro-ecological farming. These two actors are linked with most of the other actors in the network through a bi-directional flow of knowledge and information. Likewise, the Veterinary and Food Department, Biotechnology and Quality Section of the Ministry of Agriculture, which oversees issues related to organic agriculture and products as well as quality schemes plays a central role in the exchange of knowledge and information between actors in the network. It wields moderate influence

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within the Ministry of Agriculture in discussions regarding agricultural and rural development policy. The Rural Consultation and Training Centre has moderate influence within the network regarding information provision, training and consultations on good agricultural practices, including agro-ecological farming practices. Many network actors are reliant on the Rural Consultation and Training Centre for capacity building.

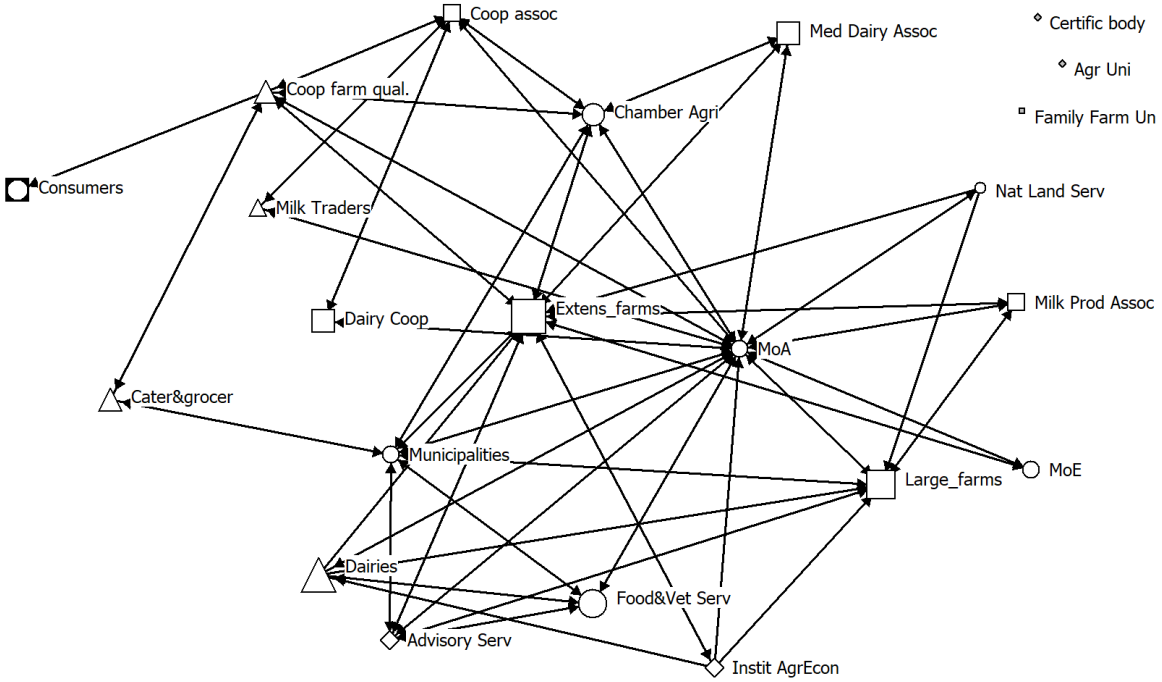

Figure 33. Knowledge and information flows in the LV case study

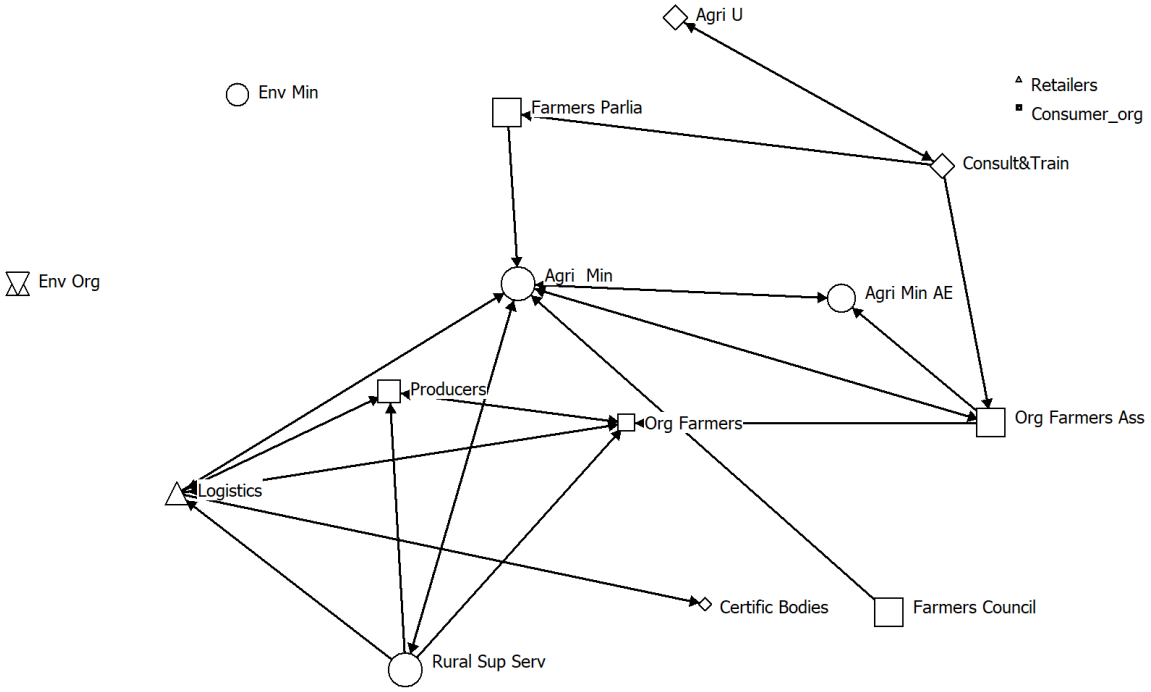

Figure 34. Goods and services exchanges in the LV case study

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The Latvian Agricultural Organization Cooperation Council annually signs an agreement with the Ministry of Agriculture regarding consultations concerning agricultural policy and thus has considerable influence. It is well-linked with governmental and non-governmental actors. One of the most influential farmers organizations is the Farmers Parliament which is linked with most actors in the network. Although this organisation represents the interests of all farmers with the Ministry of Agriculture, they are often seen as being more allied with the interests of conventional farmers. The Association of Latvian Organic Farming is the lead driver behind organic farming in Latvia. It is the issuing agency of the Latvian organic product logo. It organizes information events and trainings for organic farmers and is linked with many governmental and non-governmental actors in the network.

Dairy producers and logistics companies are strongly linked into the knowledge and information exchange network, but their influence is only moderate. The Ministry of Environment has moderate influence in the network on environmental issues related to agricultural and rural development policy and in relation to its control function in the implementation of environmental good practice on farms. A few environmental NGOs are active participants in the network and exercise moderate influence. The Agricultural University of Latvia through research and training work on agro-ecological approaches is moderately influential and linked with most actors in the network. It receives direct support from the Ministry of Agriculture and undertakes research and consultancy work on behalf of the Ministry of Agriculture.

The goods and services exchanges (Figure 34) related to the dilemma of increasing the amount of organic milk that is processed into organic dairy products, are less well linked although the Ministry of Agriculture Rural Development Support Department and the Rural Support Service retain a central role in network as do producer and logistics groups. The Veterinary and Food Department, Biotechnology and Quality Section of the Ministry of Agriculture and farmers organizations are less well linked with respect to goods and services exchanges. Dairy producers and logistics companies are strongly linked into the goods and services exchange network, but their influence is only moderate.

Both in terms of knowledge/ information and goods/ services exchanges the networks do not include major retail/ supermarket chains and consumer groups that could be supportive of organic farming and organic dairy product production. Although the network actors represent well the production or supply side of organic dairy agriculture, the supply and consumers side actors are missing from the governance network.

The identified key actors in the network have been interacting for many years and their mandates and positions on the dilemmas are known to one another. The goals of the key network actors differ as their mandates are different. However, there is no major disagreement regarding the need to increase the economic viability of conventional and organic farming in Latvia to make it more competitive at the EU level and that greater attention should be directed to increasing the environmental benefits or decreasing the negative environmental impacts arising from farming operations. A general understanding exists that environmental requirements cannot become overly burdensome to farmers so as not to make farming economically non-viable. Provision of public goods must not only be the responsibility of farmers, but also that of society. There is also a recognition by actors that agro-ecological measures that receive support need to be efficient and effective.

In Latvia, the transition to agro-ecology is as much about increasing the overall viability of all small and medium size farms as changing the mind-set of conventional farms regarding agro-ecological practices. More important still, the impetus for greater adoption of agro-ecological/organic farming practices in Latvia is dependent on an increase in the overall buying power of consumers (which remains low), recognition by consumers of the benefits of healthier eating habits and increased consumer confidence in the quality and health benefits of agro-ecological products. Perhaps most importantly, the transition to agro-ecological practices/organic farming is dependent on continued EU support to agro-ecological farmers through the RDP. In this regard, increasing the allocation of EU RDP payments to Latvia to more closely align with the average payment level in the EU would make Latvian agriculture more competitive with other EU countries and would strengthen the transition to agro-ecology.

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13. SE - DIVERSIFICATION OF RUMINANT PRODUCTION

UNISECO Partner: SLU

Authors: *Elin Röös, Kajsa Resare Sahlin*

SNA Option: 2 slightly modified (One farmer workshop, 2 individual interviews followed by a workshop)

KEY DILEMMA: WHAT ARE THE CHALLENGES AND POSSIBILITIES TO DIVERSIFY SPECIALISED RUMINANT FARMS (CONVENTIONAL AND ORGANIC) TO INCLUDE MORE CROPS FOR DIRECT HUMAN CONSUMPTION WHILE SIMULTANEOUSLY INTEGRATING MORE AGRO-ECOLOGICAL PRINCIPLES TO ENHANCE SUSTAINABILITY PERFORMANCE IN AN ECONOMICALLY STRAINED PRODUCTION SECTOR?

The case study

Swedish (and European) agriculture needs to move towards less environmentally impacting farming systems with a higher integration of livestock and crop production, and towards producing more crops for direct human consumption and less livestock. Considering this, a desired path for current livestock farms would be to instead of increasing animal numbers, reach profitability by diversifying their productions towards including more crops for direct human consumption. There is no general shortage of cropland in Sweden limiting this development and there is certain, and potentially growing, consumer demand for Swedish plant based products. There are, however, a range of other challenges for diversified livestock production, including climatic restraints in the northern and highland areas, limited sales opportunities for e.g. legumes, lock-ins into current production systems, limited investment opportunities and lack of suitable crop-varieties and knowledge of how to grow them. The level of cooperation on the market is additionally low and many farmers trying new crops and alternative production systems face lack of information, isolation in decisions-making and struggle to find appropriate seeds and advising services. The Swedish case study aims to increase understanding of these limiting factors and how they can be overcome. Farms participating in the Swedish case study will hence begin testing paths for diversification of their milk and meat producing units by incorporating more crops for direct human consumption.

The agricultural sector in Sweden is small, contributing only 0.3% to GDP and employing in total about 170,000 people (out of approximately 6-7 million). Rapid urbanisation affects rural areas where livelihood opportunities are diminishing in many regions and over 30% of farmers are over 65 years old. The financial viability of farming has progressively decreased which has led to animal production units becoming fewer, larger and more intense.

Dairy farming is by many actors – including farmers, farmer organisation, public agencies etc. - seen as the backbone of Swedish farming as is it represents one of the largest sectors in Swedish agriculture (together with cereal production) and is highly associated with several positive values such as landscape aesthetics, healthy foods, rural employment and cultural heritage. Also in organic production in Sweden, dairy is dominating; organic dairy make up 17% of all dairy farming in the country[16]. In general, organic production in Sweden is heavily dominated by livestock production – approximately 90% of the area that is certified for organic production is used for feed production[17].

The on-going concentration of animals to some parts of the country and the intensification of production have resulted in negative impacts on biodiversity due to reduced grazing of semi-natural pastures,

16 http://www.jordbruksverket.se/webdav/files/SJV/Amnesomraden/Statistik,%20fakta/Animalieproduktion/JO27SM1901/JO27SM1901_ikortadrag.htm

17 https://www.diva-portal.org/smash/get/diva2:943924/FULLTEXT01.pdf

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increased nutrient run-off causing eutrophication and a growing share of crop-land being used to produce feed rather than food. Today, about 2.5 million hectares of cropland exists in Sweden, out of which majority large part is used to produce animal feed. About 40% of arable land is temporary and semi-permanent leys used to produce grass and grass-clover silages which is the main feed source in both meat and milk production. Grains, faba beans, distillers grain, rape-seed cakes and soy are also common feed sources in Swedish milk and meat production.

Actors

Sweden has high costs of production, partially explained by high labour and infrastructure costs and high environmental and animal welfare standards, making it difficult for **Swedish farmers** to compete on the global market. About 70% of lamb meat, 50% of beef and 55% of cheese consumed in Sweden is imported. For beef, the share of imports of the total consumption is however decreasing, partially explained by a larger number of consumers being willing to pay a premium for Swedish beef. For milk and cheese however, this is not the case to the same extent. As a result of this, many farms struggle financially and profit margins are usually low. Many farmers moreover have high debt-to-capital ratios and large investments (often millions of euros) which result in lock-ins into current, possibly unviable production systems, making **banks** an important actor in this system. As a result of the poor economic situation, many farmers work full- or part-time off-farm. Moreover, many farmers also own forest which is often of significant financial importance for the farming company.

The CAP subsidies from the EU, channelled down to livestock farmers via the Board of Agriculture and the regional authorities are indispensable for the economic viably of Swedish livestock farmers. Hence, **the EU and its associated national and regional authorities** are very influential for on-farm decision making – both in terms of long-term overall investment strategies and in terms of more everyday practise on the farm (e.g. governed by national and EU regulations). Another influential actor for this dilemma is the Swedish **organic certification body**, KRAV, that develops the Swedish version of the organic certification and hence their regulations set the boundary conditions for what the organic farmer can and cannot do.

In parallel to the income from the public support system is income from buyers of meat and dairy (e.g. Arla, Scan and other dairy companies and slaughtering houses), making **the livestock industry** and important actor in this network. Price premiums for organic production paid by these actors stimulates more organic production (if it covers the additional costs) and the number of animals and hectares that are organically certified has increased during the past 20 years. Livestock industries also influence production through quality programs (e.g. Arlagården[18]) (but these seldom go much further than legislation), and through the type of contracts established. In general, the livestock sector in Sweden is dominated by a few powerful actors, and farmers are often left with no choice but to accept prices and comply with requirements because of lack of other possible buyers. Similar market conditions characterise several sections of the value chain; three actors alone control 94% of the grocery retail market, another three actors control the wholesale market and a few very large companies dominate the market for agricultural inputs[19].

There is also an ongoing trend that can be described as polarisation of farming into: a) industrialised, market-oriented units highly imbedded in a globalised commodity-based food system, and b) a move towards selling more directly to consumers and restaurants, focusing on niche-crops and markets and increasingly operating through informal networks that connects producers and consumers directly. Put simply, livestock farmers have the choice to either further intensify and grow, reaping the benefits of economy of scale and being able to compete on an international market, or move into more niche markets.

[18] https://www.arla.se/om-arla/vart-ansvar/kvalitet-pa-garden/

[19] http://www.konkurrensverket.se/globalassets/publikationer/rapporter/rapport_2018-4.pdf

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For many, especially those with high investments in infrastructure, the latter is challenging and currently such initiatives make up a very small share of the total market.

On the consumer side in Sweden, there is currently an intensive debate and movement among certain **consumer** groups and **NGOs** to reduce meat and milk consumption in favour of a more plant-based diets in order to reduce environmental pressures. After having increased continuously for decades, Swedish meat consumption was reduced in both 2017 and 2018 from record high levels. There is now a growing demand for more plant-based products, particularly protein products but also plant-based drinks and locally grown vegetables. Much of this demand is currently being covered by imported commodities, although Sweden has the biophysical possibilities to produce more of these products. As there is also a strong consumer trend for Swedish and local products in general, it is probable that there would also be a willingness to pay a price premium for these products among consumers. In some regions, Swedish cereal based cropping systems would additionally benefit from increased diversification, especially with leguminous crops which could function as an important break crop, fix nitrogen and provide flowering resources and also by the introduction of grazing animals for biodiversity preservation in regions where there is a lack of such. Important actors to enable the increased production of crops for human consumption (which for the large majority of farms is synonymous with diversification) are **mills and other buyers of crops.** Currently, large mills and grain companies only accept a limited range of crops (mainly wheat, barley, oats and rye) although there is a consumer demand for a larger variety which make these commodities unavailable for **larger food industries** and **retail.** The large buyers of crops are also highly influential for price setting and they rarely pay premiums for more sustainable production practices that fall outside of the established categories of conventional and organic[20]. The resulting outcome is a lack of incentives for farmers to grow a wider diversity of crops and to move towards farming methods that are more sustainable but also incur larger costs, e.g. increased mechanical weeding in conventional farming that reduce the use of pesticides but require more labour.

For the key dilemma of the Swedish case study, large food industries, retailers and large wholesalers are very influential actors as these largely govern what is made available to consumers. At the moment, there is a type of catch 22 as regards making a wider variety of domestically grown crops available to Swedish consumers - there is consumer demand for Swedish plant-based foods, but food industry is reluctant to make commitments due to uncertainties in prices, volumes and the possibility to charge for the added value. Hence **banks and investors** and mills are reluctant to make investments in production and processing facilities and farmers, although interested in growing these crops, have difficulties finding someone willing to buy the crops and hence hesitate to diversify their crop production. The extent to which this is valid varies, there are some examples where this lock-in has been overcome; a key example to our case study is the oat drink company Oatly which base its production on Swedish oats and rape seed and is growing rapidly due to booming demand from consumers. Similar developments are needed for other crops where there is consumer interest, e.g. different types of legumes mainly for processing into meat substitutes (e.g. lupins, grey peas, faba beans) and crops like quinoa and buckwheat. Further hindering farmers from increasing production of such crops is however the limited availability of seeds and other input goods, including appropriate machinery, which highlighting the importance of different **input companies** for increased diversification of Swedish crop production.

New crops and foods from alternative production systems are currently made available to consumers via a number of **small-scale food industries** and via the **public sector** procurement. There are a number of projects (a few very successful, e.g. Matlust) supported by public funding to stimulate this development.

The Swedish Food Strategy that was launched in 2017 by the Government and handled by the **Ministry of Industry**, has the overarching goal to reach "*a competitive food supply chain that increases overall food production while achieving the relevant national environmental objectives*". Many agriculture actors, including the Board of Agriculture and the **farmer organisations**, put a lot of emphasis on *the*

[20] Although there are examples, e.g. Saltå Kvarn and Lantmännens vänligare vete.

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competitiveness and increase of production but there is no discussion in the strategy of what types of foods that should be increased[21]. The strategy is therefore often interpreted as if all types of agricultural production in Sweden should increase, including livestock production. A perspective commonly highlighted by farmer organisations and other Swedish livestock representatives (and the Board of Agriculture) is that although one acknowledges that *livestock consumption* might have to decrease there is no need to decrease *production in Sweden* seeing as, 1) Sweden has a sustainable production in an international perspective and it would be a pity to decrease this type of production, and 2) Swedish conditions for farming favours livestock, especially ruminant production. Both these rationales can be questioned; several studies show the difficulty in reducing environmental pressures even with sustained livestock production, let alone increased - but this line of reasoning is very common in the Swedish debate on the future of farming in Sweden and a highly accepted viewpoint.

Tightly interlinked with the status quo described above is a polarised debate **in the media** in Sweden around sustainable consumption and sustainable farming. The need to decrease meat consumption is sometimes (but not always) simplified by media into messages like "*becoming a vegan is the most influential you can do to save the climate*", followed by recipes containing nuts and avocado that cannot be grown in Sweden. This can be highly provocative for Swedish livestock farmers as the messaging can be interpreted as a threat to their livelihoods. Farmer magazines additionally regularly contain articles that downplay livestock's effect on climate change and other environmental stressors. As a result, farmers are confronted by mixed-messages on the future needs for sustainable food production, making it difficult for them to know what to believe.

Other influential actors in this case study are those working with capacity building. The type and quality of advice that farmers get from farm **advisors** is important, as is the inspiration that advisors can give. There is a lack of advisors with a system perspective that includes new business models and profitability evaluations. In addition, knowledge regarding more uncommon crops (e.g. legumes for human consumption) is lacking among advisors.

What is taught at agricultural schools, universities and other **educational institutions** is naturally also highly influential on farmers and on advisors later assisting farmers. Lower level agricultural schools ("Naturbruksgymnasium") currently have to compete to attract students and several institutions do so by showcasing e.g. large machinery which is seen as attractive by many young people to a larger extent than e.g. agro-ecological methods that might be perceived as old-fashioned. The next generation of farmers hence risk meet farming education that tend to focus more on specialisation and rationalisation than e.g. diversification and integration of crops and livestock, although there are important exceptions. There are however, of course, also many actors not fostered by these kinds of institutions active within this social-ecological system. Many entrepreneurs, both in farming and in small-scale food processing, come from other sectors in society and from educational programs not related to agriculture (e.g. IT) who bring new ideas and energy that can be very important drivers of change within the system. Linked to the influence of schooling is **research** which of course is highly influential on many levels, creating and disseminating knowledge to many actors in the food system.

Finally, another important actor affecting on-farm decision making is that of **other influential farmers including the parents of the farmer** as farming businesses are often inherited. Traditions upheld in farmer communities are highly influential on the decisions that farmers make. There can be a strong social pressure not to go against views of parents and other family, neighbouring farmers and farmers frequently seen in media and on social media. Neighbours, friends, family members and influential farmers are also sources of information and knowledge sharing, which can both reinforce traditions and be a source of novel ideas.

[21] A plan following the strategy however sets high goals for organic production, by 2030, 30% of the agricultural area should be organically farmed and 60% of public procurement should be organic foods.

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Table 13. The actors of SE case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- EU Commission - Ministry of Industry - Municipalities	EU (5) MinIndustry (3) Municipalities (1)
	**Farmers and farming organisations**	- The farmer himself/herself - Influential farmers - Farmers Organisations	Farmers (4) Inf farmers (1) Farmers org (1)
	**Agri-food value chain**	- Seed/fertiliser/pesticide companies, breeding companies, etc. - Large food industries - Small food industries, restaurants/ local stores/local entrepreneurs, small scale processing - Retailers and large wholesale for the public sector - Livestock industries - Large mills and buyers of crops - Banks and investors	InputCo (1) Large food ind (1) Small food ind (1) Retail&Wholesale (4) Livestock ind (1) Mills (1) Banks (3)
	**NGOs, civic society organisations, local community representatives**	- Evironmental and sustainable food organisations	NGOs (4)
	**Science, innovation, advisory, capacity building**	- Farm advisors - Education (lower and higher education in agriculture, other university programs) - Certification bodies (eg KRAV; Svenskt Sigill) - Research	Advisors (2) Education (1) Certific bodies (1) Research (1)
	**Consumers**	- Consumers	Consumers (2)
	**Media**	- Media	Media (4)

*missing actors

Governance network

Most farmers sell their produce to one of the large dairy companies, slaughterhouses or mills. As was previously mentioned, a few large actors dominate the sector. Some farmers have the possibility to sell directly to consumers via e.g. on-farm stores or similar, or to small scale food industries or similar, but such possibilities are limited by availability of such facilities in proximity to the farm, consumer demand[22] and

[22] However, there is a quickly growing interest in such initiatives. https://dela.dn.se/NEpKeFZGOUZlVmdYc0lQUFAzaGlkbGQvNldNWTRhQ1hrNDN4MUNBcW5KSEJQOG5oWEg0anlOWXFVbWtnMElKYUJ0NXNLRWR2U0FrYzlGVDZWT1FVK2c9PQ?fbclid=IwAR2ucfrZHL_LiVDmu8QceKhF4yzSgMCmeaxR_NeYv2bBNZIi1EbfeIb57PU

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requires substantial engagement from the farmer. As was mentioned above, market concentration is additionally high along the whole value chain of Swedish food industry. Most of these large companies operate according to traditional business logic, acquiring food ingredients to lowest price on the global market, however, with certain (and varying) requirements regarding quality and sustainability. For example, Sweden's largest retailer controls over 50% of the market alone and hence has enormous power over what is sold, how food is procured and in controlling the overall discourse on sustainability in the farmer-industry-retailer chain[23].

The financial support that comes from the EU through the CAP is highly important for Swedish farmers. There are several support mechanisms that are targeted at livestock farmers directly (i.e. coupled-payments that e.g. support holding cattle), which can be beneficial for our key dilemma if this makes the farmer keep grazing animals for biodiversity conservation. It can also act against diversification if it leads to the farmer holding more cattle than needed for a suitable level of diversification on the farm. Another example is the support to less favourable areas in Sweden that does not include cereals or legumes but goat, potatoes, berries, vegetables, dairy, pork or egg. It is well established that current pillar 1 area-based direct payments are ineffective as regards most sustainability dimensions[24]. One specific problem is that they lead to increased land prices, hindering entrance of new farmers.

Support for diversification is currently weak in the CAP – for example, most Swedish farms already comply with the requirements of the greening measures - and developed for other reasons than the production of more plant-based foods[25]. Several support systems that promote organic and pasture-based production exist and it is important to sustain these. Although subsidies are currently very important for farmers, current set-up may decrease flexibility and innovation. Farmers often feel stressed by the complexity in all the requirements and the risk of making mistakes and being required to pay back the subsidies might decrease the will to test new crops and strategies. Additionally, there is unfair strictness in compliance to existing rules from farmers to commitments towards authorities and vice versa. Farmers are e.g. financially punished for not delivering applications on time while authorities can delay payments for several years without the farmer being compensated. This creates conflict and negative feelings from farmers towards regulating bodies that are further enforced by farmers experiencing rule compliance checks (on-farm control) as highly variable and arbitrary. Although the EU CAP sets the overall regulations and subsidy systems, the Swedish Board of Agriculture interprets the EU regulations etc. so there is some wiggling room here, which means that the Swedish Board of Agriculture has influence on the politics of farming in Sweden (more so in the coming CAP). So does the government that decides on Pillar 2 orientation and priorities and decides on the amount of national money to invest.

The money that flows from the EU to research and other initiatives is also important for our key dilemma – depending on the type of research and initiatives supported this can negatively or positively help overcome the challenges and barriers hindering diversification of ruminant farms. Likewise, the type of investments made by banks is crucial to steer developments in the desired direction.

As for knowledge and information, there are many connections between the actors. The farmers is in need of many different types of knowledge as regards diversification and agro-ecological farming practises as this involves cultivation of new types and varieties of crops and often new ways of selling the crops, acquiring seeds etc. This involves substantial requirements of ingenuity and entrepreneurship from the farmer. As for the practical aspects of developing a truly diversified cropping system including high-value (often new and uncommon) crops, advisors' knowledge in this area is limited which makes formal (e.g. Nordisk Råvara and Kalmar Ölands Trädgårdsprodukter) and informal farmer networks very important. These could be developed, and the advisory services also have to be strengthened.

[23] https://link.springer.com/article/10.1007%2Fs41055-018-0027-7

[24] See eg Peer et al 2019 A greener path for the EU Common Agricultural Policy, Science 365 (6452), 449-451

[25] https://www2.jordbruksverket.se/download/18.36b894651576a404e02f139/1474966108018/ra16_18.pdf

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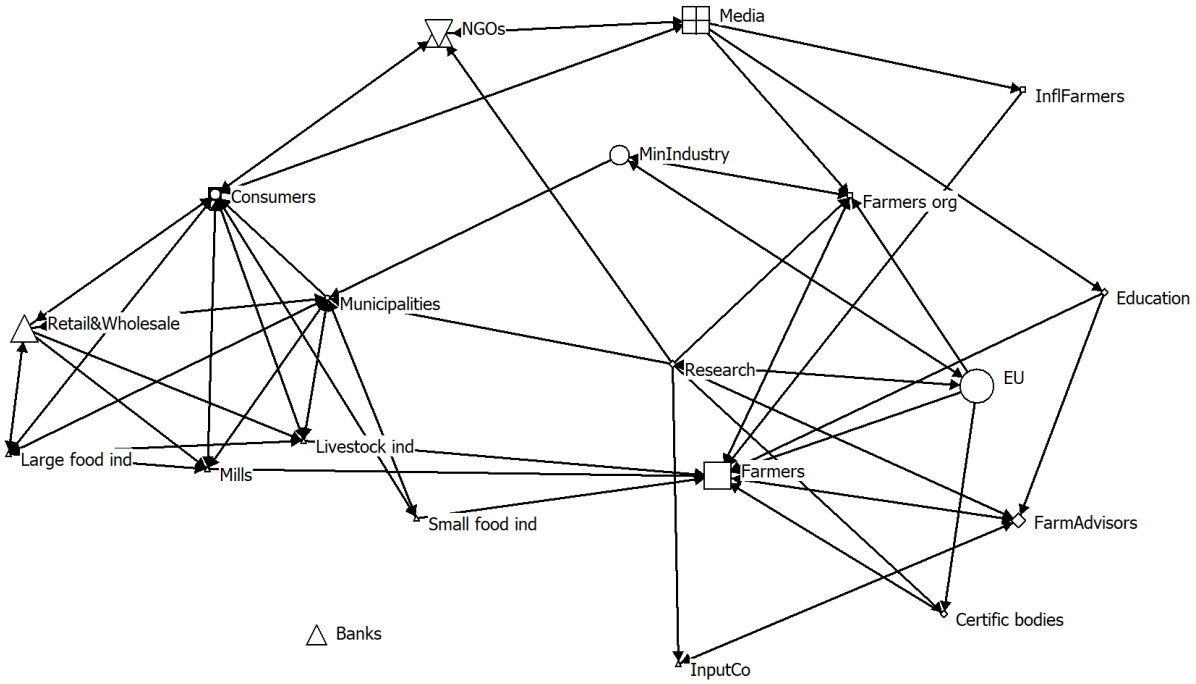

Figure 35. Knowledge and information flows in the SE case study

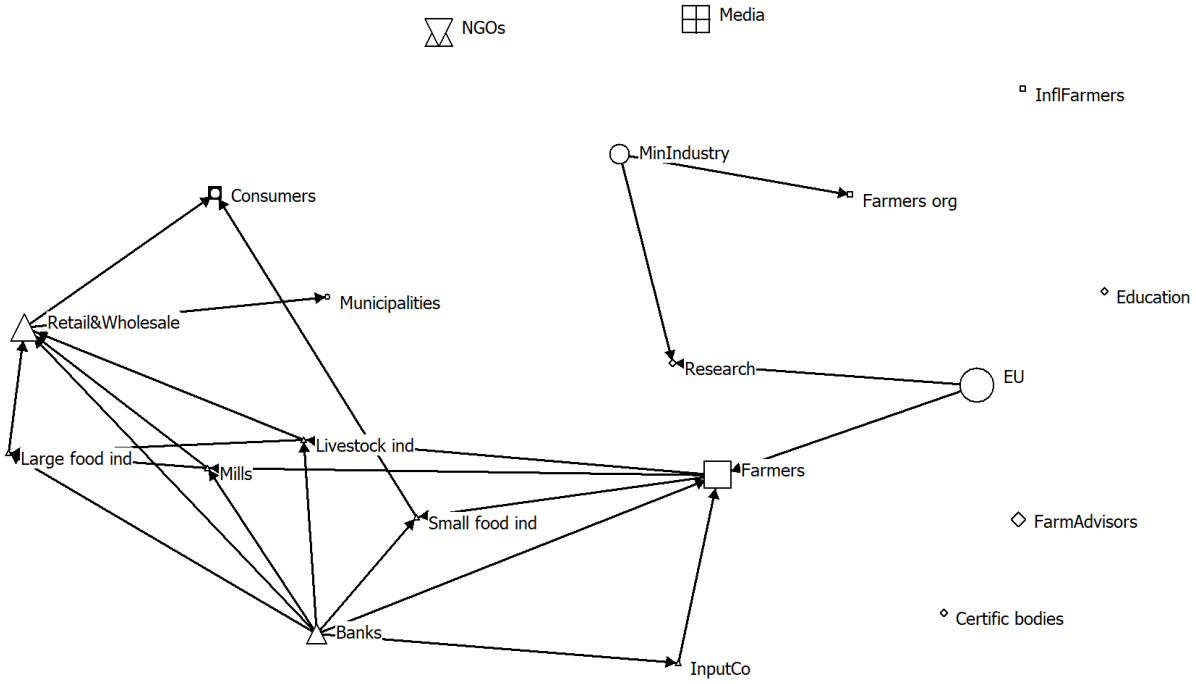

Figure 36. Goods and services exchanges in the SE case study

As for making more Swedish plant-based products available to consumers, a wide range of actors are important. The main sales route (mills – industry – retailers) requires multi-actor collaborations to overcome the current lock-in situation. Here it is important to develop risk-sharing strategies across the chain in order to avoid leaving the most vulnerable, the farmers, with the all the risk and that payments reflect the added value of farm diversification and agro-ecological methods. As the consumer interest for alternative sales routes, e.g. local markets, online informal networks etc. is growing rapidly - albeit from low levels - there is also scope for developing such strategies that are more efficient in terms of the time the farmer has to invest in selling products, the transports required and the number of consumers they can

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reach. There is also a need for more processing facilities, both locally to take care of crops directly from farmers, and regionally for processing and packing foods in order to make them available to consumers. There are several possibilities for new actors to engage here and investment capital is of course highly important.

As for the overall need to move towards diversification and agro-ecology there is currently no overall consensus on this – which presents one of the major tensions. While most actors see possibilities for this as a niche market, several influential actors see further specialisation and efficiency gains as the overall most important strategy for Swedish agriculture and food industry. This is based on the rationale that Swedish farmers operate on a global market where comparative advantages have to be made up of other factors than price. However, Swedish livestock exports are currently limited and Sweden is therefore the most important market for most Swedish agricultural commodities. Through marketing of the added values of Swedish meat (e.g. stricter animal welfare legislation), prices payed by consumers for Swedish beef, pork and chicken is currently substantially higher than the EU average equivalents. However, that is not the case for dairy products, especially cheese, which have not been marketed as Swedish as clearly. It is probable however that by similar marketing initiatives as those of Swedish meat, this could change. Therefore, some actors argue for the importance of preserving and enhancing the added values of Swedish farming and also argue that since Sweden is the large market for Swedish foods, focussing more on developing the added values and marketing these to consumers is a more fruitful way forward than for Swedish farmers to lower their sustainability standards to be able to compete on the global market. However, it is important to note that if Swedish farmers are to produce mainly for the Swedish market there is a clear limit to a sustainable expansion of production as the Swedish population can only consume a certain amount of foods, and consumption of livestock products in Sweden is already high. This touches another tension which was mentioned in section 2, namely the disagreement around the need to decrease the consumption of animal products which is not commonly supported although most actors understand this need. NGOs and the media, including a range of influencers on “both sides”, are actively engaged in this currently polarised debate.

Finally, another tension is the fact that income is very unevenly distributed in the food supply chain. Some of the retailers make large profits while many farmers are highly pressured and struggle financially.

What the farmer decide to grow on his/her farm is ultimately the decision of the farmer him/herself, but obviously largely determined by a range of factors, not least local conditions for growing different types of crops (climate, soils, infrastructure, presence of wild animals etc.), farmer knowledge, traditions, access to seed and other input, availability of machinery etc. Most important for this decision is however the possibility to sell the crops at a good price. Currently the Swedish agricultural sector is small and dominated by a few crops and a few large purchasers of crops. Selling common crops like wheat, oats, rape seed etc. is straight forward but might not be profitable for farmers located in less favourable areas. Here, more rare crops or varieties could be an alternative. But finding stable sales channels for such crops is currently difficult, although some interesting examples exist. Retailers were identified as very crucial actors to enable this development as they both control what is purchased and what is made available to consumers. Retailers could work more with local procurement but this introduces additional costs and efficient logistics chains have to be developed. Consumers, naturally, were also mentioned as very important actors, ultimately driving the demand for more Swedish sustainably produced foods. However, consumer demand is also to a large extent created by what is made available and what is marketed. Here many actors, including retailers, food industry, NGOs, public agencies and the media, are important actors. Several local authorities are, via public procurement (mainly the publicly funded school meals), already taking important actions to promote more plant-based foods and procuring these foods locally. Such initiatives could be scaled up and spread more widely.

Finally, farmers operate within the CAP and are heavily influenced by the regulations and support systems that this entails.

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement N° 773901.

The issue of diversifying livestock farms includes many important actors with many links between them. Although diversification of farms is central to agro-ecology and has been discussed substantially, few projects or initiatives have previously dealt with this topic in depth and from a systems perspective, at least not with the focus on increasing the production of plant-based foods. There is therefore currently no established network related to this key dilemma that could be easily described. To successfully overcome the main obstacles, several actors have to work together, and policies have to be directed to support this transition. There is a need of political leadership to shape a coherent and supportive policy environment to steer developments in the desired direction. This is heavily dependent of the how the EU CAP is set up, but member states have substantial freedom to develop strategies and make investments in the needed knowledge and infrastructure capacities needed. This includes increased support to holistic extension services, investment in research and needed processing facilities and infrastructure. Here banks and other investors are also very important. The private supply chain actors, especially the ones currently making profits, also need to take a larger responsibility to share risk with less profitable actors – here new private-public partnerships could be established to overcome some of the obstacles, for example, enabling new crops to reach large markets. The awareness among consumers have to be increased – this can be accomplished through information campaigns etc. and further development of alternative sales channels where consumers more closely meet farmers. In addition, food environments (including pricing of food) in which the more sustainable choices are the easy ones needs to be established.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

14. RO - HOTSPOT OF BIODIVERSITY AND HEALTHY FOOD IN TRANSYLVANIA AREA

UNISECO Partner: WWF

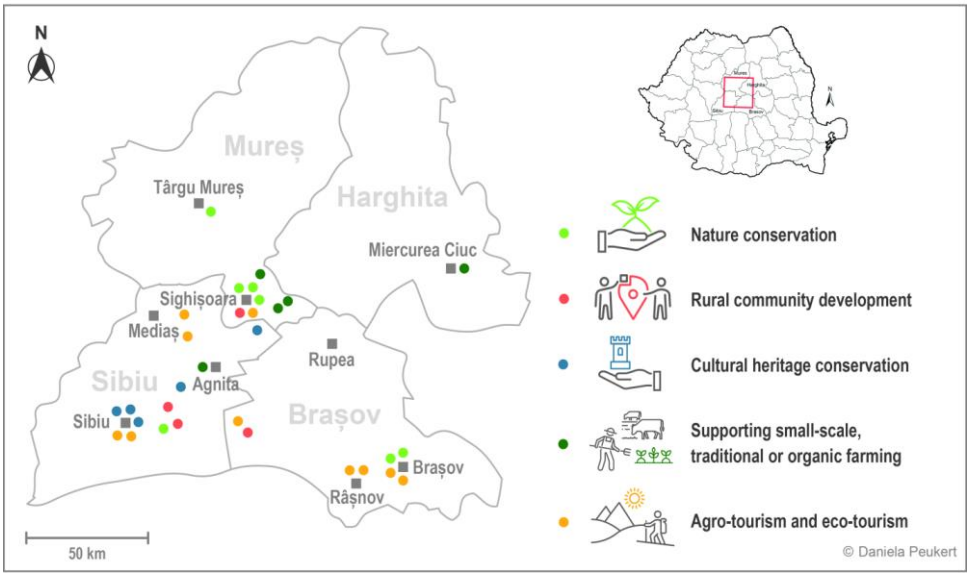
Authors: *Mihaela Frățilă*

SNA Option: 2 interviews followed by a workshop

KEY DILEMMA: HOW TO INCREASE THE ECONOMIC VIABILITY OF SMALL- SCALE FARMING WHILE PRESERVING THE CULTURAL LANDSCAPE AND BIODIVERSITY?

The case study

Case study in Romania will focus on Transylvania Highlands, an area caracherised by fragmented agricultural landscape, mosaic patches of semi natural grasslands created and maintained by traditional livestock grazing systems: cattle and sheeps, small plots of cultivated land with rather low intensity/extensive management. Transylvania's land cover mosaic results from the long-term application of low-intensity, and often traditional, farming practices. In addition to such practices supporting a diverse land cover mosaic, they also have other benefits for biodiversity. First, the input of pesticides and fertilisers is low, while the amount of manual labour to work the land is high. Many farmers still plough their land with the help of horses, weed their crops by hand, and manually cut hay for their livestock. While being labour-intensive, these techniques enable plants to spread their seeds and animals to survive within the cultivated land. Second, traditional silvo-pastoral techniques have created wood pastures, which host diverse ecological communities. In wood pastures, both forest species and grassland species thrive because of the combination of woody vegetation cover and grassland. Third, traditional livestock herding techniques are adapted to mitigate the risk of predation from bears and wolves. The use of guarding dogs, in particular, reduces livestock predation and thus facilitates a relatively peaceful co-existence of humans and carnivores. Traditional practices thus have many benefits beyond the creation of a heterogeneous land cover mosaic.The high biodiversity in Transylvania is tightly linked to the structural diversity and the specific management practices that can be found in that landscape. However, like many cultural landscapes, Transylvania is changing rapidly, which poses a range of challenges for sustainability in general, as well as for biodiversity conservation in particular.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 773901.

Figure 37. The CS area

Transylvania landscape in general, is dependent on continued traditional management by small-scale farming communities, and on cattle farming to maintain haymeadows. As long as traditional management provides decent local incomes, incentives will maintain the management and the farmers will preserve the habitats and associated species, as they have done for centuries. In terms of the structure of the local economy, farming is one of the most important sectors, alongside forestry and fishing, the processing sector (of forestry and farming goods, and textiles), and commerce (retail); constructions and the HoReCa (hotels, restaurants and cafes/bars) are also well represented in this area. Most of the economic activity takes place in and around towns and cities, with Sibiu, Brasov and Sighisoara as the most well-developed and dynamic urban centres, explained in big part by their status as touristic attractions (both to domestic and international visitors) and their connections to other regions and other cities in and outside the country created by a good transportation network. In consequence, most of the work opportunities are concentrated in these towns and cities, and people commute to work from the neighbouring villages. This is especially true for stable/long-term jobs, but in the case of farming - seasonal work is much more frequent. Farming is characterised here by family-owned households, managing lands of up to 5 ha and mixing cereal crops, fodder, orchards and livestock, mainly sheep and cattle (for dairy and meat). This is an area of High Nature Value (HNVF), where the combination of small plots of land used extensively for the production of various goods has led to a mosaic landscape of productive and natural features. Farms are mostly of the semi-subsistence type, and this is why seasonal work is frequent.

Actors

The table below gives an overview of the actors identified in the RO CS and their influence on the key dilemma.

Table 14. The actors of RO case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Agricultural institutions (Agricultural Payments Agencies) - APIA, AFIR - Local and regional authorities (City halls and County councils) - Local Action Groups	APIA (3) LR authorities (5) LAG (3)
	**Farmers and farming organisations**	- Farmers - Local Association of farmers	Farmers (4) Farmers unions (3)
	**Agri-food value chain**	- End user companies (guest- houses, local fairs) - Local associations of organic products - Cooperatives*	Value chain (3) Local assoc (4) Coop*
	**NGOs, civic society organisations, local community representatives**	- Agroturism and Ecoturism Associations - Environmental and food related NGOs	AEA (4) Env org (4)
	**Science, innovation, advisory, capacity building**	- Certification bodies for organic agriculture - Education centres (schools and after school centres) for learning about healthy food - Schubz - Universities and research centres*	Certific bodies (2) Educ centres (3) Research*

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Consumers

Media

Governance network

In terms of the flow of information and knowledge (Figure 38), people rely on "traditional" source of information, such as the town hall, employees of public institutions (such as the farming payment agencies) and local opinion leaders (informal leaders). Due to this information and knowledge gap (because the public institutions aren't update all the time accordantly) NGOs have taken upon themselves this responsability also to inform and empower local communities, as part of wider conservation projects for instance, and LAGs also have to ensure people are prepared to access the rural development funds they are managing.

Farmers, Farmers and Local Association are very knowledgeble from good experience perspective and they are a source of informations that we should be taking into account when we are setting trends and future planning at local level and national level. Education centres (schools and after school centres) are planting the precious seeds for the next generation, which are growing at this very moment and became the main source of information for the youths. Information and knowledge must be interlinked with social, economic and ecological dynamics and influenced by EU policy, global markets, national institutions and local leaders.

With regard to goods and services exchanges (Figure 39), producers do not have the capacity (including the fiscal status which is very difficult to obtain) and the infrastructure to store and process their raw material and sell finite food products, thus they tend to sell it to big, regional processors, usually at low standard prices, who develop their own branded product ranges which then reach regional and national shops and retails chains. Another method of selling/sourcing food is through intermediaries who buy foods in bulk like cheese, milk, meat, honey from the local producers and then travel to more distant urban centres to sell it at a premium or send it to export. The number and/or relevance of farmers markets and traditional food fairs, where producers can directly sell their goods to end customers, have been shrinking because of the expansion of retail chains, even in smaller towns. Direct sales to end customers is also a common practice, but non-fiscalised. HoReCa players do not make a habit out of sourcing food from the local level, although some newer small guesthouses in rural settings are trying to follow a new mindset and operation model where local producers have a role as suppliers and are esteemed as keepers of an authentic, localised know-how in farming which makes part of the cultural identity and which attracts interest from visitors. In order to develop the market for local products, environmental and agro-tourism NGOs have started in the last four-five years to organise "Transylvanian brunches", especially in the warm season – one-day weekend events marketed towards urban consumers, where a menu of local specialties is prepared and served by the local community in outdoor locations of valuable historical or natural significance.

Trust and collaboration are very weak in the region due to the social trauma left by the nationalized, collective agricultural system imposed by the communist regime. Associations exist, but in low numbers and they have been founded only to be able to comply with eligibility criteria in accessing agricultural subsidies through CAP; cooperatives, which could be regarded as an "upgrade" to associations, are missing. Due to this unwillingness to develop economic activities together, farmers are stuck in a regime of low productivity, with no means to add value to their raw agricultural output and create or access the market, and representing the weakest player in the supply chain. However, "informal" social bonds are strong and most people spend their leisure time visiting each other, while in times of hardship (in situations such as house fires or the passing away of dear ones) they help each other to overcome the losses or the economic

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strain (this is maybe the sole remaining custom of the old socio-economic support structures of “vicinities”, created and cultivated in each village by the Saxon who lived in the area until the instauration and spread of the communist system).

The most trusted actors in local communities are still the people who practice a traditional profession, such as the doctor, the priest, the teacher. People also trust and use as source of information the national mass-media (primarily national TV and radio), and when it comes to finding out about events/happenings of local relevance, “word-of-mouth” is the primary source of information.

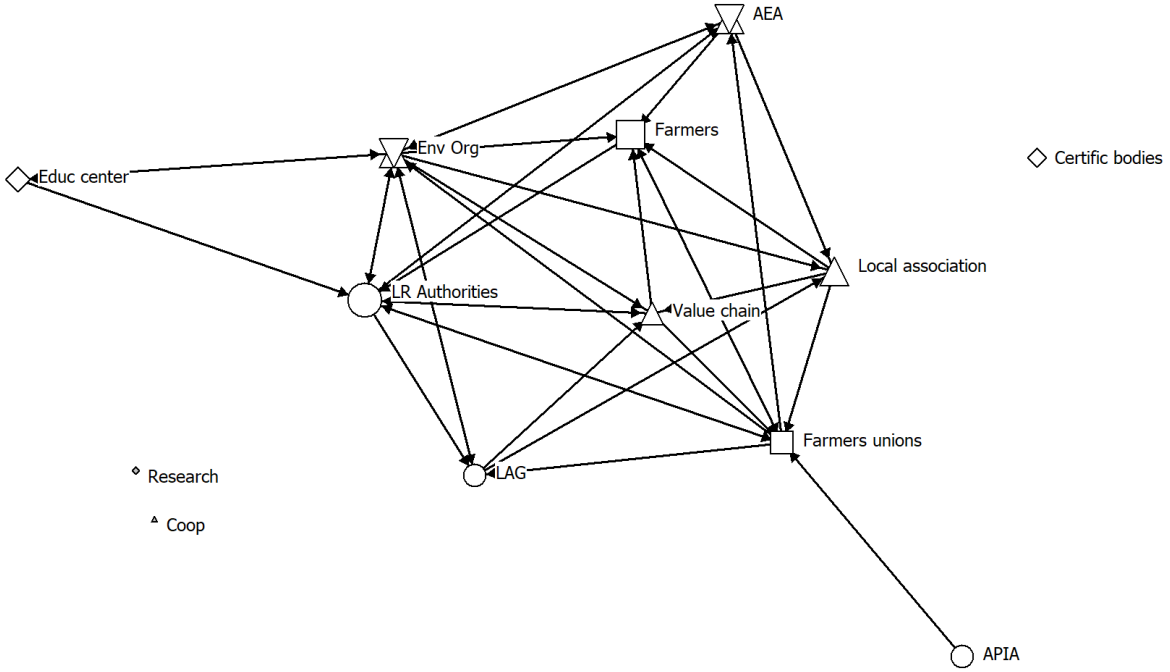

Figure 38. Knowledge and information flows in the RO case study

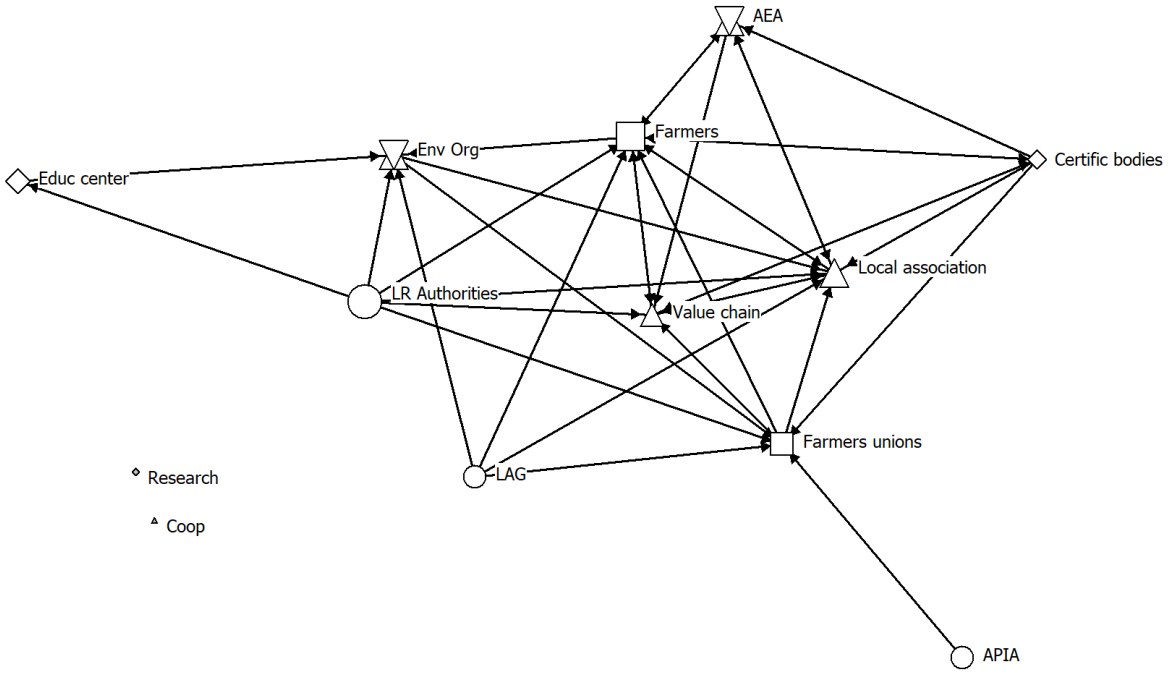

Figure 39. Goods and services exchanges in the RO case study

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The organizations which are active in the region have been running projects in the last 10-15 years to bring locals together, to build trust in associative structures and the opportunities they can bring, to connect them with funders and information streams, to directly invest in local communities (in ecotourism and food-related infrastructures/facilities and events, ongoing professional training, in market development), and to inspire them with best practice examples from other regions and other countries. But the change in mentality is slow, and the know-how to do things differently hasn't reached a critical mass yet. However, these active organisations know each other well, they are implementing projects in partnership and the whole system of "social and economic capacitation" is interlinked and well-immersed into local contexts. The LAGs and NGOs are also watchdogs in regard to changes in law at national level, the level of law enforcement locally, and local council decisions, and they pass this information to local communities and try to facilitate public participation to political decisions, thus nurturing a civic spirit in locals and more accountability in local authorities. They also act as constant and passionate promoters of the local natural and cultural values, the local produce, farmers and craftsmen to the "outer world" – the capital and bigger cities throughout the country and abroad, in mass-media, large fairs, conferences.

Another working relationship is between farmers/associations of farmers and agricultural payment agencies (APIA, AFIR), whereby beneficiaries of funds rely on agency employees to not only register their applications, but also help them fill them out in the correct way. This is reciprocal dependency relationship fuelled by the need for subsidies, on the one hand, and the ambition for a high rate of fund absorption coupled with a low rate of penalties for non-compliance/improper use of funds, on the other.

Most of the conflicts appear between active local organisations and public institutions, and tensions can arise also between members of the local communities and public institutions, especially town halls. All of these tend to stem from the lack of transparency in decision-making and from corruption. Frustration can also be caused by the fact that support measures and payments in the CAP, developed by public institutions, are not sufficiently adapted to realities and need and opportunities from the field, in terms of measure of equity in the sums allocated, cash flow/planning of payments, eligibility criteria, types of investments supported from public funds.

Moreover, funding provided for measures aiming at stimulating rural entrepreneurship and generating added-value in the community (e.g. Measure 4 or 6 of the NRDP) only cover part of the expenses incurred with the respective project and the grant is received as reimbursement (i.e. producers are supposed to have their own funds to cover the expenditures first) or as down payment only for beneficiaries able to provide equivalent bank guarantees.

The governance model is old-school and hierarchical, and predominantly unilateral/unidirectional: from public institutions to citizens. Decisions are being taken by people in positions of power with minimal public consultation or none whatsoever, and people have to abide by them. Information circulates through informal social channels, and if red flags appear then information has to be solicited from the public authorities on the basis of the citizens' right to access to information of public interest. Usually investments in public infrastructures – roads, public sewage systems, renovation of schools, renovation of historical monuments, etc – are being done in periods leading up to elections in order to generate the goodwill necessary for votes. As mentioned before, LAGs and NGOs play an essential role in informing the local communities of matters of common interest related to their field of expertise or project interest, in organising public consultations and representing the voice of communities in decision-making forums, such the local county hall councils.

In terms of the food supply chain, governance over its workings is controlled by intermediaries, processors and large retail chains.

EU incentives and global markets have created a favourable business and development environment, but where there is also a high risk of being squeezed out of the market by the more tenacious economic players who manage to acquire bigger plots of land, who have the cash flow to access and sustain public funding for investment, and also by players from abroad with bigger economic power and market penetration. A

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key barrier which could turn into a springboard for local development, if sorted, is the habit of farmers of working their lands by themselves, “in isolation”.

CAP is a major instrument in addressing the key dilemma especially in the context of rural development, where funds are tighter than the budget for direct payments. But in order for this to happen, small and medium farms have to be given a real say, and have to be prioritised in the allocation of funds on the principle of “public money for public goods”. The elaboration of the new CAP has to be done with an authentic participation of social and environmental NGOs, on the basis of the same principle, and the CAP has to include mandatory state-owned or independent communications channels and actors with the mission to properly spread correct information at the right time amongst the local communities, and to collect/register things that are not working, remaining gaps of information or training and feed it back into the monitoring and adaptation/improvement of the CAP. This mission was supposed to be exerted by the Farm Advisory Service defined by the European Commission, but in Romania this body hasn’t been created, and some of its prerogatives (the minimal information distribution) have been undertaken by the agricultural divisions of the county councils.

Public institutions must increase their focus on the development of infrastructure for collective storage and processing of agricultural raw materials in order for producers to obtain finite products with added-value; increased support for traditional selling modes would also greatly help in the economic development of agro-ecological systems (e.g. networks of small, independent and specialised shops that use and promote artisanal methods, focus on the quality and origin of products and help re-distribute profits at local level, in the community, and farmers markets).

The storage and processing infrastructure and the support to traditional types of trade should be addressed promptly and through an integrated vision, as they may be the key to a revival of local agriculture on traditional and sustainable grounds, to the preservation of the endangered artisanal know-how, and to the creation of a thriving rural economy. An integrated strategy would ensure that investments in rural areas are synergistic and funded on a principle of complementarity from various available funds (European and national) - not only CAP, but also other funds such as human capital, competitiveness, cohesion, SMEs, regional development.

Organizations and individuals listed changes that have marked the evolution of the social and economic fabric of farming communities, and their views of what might happen in the future. Looking at the relationships between those changes, one can draw chains of results or chains of weaknesses – e.g. the low profitability of small-scale farming is causing people to sell their land; buyers most likely intensify the newly purchased land to make money; as a result, some bird species that are adapted to low-intensity farmland decline, with ripple effects across the ecosystem (in short low profitability → selling of land → farmland intensification → bird decline). Another such example is on the attractiveness of a farmer’s life in rural areas and the real, widespread issue of the young migrating to cities and abroad in the search of a better life. Family farming is in real and immediate danger of disappearing as these homesteads and farms are being left derelict with cascading effects both in terms of biodiversity survival and rural social vitality.

All actors pinpointed on the network map have a role to play in the future too, in order to overcome the mentioned barriers and weakness chains, but efforts need to be intensified and the governance and public information systems have to be greatly improved. Missing actors listed in the table above also need to become part of this network to perform on the needs that others cannot cover and which influence the transition to a competitive/economically sustainable agro-ecology paradigm.

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15. UK - MIXED FARMING AND GENERAL CROPPING IN NORTH-EAST SCOTLAND

UNISECO Partner: James Hutton Institute

Authors: *David Miller, Carol Kyle, Kate Irvine, Inge Aalders*

SNA Option: 2 (3 interviews followed by a workshop)

KEY DILEMMA: PRODUCING PUBLIC GOODS WHILST MAINTAINING VIABLE PRODUCTION OF PRIVATE GOODS, AND SECURING ECONOMIC AND SOCIAL SUSTAINABILITY AT A FARM LEVEL

The case study

The case study represents sustainability issues relevant to the EU (soil degradation, climate change adaptation, animal welfare, environment pollution by pesticides). The farming production systems represented by this case study are relevant across the EU (i.e. mixed farming and general cropping). The agro-ecological farming practices used to address the sustainability issues are, for example: biodiversity support practices, nutrient budgeting, organic farming, permaculture and agroforestry. Farming contributes significantly to the attractiveness of Scottish landscape, evidence of which is recorded in surveys of visitors visitors and their annual expenditure in the region. There is a strong tradition of cooperation between farmers (e.g. machinery rings for mixed farming and general cropping). An example of an innovative policy is the Knowledge Transfer and Innovation Fund, supporting initiatives including environmental performance. The case study will provide an example of a process of transformation in its initial stage. The size of the case study area is is 291,826 hectares with 4,366 farms.

The network as a whole is subject to external drivers and pressures (i.e. political, economic, social). It operates in an open economy, with significant national and international exports into agri-food markets, and the area is one with a significant number of tourists and migrant workers attracted to the area for its economic and environmental benefits. For example, combined visitor nights was 2.63m, and £697m expenditure, to the area covered by the case study, with 'scenery and landscape' the top attraction for visitors in 2016.

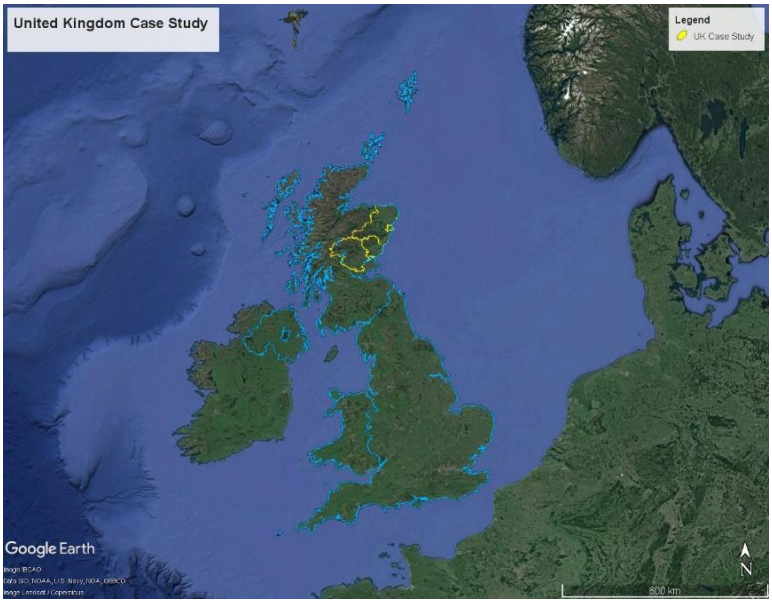

Figure 40. The United Kingdom Case Study Area.

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Actors

Based upon the three one-to-one interviews, the principal actors are:

i) the farmers and land managers who have responsibility for delivering the public goods and social outcomes, whilst remaining financially viable;

ii) the NFUS (farmers union in Scotland), providing advice to members, and lobbying politicians, Scottish and UK Governments, European Union, and public agencies;

iii) Scottish Land and Estates (membership organisation for land owners, generally upland and not farmers);

iv) research organisations, providing advice, evidence, tools (e.g. maps and data);

v) independent advisors;

vi) SAC Consulting (commercial consultancy dedicated to advising farmers);

vii) Soil Association (accreditation body, source of advice to land managers, advice and lobbying of policy, politicians and public agencies).

In discussion with the roundtable actors, the most influential actors was revised to:

i) **Most significant** - Retail/food and drink sector; most significant; which influences what is supplied, and its standards (e.g. consistency, quality).

i) **Second most significant** - Land managers; second most significant; which influence the delivery on-the-ground of the measures to achieve the balance in the dilemma.

ii) **Third most significant (equal)** - Banks and sources of financial capital; early adopters and pioneers in the process; local processing facilities; marketing groups; monitor farms (sources of best practice and sharing of knowledge); NFUS (farmer's union); Opportunity North-East; research organisations.

These actors operate within the production space defined by climate and natural resources, with perturbations due to weather; and, the policy environment at international, European and national levels.

A total of 31 actors were identified and scored as relevant to the dilemma in the case study (See Table 15). In addition, the press and media were identified as being influential under two separate headings of 'Influence can be very high, but can be negative (not influential towards the dilemma), and 'driving consumer sentiment'. These group into 20 actors which, within the categorisation of actors used by UNISECO, equates to 5: Agri-food value chain; Farmers; Science, innovation, advisory, Authorities and administration; and Civic society.

No actors perceived as key to achieving the dilemma are missing from the case study area. Those with national remits relating to the dilemma all have a presence in the area, which reflects the importance of agricultural activities within the area, and its importance to the wider Scottish and UK economy.

However, an actor which does not exist, but would have a role in contributing to influencing and achieving the dilemma is an equivalent of a machinery ring such as Ringlink for the forestry sector.

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Table 15. The actors of UK case study and their influence on the identified dilemma

	Category	Actors	Code (influence)
	**Authorities and Administration**	- Non-Departmental Public Bodies - Public Sector forest bodies - North-East Scotland Agriculture Advisory Group - Local planning department	Non-govPublicBod (3) PublicForestBod (3) NESAAdvisoryGr (3) LocalPlanDepart (3)
	**Farmers and farming organisations**	- Land Managers - Early Adopters - Monitor Farms - NFUS - Scottish Land & Estates	LandManagers (4) EarlyAdopters (4) MonitorFarms (4) FarmerUN (4) LandownerFarmerAs (3)
	**Agri-food value chain**	- Retail / Food & Drink sector - Banks - Local processing - Marketing Groups - Opportunity North East - Machinery Rings	Retail (5) Banks (4) LocalProcessors (4) MarketingGr (4) Investors_ONE (4) MachineryRings (3)
	**NGOs, civic society organisations, local community representatives**	- Environmental NGOs	Environmental NGO (3)
	**Science, innovation, advisory, capacity building**	- Research - Independent Advisors - SAC Consulting - Accreditation Body and Advice	Research (4) IndepAdvisors (4) SAC Consulting (3) CertificationBod (3)
	**Consumers**		
	**Media**		

*missing actors

A few brief observations about the actors in the case study, drawn from the Roundtable (12th September 2019) and interviews of individual actors (August 2019) are below, and others expanded in the sub-sections which follow.

i) **Public bodies** with responsibility, or leading forums of relevance are split into two groups. North East Scotland Agricultural Advisory Group (NESAAG) and non-departmental public bodies. NESAAG contributes is a major cross-sectoral forum that lobbies on behalf of the sector as well as providing support and advice both to the agricultural sector and the wider rural economy of north east Scotland. It is a central forum for bringing together most of the types of actors identified in the case study, and engaging with them all. Non-departmental public bodies include public agencies of Scottish Natural Heritage, SEPA, Scottish Water, Cairngorms National Park Authority, SASA and the Scottish Government animal health team, are perceived as influencing policy, and thus the context for addressing the dilemma. The nature of their roles (e.g. regulation, guidance, advice) means that they contribute to flows of both knowledge and information and the delivery of goods and services.

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ii) **Marketing groups.** Marketing groups include co-operatives, SAOS and member organisations, which may have land managers as members directly, or have intersections with the leading sectorial groups NFUS, and Scottish Land and Estates. In the case study, they also include machinery rings. Therefore, this category reflects the extensive connectivity of the Ringlink Machinery Ring and Aberdeen and Northern Marts cooperative.

iii) **Research.** Research includes providers of tools (written guidelines, software, maps) which are relevant to addressing the dilemma in the case study. Principal organisations represented within this category are the James Hutton Institute, SRUC and University of Aberdeen. There is an overlap with other actors listed as monitor farms which are identified as sources of advice and knowledge, principally based upon demonstration and trials.

However, responses from interviewees distinguished between the details in remits and perceptions of roles of individual research organisations. The principal training of farmers is by SRUC, drawing on research from its own research, that of James Hutton Institute and University of Aberdeen, and the wider academic and technical literature. James Hutton Institute as perceived as providing a conduit to Scottish Government policy teams of relevance to the dilemma through its institutional relationship, and University of Aberdeen through, for example, the Centre of Expertise in Climate Change.

iv) **Training**. The influence of organisations responsible for training staff or the provision of training materials (e.g. SRUC, LANTRA) is important in delivering contemporary expectations and requirements that deliver to the dilemma. There is evidence that industry and farmers have a need for more work based skills coming through, including apprenticeships, not only formal educational qualifications.

The three main drivers of change are Government policy (mainly Scottish Government), the food and drink (i.e. production, processing and retail) sector, and climate change. The food and drink sector within the area of the case study is well integrated, with the exception of weaknesses in local processing of some produce (e.g. pig meat, poultry).

Market forces are very influential, which means that the actors which collectively represent the retail sector (food and drink chain) is the most significant underlying influence on the dilemma. Farmers will consider most options if there is a credible prospect that they will be financially viable. Retailers have an influence on what farmers grow, set standards for high volume produce (e.g. non-conforming vegetables), and can influence environmental improvements. They can promote and encourage suppliers, traceability, corporate social responsibility, and green initiatives.

Several types of institutions have remits to influence public policy, of which environmental NGOs represent a significant actor group. These groups (e.g. RSPB, Scottish Wildlife Trust, Soil Association, National Trust for Scotland) and collectives which represent their interests (e.g. Scottish Environment LINK, North East Scotland Biodiversity Partnership), are effective in influencing policy actors. Their influences on those responsible for policy can be through commissioned research, consultations or promotion of a theme. These organisations can also have significant influence on the ground in relation to the delivery of public goods (e.g. Farmland Waders Project).

At the point of delivery to the dilemma are the land managers. They are absorbing, or reacting to, the pressures elsewhere in the network, impacting upon the viability of their business, or the type and extent of investment in delivering public goods. Some responses have been required due to regulatory requirements (e.g. farm practices in Nitrate Vulnerable Zones), others have emerged due to combinations of personal motivations, societal expectations, access to information (e.g. threats to pollination, risks to business due to degradation in soil health), leading to a continual process of innovation in farm practices and technology.

There are examples are evidence of new ideas from farmers which align with emerging consumer preferences (e.g. organic dairy enabling consumers to self-collect milk [Forest Dairy,

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https://www.forestfarmdairy.co.uk/]), and the role of care farming for the benefit of the community. These deliver public goods, while remaining viable, within their selected form of governance.

Governance network

For many types of activities linked to public investment there is a requirement for structures to be put in place for exchanging knowledge and information (Figure 41), including funding of research through many different channels such as: (i) European Union Horizon 2020 through data management on repositories (e.g. Zenodo), findings made available through project specific (e.g. https://uniseco-project.eu/) and centralised mechanisms (e.g. DG Agri EIP Service Point, https://ec.europa.eu/eip/agriculture/en/about/service-point-eip-agri-network); (ii) and the Scottish Government Strategic Research Programme (e.g. https://sefari.scot/research/case-studies).

Government initiatives aligned to EU policy or international conventions (e.g. Aarhus Convention on Public access to information) (e.g. Scotland's Environment Web, Scotland's Soils), and technological developments (i.e. provision of information on WWW and accessible on mobile devices), have led to a dramatic increase in the type and extent of information which is available to land managers and other actors in the network. Arguably, an increase in the opportunities to enter higher education and training since the 1980s has also contributed to the increased capability of land managers, and actors in general.

Knowledge and information flow through different media, and at different rates. Significant sources are the research bodies with responsibilities and products of relevance to the case study such as information about soils (e.g. maps from James Hutton Institute), guidance notes (e.g. SRUC), and tools (e.g. University of Aberdeen). Although some have been constructed with stakeholder and land manager inputs, most are flows to land managers and relevant public bodies.

Mechanisms for transferring knowledge about specific issues relating to public goods (e.g. disease to crops, soil and water management, biodiversity and field margins, new technologies) take advantage of two routes, one of which was highlighted in an interview with one of the actors:

> *"If you want to make things happen on the ground, you have to go through membership organisations".*

Key membership organisations with direct links to land managers, and which hold events (Open Farm Sundays, Monitor Farm Open Days, sectoral information days) or disseminate information through literature and sub-groups are NFUS, Scottish Land and Estates, SAOS, Ringlink and the monitor farms network, and research organisations (e.g. SRUC and James Hutton institute), and individual businesses.

Almost all of the types of actors identified in the case study hold some form of knowledge exchange sessions for their clients, members or affiliates, contribute to large scale events across many sectors held in Scotland but outwith the geographic area of the case study (e.g. annual Royal Highland Show; Scottish Game Fair), and have WWWsites, social media and paper-based means of sharing information.

Overall, the rights of people to information relevant to addressing the dilemma, and the means of its transfer, mean that there is a dense network of flows of information in multiple directions.

There is a broad range of goods and services which support achieving the dilemma (Figure 42). Flows of information and knowledge are addressed above. In this section the nature of information is that which would be a contractual service (e.g. purchasing information as part of the delivery of the farming practice), accreditation (e.g. organic status).

Scotland's Land Use Strategy (LUS) is a key commitment of Section 57 of the Climate Change (Scotland) Act 2009. One of its key aims is that land based businesses work with nature to contribute more to Scotland's prosperity. The provision of goods and services, food and environmental goods, is within the context of the environmental characteristics and constraints of the area, and various such as weather. The case study area includes all classes of land in the Land Capability for Agriculture of Scotland

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(https://www.hutton.ac.uk/learning/exploringscotland/land-capability-agriculture-scotland), from that supporting the greatest flexibility in crop production (e.g. fruit and vegetables) to mountain tops. Changes in climate will have impacts on the geographical distribution of the different types of land capability, thus the risks associated with existing farming practices as well as offering new opportunities.

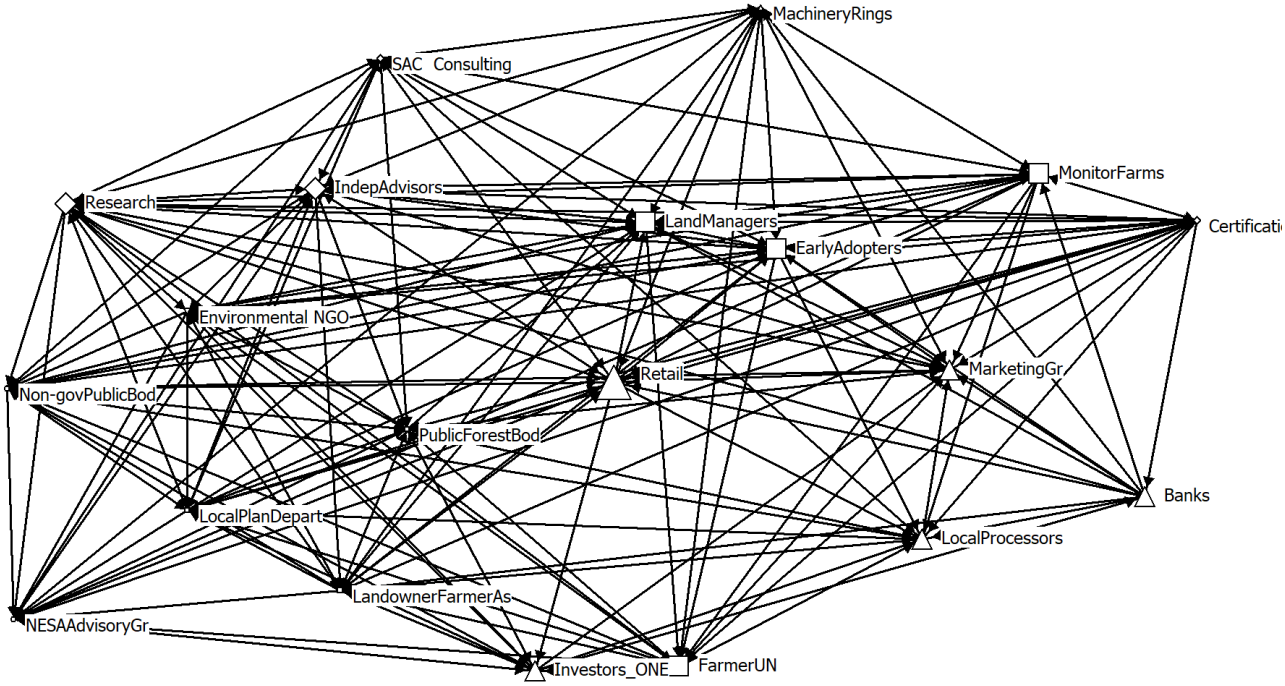

Figure 41. Knowledge and information flows in the UK case study

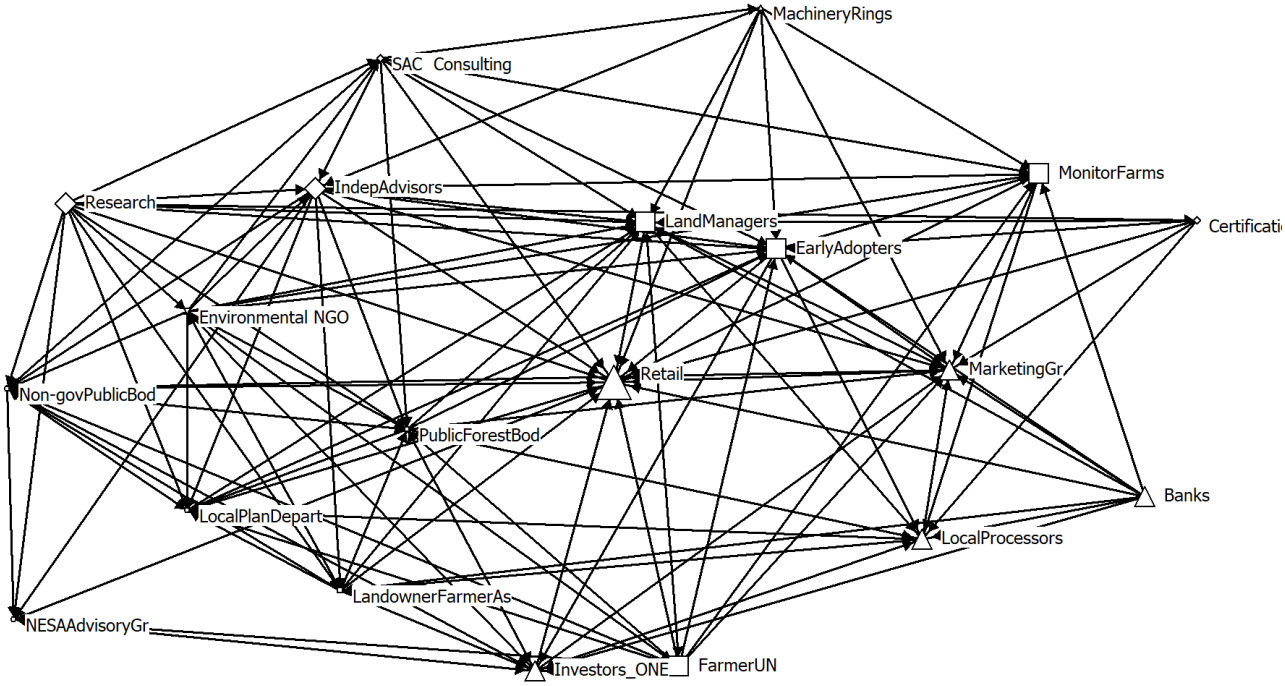

Figure 42. Goods and services exchanges in the UK case study

All businesses require financial services (e.g. loans, payment services). Actor with these responsibilities and functions have flows which are generally outward. The direction of flow is the same for regional bodies which provide financial or infrastructural support to initiatives which promote food and drink, agriculture

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and forestry in the region (e.g. Opportunity North East). Banks and financial services have considerable influence on the supply of goods and services if the actors have loans or equivalent exposure to financial support. However, they have limited influence over actors with no such financial dependencies (e.g. no loans).

In north-east Scotland, many food processors have closed. Those that remain have very significant roles in the supply chain, and are sensitive to the requirements of the retail sector. Key links in the supply chain of agricultural production are through marketing groups, generally constituted as cooperatives (e.g. livestock through Aberdeen and Northern Marts, cereals through East of Scotland Farmers). Although not exclusive pathways to markets these types of links in the network are key to the viability of many businesses. Actors such as land managers, early adopters and monitor farms also contribute to the marketing of goods either individually, collectively (e.g. through cooperatives) or by association with wider regional initiatives.

The functions of some actors lead to significant differences in the extent to which they influence achieving the dilemma between the provision of information and that of goods and services. For example, some actors have a central role in the provision of knowledge and information (e.g. NESAAG) but are do not have a contractual or regulatory role with respect to the direct provision of goods and services. However, some bodies will commission research or advice (e.g. Scottish Forestry, local planning department, land managers) and so have an inflow of services from research, independent advisors and SAC Consulting.

The representation of flows and influence covers a period of time up to summer 2019. Some new links and flows may be created with small changes in the pattern of the network. For example, Scottish Government initiatives to open access to land for farming, and forestry, such as a Scottish Land Matching Services to enable young people to enter the farming sector, starting in September 2019. This will be managed by NFUS, which is a new form of institutional arrangement. Other public bodies have roles in relation to 'starter farms' which includes forestry, thus including Scottish Forestry/Forest and Land Scotland in the delivery of goods and services. Such land management businesses could be amongst early adopters (e.g. of governance arrangements).

For some actors, the direction of flows changes between that for information and knowledge, and the provision of goods and services. For example, a role of monitor farms is in the provision of knowledge based upon operation experience to inform the approaches of other farmers. Therefore, it is identified as a source of information, and (generally) the flows are outward. However, in the delivery of goods and services it is assumed that these are of the farm produce and the impacts of its system and operation. So, for goods and services, it is a receiver of knowledge, advice, regulation (including advice from organisations of which they may be a member such as NFUS and Scottish Land and Estates).

Where the nature of the transaction between actors is unclear the entry is left as zero. For example, interactions between actors and membership organisations could include the provision of a service (e.g. legal advice, if offered), but most interactions are assumed to be the representation of the interests of the members and so in the advocacy, lobbying, contributing to public debate and consultations, and forums for networking and information sharing. Where this is believed to be the dominant role the links are represented within the matrix on flows of knowledge and information. However, that role is reflected in flows at a regional level (i.e. across the case study) between such membership organisations and authorities, administration or public/private sector initiatives which are categorised under the Agri-food value chain (e.g. Opportunity North East).

Trust and honesty between actors is key for the development of relationships between actors. Those relationships may be manifest in business transactions, extending support (e.g. financial, social) and treating information exchanged as credible and usable.

Farmers have high levels of trust with their advisors. Trade representatives and merchants (e.g. suppliers of feed), veterinarians and agronomists spend a lot of time with farmers, building trusting relationships between actors.

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Within the northern part of the case study region most farmers are members of a cooperative (Aberdeen and Northern Marts, ANM), which has approximately 5,000 members. ANM is one of the largest and most progressive farmer-owned agri-businesses in the UK. Its core business is livestock marketing, with interests in the land market, non-agricultural auctions, events, catering/hospitality industry (www.anmarts.co.uk/index.cfm). The principal market, Inverurie, is an important place for farmers to meet each other, providing access to a range of professional services, as well as a venue for offices of other actors (e.g. solicitors, bankers, vets).

The infrastructure provided for matching farmer needs with the supply of available equipment and knowledge are the machinery rings (e.g. Ringlink), which are membership organisations and operate with a high level of engagement between farmers. This also provides a social network built on trust and reciprocity, which delivers significant financial benefits (see also the findings from FP7 FarmPath http://farmpath.hutton.ac.uk/ FarmerCollaborationScotland).

On-farm shops and farmer's markets provide social infrastructures for one-to-one relationships to be developed, both with neighbours and supporters of local production, and including early adopters. These mechanisms for retail also provide opportunities for farmers to develop and try out new products (e.g. preserves) or means of delivery (e.g. 'veggie boxes'), and establish the credibility of farming practices with respect to their viability. They also provide channels of communication between actors, linking exchanges of information with the provision of goods.

Recognition and fairness are elements of the development of social capital. Although not necessarily linked to motivation for the original concept or its implementation, the early adoption of agro-ecological farming practices or demonstrated by monitor farms should have associated recognition of effort, and possibly significant barriers which had to be overcome, and fairness in treatment (e.g. financial support, retail sales, regulation), and credit for the delivery of public good.

Conflicts and controversial issues:

i) Conflicts between actors. Competition between actors for funding means the quality of collaboration may be poor. Aspects of this followed as a consequence of the financial crisis of c. 2008 when funds were in short supply. However, there is a trend of improving collaboration through mechanisms of cooperatives, and novel means of support emerging (e.g. peer-to-peer lending). Tensions exist as a consequence of pressures for land uses, most evidently between woodland and agriculture (arable or livestock). In relation to actors, there is some evidence of tensions between the NFUS and environmental NGOs or their equivalent. Conflicts relating to the dilemma, due to business decisions, are often trade-offs made by actors between maintaining viability and the delivery of public goods. These can vary between years and seasonally in response to other pressures (e.g. market value of produce, weather). Generally, these are short term, but could be longer term strategic decisions relating to the allocation of land, or whether to change system towards or away from accreditation as organic status.

ii) Conflicts between actors and achieving the dilemma. Pressures on land managers to meet the expectations set by the dilemma create issues of mental (ill)health due to stress. Therefore, there is a negative impact on social goods as a consequence of the demands placed on those at the forefront of delivering the public goods. The provision of food below the cost of production is, in effect, supporting a public good. However, cheap food could be considered a 'public bad', particularly if it is also linked to waste (e.g. public perception of low value of a product), and such production is with costs to other public goods (e.g. environmental).

iii) Conflicts between actors and achieving the dilemma created by their context – SAC Consulting are heavily influenced by the Scottish Government which pays for a significant part of the service provided (indirectly, through advice to farmers when bidding for support from the Rural Development Programme). Such influence is not necessarily in line with what the direct clients (the farmers) are seeking or paying for. Regulation, business and social contexts can create

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conflicts between actors and achieving the dilemma. Early adopters face considerable challenges, requiring an enabling business environment within which they can establish their viability together with delivering public goods. The design of certain regulations is a poor fit for circumstances in the case study, such as the '3 crop rule'; no carbon credits granted for trees planted more than 10 years; and cattle less than 1 year old is considered to be veal, and thus cattle older than 1 year old are penalised as being too large.

Controversial issues not discussed in the roundtable or with individual interviews with actors are: the role of genetically modified produce and changes in political structures (e.g. political independence of Scotland). Other areas of debate of significance are land reform. In particular, issues linked to land tenure have potential influences on decisions about long term investment by tenant farmers, notably in relation to woodlands and renewable energy (i.e. benefits may accrue to the land owner rather than the tenant, over the short or long term). Other aspects of land reform in Scotland are more beneficial, such as developing new mechanisms to support access to land for new entrant farmers (see note under Interactions, above).

Decision-making processes relevant to the case study operate within the international, European and national (i.e. Scottish) policy environments. At a Scottish level[26], the EU Common Agricultural Policy direct payments (Pillar 1) and Scottish Rural Development Programme (2014- 2020) (Pillar 2) influence decisions by public agencies (regulations and compliance) and farm businesses (uptake and delivery on-the-ground). Payment mechanisms are of particular significance when seeking to influence decisions at the level of the farm business.

> *"Difficult to engage with majority of farmers re environmental issues. The best way is through payments. Primary focus is production."*

At a regional and local level other policy responsibilities can be of influence such as planning (e.g. relating to renewable energy, water management). The overall approach of local authorities in tackling rural issues varies considerably across Scotland but Aberdeenshire Council, the largest authority in the case study was rated as being very good, with the role of the North East Scotland Agriculture Advisory Group as a forum for exchange of knowledge and information between policy, farming practice and research identified of particular importance.

Within the case study, relating to achieving the dilemma, there are different types of governance associated with different types of institutional functions and structures of actors.

Actors under public governance answering directly to elected representatives as authorities or administrations, e.g. local authority planning departments), who are in receipt of information and knowledge in the social networks, and set regulatory or policy frameworks which influence the delivery of goods and services for addressing the dilemma (including approving or prohibiting certain types of activity, e.g. renewable energy). This group also includes non-departmental public bodies (e.g. Scottish Natural Heritage, SEPA, Scottish Water, QMS) which are separate from government but are still accountable to government Ministers, albeit in different ways.

Actors with independent boards but public responsibilities which include research, innovation and advisory groups (e.g. James Hutton Institute, SAC Consulting, Univ. Aberdeen, SRUC). Each has Boards appointed by Government Ministers, or are privately owned but receive sufficient public funding that they are subject to many of the same regulations as government (e.g. Freedom of Information, reporting on carbon use and emission targets).

Actors which have membership organisation structures of relevance to the case study and dilemma, comprise individual private businesses as members of co-operatives, active in the agri-food value chain (e.g. Aberdeen and Northern Marts, members of SAOS), and environmental NGOs, categorised in the UNISECO

[26] Scottish Government, Rural Payments and Services (2018). https://www.ruralpayments.org/publicsite/futures/topics/customer-services/common-agricultural-policy/about-the-cap/

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scheme under civic society. Each has a very different form of constitution and aims, but both have mechanisms for inputs to decisions by members and thus a form of collective action. Each type of membership organisation has executive staff with authority to take actions on behalf of the members they represent, which could be farmers and land managers (e.g. NFUS, Scottish Land and Estates), businesses (e.g. ANM), NGOs (e.g. RSPB, Scottish Environment LINK).

Actors under private governance which answer to their own aims, responsible to their own ownership and management structures. Those will include farmers and land managers, agri-businesses and retail in the agri-food value chain. The decision-making processes of actors with private governance will take account of the specific forms of ownership (e.g. sole trader, company limited by guarantee with shareholders), status of land tenure (e.g. owner occupier of a farm, tenant or croft), and whether land is owned, leased or common.

Further analysis of the interviews and roundtable discussion is required to complete the understanding of the network, in particular the flows in relation to goods and services, and the strengths and weaknesses (i.e. resilience) of the network as a whole for achieving the dilemma.

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