



NOVASOIL

INNOVATIVE BUSINESS MODELS FOR SOIL HEALTH

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PIL Estonia



Project Consortium

N°	Participant organisation name	Country
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1 Background, focal question and needs

Review of pentagonal problem

- 1) Problem statement: *present the real and visible implications of soil health issues related to your case study*

Poor soils structure on production fields is result of intense tillage without use of manure. The crop rotation contains mostly cereals and little share of legume crops like red clover and pea. The seed production requires that fields must not contain any weed and other crops/varieties. Therefore intense mechanical weed control is used in addition to chemical weed control.

Water damages on crops on early spring or after heavy rainfalls is result of bad soil structure and insufficient melioration.

Ice damages on crops cold season is partially result of bad soil structure and insufficient melioration.

Drought damages on crops on late spring is partially result of bad soil structure and insufficient melioration.

Excessive nutrient content in soil on production fields is result of overuse of fertilizers. This rises risk of leaching of nutrients and polluting of water. It can cause also acidification of soils, what can impair some soil functions in longer perspective.

Poor biodiversity is result of small number of crop species in crop rotation, which contains mostly cereals and little share of legume crops like red clover and pea.

- 2) Climate change challenges: *aiming at healthy soils by 2050, what environmental challenges are expected?*

In Estonia, both hot days and tropical nights have become more frequent. Springs have warmed the most, with early spring arriving earlier and earlier. Precipitation in northern Europe has increased, especially in winter. In Estonia, both the duration and thickness of snow cover have decreased, with permanent snow cover melting 10 to 30 days earlier, depending on the region.

The average temperature in northern Europe will rise by 3 °C by the middle of this century compared to the average in the second half of the 19th century. Heat waves and torrential downpours intensify in Estonia. With warming, annual precipitation in Estonia will increase and floods caused by heavy rainfall will become more frequent. Winter precipitation in Estonia will increase, but summer precipitation will also increase. The duration of snow cover is shortening and spring floods are mostly absent - increasing the risk of spring droughts. Snowfall is generally decreasing, but it is possible that in some years snowfall will exceed even previous record years.



- 3) Societal and economic challenges: *how is society affected and/or impacts the problem?*

Under-funding of agricultural research, education and extension services hampers the production, dissemination and implementation of soil health information. Under-funding of agricultural science hinders the research needed to develop solutions.

Deterioration of soil functions in seed-producing fields reduces the efficiency of seed production and may reduce the availability of sufficient quantities of good quality seed on Estonian farms, thus undermining Estonia's food self-sufficiency.

- 4) Socio-technological solutions: *what sectors and technologies can tackle the problem?*

Research on soil, plant protection and plant nutrition will help to find solutions to the problems.

Education and extension in these areas help to collect, synthesize and disseminate relevant information. In addition, farmers need high quality and user-friendly software for planning fertilization, crop protection, crop rotation and soil management so that soil health is also ensured.

In Estonia, a soil monitoring system is in place to collect data about soil conditions, and various dynamic online maps have been produced based on the data - soil texture, moisture, nutrient content, suitability for crop production, etc.

A software is required which helps better to take into account weather conditions when planning field operations and thus reduce the adverse effects of field operations on soil health.

- 5) Barriers and needs: to pursue the solutions, *what is lacking? e.g. _ resources, advocacy, ...*

Adequate funding for research on soil, plant protection, plant nutrition and agrometeorology will help to find solutions to the problems. Also, stronger funding for education and extension in these areas. A strong agricultural advisory system needs to be built up, which also attaches importance to soil health.

The soil monitoring system is currently underfunded, which risks making the data set outdated and the mapping software out of date. Increased funding would help to upgrade the dataset and the software for online maps.

Adequate funding is required to build up an efficient agrometeorological network in Estonia with strong data analysis capabilities to help better take into account weather conditions when



planning field operations and thus reduce the adverse effects of field operations on soil health.

Focal question and the associated research needs

1. How to keep seed production fields free from weeds if soil tillage and chemical weed treatment both should be minimised?
2. How to build crop rotation to achieve minimal weed pressure and increase biodiversity?
3. How to choose best time for soil tillage and weed treatment depending on weather conditions, weed conditions, soil conditions and crop conditions?
4. How to guide farmers to optimise the use of fertilisers by the local agro-climatic conditions on the fields?

2 Policy mix

Abbreviations

- **AES:** agro-environmental schemes
- **CAP:** Common Agricultural Policy
- **ES:** ecosystem services
- **PUG:** Piano Urbanistico Generale, general urban plan
- **RDP:** Regional Development Plan

Table 1 Key elements of national **policy mix and institutional framework around soils**, based on and adapted from Rogge and Reichardt, 2016; Williamson, 2000.

Domains	Elements to consider	Description	Lickert (1-5)	
			P ¹	Q ²
O.Awareness and understanding	Definition of soil health	- The understanding of healthy soils is quite similar, that they should provide all ecosystem services, soil should be with good content of organic matter, favourable pH and with good productivity. Different opinions about dealing with soil issue in state level and local government level, generally the	5	3

¹ P=priority. Please rank accordingly to 5 point-Likert scale based on how these elements are currently considered in your case study: 1 no priority; 2 low priority; 3 neutral; 4 moderate priority 5 high priority

² Q=quality. Please rank accordingly to 5 point-Likert scale based on the current quality of the political process in your case study: 1 very poor -2 poor; 3 acceptable; 4 good 5 very good



		dealing with soil problems in governed is low and awareness about soil problems is little but some opinions are that state is already dealing with soils.		
1.Policy concern	Soils as policy priority	There are some regulations like water law and plant protection act that are also dealing with soils but generally the soil issues are not the priority on state level as there is not soil health law. Although the preparations are going on to generate the soil law and some answers are quite optimistic about that. Local government is not dealing with soils (they can deal in some cases with the questions like not allow to build on fertile agricultural land)	2	2
2.Policy agenda on soils	Political commitment towards soil health, non-binding targets	There are soil protection measures in agricultural support system, like measures against soil water erosion and protection of agricultural peat soils. Mapping of polluted areas but there is not enough money to remediate those areas. Natura 2000, forestry strategy are somewhat connected to soil. The spreading of every kind of information about soil friendly agriculture to the producers would improve the situation. There are development plans for agriculture and environmental strategies, also soil monitoring (small scale) financed by state (for agricultural soils)	4	4
3.Institutional environment	Binding national regulations on soil	<p>Soil health is promoted through CAP subsidies and eco schemes. Water Act and Plant Protection Act regulate the use of pesticides and fertilizers. Agricultural Registers and Information Board is responsible for the distribution of subsidies, including CAP funds and national support schemes.</p> <p>Organizations related to organic farming pay the most attention to the soil.</p> <p>From climate perspective, it is recommended to reduce livestock production, but soil fertility decreases because of the lack of manure.</p> <p>With the EU Soil Directive, it would be possible to move forward.</p>	1	1



4. Policy integration	Interactions between and within policy sectors	There is close cooperation between the Ministry of Regional Affairs and Agriculture and the Ministry of Climate, especially regarding carbon issues (sequestration and emissions) and ecological diversity. On the other hand, there is a concern that carbon has become too important and it is not known if big investments pay off in the end.	3	2
5. Governance structures	Levels of governance involved, roles and functions	Ministries as legislators and developers. Subordinate agencies (Agricultural Registers and Information Board; Agriculture and Food Board) control the implementation of laws. Local governments are not commonly involved in addressing problems related to soil. Indirectly, the soil can be affected by the land tax established by the local government, and a higher land tax may lead to the abandonment of environmentally friendly production practices.	3	2
6. Contracts	Property rights enforcement, land tenure agreements	<p>Soil condition is rarely taken into account in land rent contracts. More account is taken of the type of production - there are some owners who prefer organic production and others who definitely don't want to do it on their land. Some contracts prohibit using the lands as permanent or semi-permanent grasslands</p> <p>There is a clause in the lease of public land that the land must not be in a worse state at the end of the lease than before (no exact indicators are given). There is, however, a clear relationship between the fertility of the soils and the price of the rented land.</p> <p>Under the EU Soil Directive, the creation of soil passports was under discussion but was taken off the agenda. However, some Member States will probably still start to use it.</p>	2	1
7. Validation and coherence	Mechanisms in place to measure impacts and ensure compliance	A number of subsidies require soil samples to be collected. The aim of the support for environmentally friendly farming is to encourage the adoption and continued use of environmentally friendly farming practices, to increase biodiversity and landscape diversity and to raise farmers' environmental awareness. Payments will	4	2



	to targets and limits	<p>be granted for the implementation of the main or ancillary environmental management activity on eligible land during one calendar year. Subsidy applicants will be subject to requirements to reduce the use of plant protection products and to ensure good soil condition (crop rotation, legumes, green manures, etc.). Subsidy for liming is also important, and samples must be collected before and after neutralisation.</p> <p>Estonia has a long-standing monitoring programme on agrochemical properties of soils (1983) and also participates in LUCAS monitoring. Activities carried out in agricultural areas are also assessed under the CAP, in the context of the national strategic plans and in the context of research.</p>		
8.Non-governmental actors	Role of different actors and multi-stakeholder coordination	<p>Local authorities only deal with soil from a planning perspective, valuable farmland is not so easily built on. Research institutions are involved in creating and transferring information to producers. The Estonian Nature Conservation Fund is working on the issue of peat soils, and there are also a number of voluntary, non-profit organisations (NGO Northern Roots, Estonian Soil Science Society, Estonian Permaculture Society, Organic Club, Plant Protection Society). Urban gardening and community gardens are good examples of civil society.</p>	1	1
9.Allocation of resources and sources of finance	Available budget for soil health and blended finance	<p>Respondents were generally aware and also rated the awareness of beneficiaries high. This is also linked to the fact that the funds are not very numerous. As agriculture is very strongly linked to the weather and conditions have been volatile in recent years, subsidies are of paramount importance to producers and are being used.</p> <p>Subsidies encourage grazing, which is indirectly linked to soil and carbon sequestration potential.</p> <p>Awareness of private funds was low, but these are more related to forestry. However, carbon credit trading in Estonia is related to</p>	5	3



		reforestation and not to soil management for food production.		
10. Policy consistency with soil health	Synergies and trade-offs between policy sectors and towards soil ES	<p>- Food and biomass production. Policies have a significant impact on production. In part, they guarantee production. There are surpluses of cereals and milk. Other e.g. meat, vegetables have to be exported. Construction on farmland should be limited. Some land is afforested or goes to solar energy production. Measures to encourage the cultivation of legumes.</p> <p>- Water filtration, storage, groundwater protection. A large part of the area has unprotected groundwater, and serious restrictions should be placed on the use of both fertilisers and plant protection products. Legislation and protection are in place, but recently there has been a resurgence of intensification of production and the indicators are getting worse. Policies have little impact on the provision of this service. The Water Act should increase the nitrate sensitive area, because the condition of water bodies is still not very good. The Water Act does not take into account soil characteristics and therefore the protection of groundwater is weaker.</p> <p>- Ensuring biodiversity. This service is not a priority in the policies, only in nature conservation terms. Problems in large intensive fields. Payments for grass strips promote biodiversity. Recommendations have been given - Good Agricultural Practice etc. Policies have a big influence here, it encourages strips in field edges. The situation in Estonia is relatively good, although some habitats are not in as good a condition as they could be. The implementation of the measures is partly complicated by the control mechanism.</p> <p>- Acting as carbon reservoir. The measures will encourage practices to increase C sequestration. The CAP includes support for peatland protection. At the same time, peat extraction continues. It is recommended that peat soils should not be subject to intensive tillage. Support for environmentally friendly management is helpful. The policy favours but the C market</p>	1.5 2.3 3.2 4.3 5.1 6.1 7.1	1.5 2.2 3.2 4.2 5.1 6.1 7.1



		<p>motivation is even stronger here. The impact of policies is currently small. Measures need further development.</p> <ul style="list-style-type: none"> - Provision of physical environment for people (sport, culture, health). In Estonia there are places in nature for sport and health (forests, hiking trails, etc.), they do not need to be linked to fields. There is a lot of natural diversity in Estonia. . Too much infrastructure is being built. Too much building on agricultural land. Grasses have a cultural impact on the surroundings although for some they get on the nerves, especially if there's thistle inside. The state could do more to raise awareness - that there is a need for natural diversity. Policies have a major impact on the provision of this service. - Raw material source. Supports the production of raw plant materials. Policies have little impact on the provision of this service. - Archive of geological, geomorphological and archaeological heritage. This is governed by other laws which do not concern soils. It is a matter of nature and heritage conservation, not directly related to agriculture. There are regulations there. Certain areas are heritage areas, a little bit is regulated - where and who can walk through fields with a detector. Policies have a big influence on the provision of this service. 		
<p>11.Contextual factors</p>	<p>Enabling and disabling conditions</p>	<p>Stimulating. Subsidies, cultivating a mindset that values soil health, promoting sustainable lifestyles and production, the desire to live in a non-polluted environment, legislation at national level and directives at EU level, raising awareness among farmers and the rest of society, organising events that value soil condition (Northern Roots).</p> <p>Hindering. Past beliefs that did not value soil health; lack of awareness of the importance of soil and what to do to ensure</p>	<p>2</p>	<p>2</p>



		soil health, insufficient cooperation between forest and agricultural soil management, excessive bureaucracy.		
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3 Policy directionality

Aim of this section is to assess how existing instruments (regulatory and economic) put in place by the national policy mix are able to support business models for soil health. Policy instruments constitute the concrete tools to achieve overarching objectives and are usually associated with specific goals, i.e. the intended effect of instruments on the medium-long term. Furthermore, policy narrative are defined as the key words and concepts that express the political understanding of a problem, i.e. soil health.

3.1 Instruments

Table 3 Assessment of **policy instruments** (adapted from Rogge and Reichardt, 2016)

PRIMARY TYPE	PURPOSE TYPE		
	Supply	Demand pull	Systemic
Economic instruments	RD&D* grants and loans, tax incentives, state equity assistance	Subsidies, feed-in tariffs, trading systems, taxes, levies, deposit-refund-systems, public procurement, export credit guarantees	Tax and subsidy reforms, infrastructure provision, cooperative RD&D grants
Regulations	Patent law, property rights; land tenure;	Technology/performance labels and standards, prohibition of products/practices, application constraints; public procurement	Market design, grid access guarantee, priority feed-in, environmental liability law Information
Information	Professional training and qualification, entrepreneurship training, vocational training, advisory	labelling programs, public information campaigns; consumers organizations	Education system, thematic meetings, public debates, cooperative programs, clusters



PRIMARY TYPE	PURPOSE TYPE		
	Supply	Demand pull	Systemic
Economic instruments		subsidy	
Description*	<p>Environment friendly production eco plan Main activities:</p> <ul style="list-style-type: none"> • crop rotation and cultivation of leguminous crops; • use of certified seed (15% cereal seed); • glyphosate restriction; • winter vegetation (30% of eligible land); • soil samples and fertilization plan; • grass strips (flowering strips); • education. <p>Additional activities: additional water protection (50% winter vegetation); promoting pollinators; promoting field birds (not mowing permanent grassland) -support from CAP</p> <ul style="list-style-type: none"> - <i>who is the target of this instrument - farmers</i> - <i>does this instrument serve to implement an EU objective - yes</i> - <i>is this instrument based on obligations of result or of means – obligations of means</i> - <i>what are the sanctions in the event of non-compliance – subsidies can be decreased or canceled</i> - <i>does this instrument directly or indirectly target soil health - directly</i> 		
Economic instruments		subsidy	
Description*	<p>Basic income support payment Agricultural land to be used for agricultural activities. Agricultural activity is defined as the use of agricultural land for agricultural production (crops, livestock, etc.) and the maintenance of agricultural land in a condition suitable for grazing and cultivation.</p> <ul style="list-style-type: none"> - <i>who is the target of this instrument - farmers</i> - <i>does this instrument serve to implement an EU objective - yes</i> - <i>is this instrument based on obligations of result or of means – obligations of means</i> - <i>what are the sanctions in the event of non-compliance – subsidies can be decreased or canceled</i> 		



	- <i>does this instrument directly or indirectly target soil health - indirectly</i>		
Economic instruments			infrastructure provision
Description*	<p>Support for land melioration. (Investment support for the development and maintenance of agricultural and forestry infrastructure)</p> <ul style="list-style-type: none"> - <i>who is the target of this instrument - farmers</i> - <i>does this instrument serve to implement an EU objective - yes</i> - <i>is this instrument based on obligations of result or of means – obligations of result</i> - <i>what are the sanctions in the event of non-compliance – subsidies can be decreased or canceled</i> - <i>does this instrument directly or indirectly target soil health - directly</i> 		

3.2 Policy narrative

Current policy intervention is operational and farmers have to obey rules. Otherwise, their subsidies will be reduced. Even heavier outcome may be reduced access to financial markets due voluntary schemes adopted by banks if policy requirements are not filled exactly. Both ways may push farmers to more precisely follow rules. From other side market pressure to reduce production costs pushes farmers to be very creative and not always on soil favour. Higher market price for soil-friendly produced goods may be even higher motivator, but this requires extensive marketing towards society.

The policy instrument “Environment friendly production eco plan” involves obligation to use at least 15% certified seed from all seed used on supported land. METK Case Study is certified seed producer METK SK. Certified seed producer’s (incl. METK SK) customers should use less pesticide compared to those who use uncertified seed on wider area. Also, nutrient uptake from the soil should be better. And the uptake of carbon and nitrogen compounds from the air should be better, with more of these compounds being retained in the soil with plant residues. Thus, the use of certified seed should have a positive effect on soil health. In conclusion, the production of certified seed by METK SK is a business model that supports soil health and this support measure encourages this business model.

Recommendation to policy makers is to:



1) require wider use of certified seeds in Environment friendly production eco plans, especially for crops and varieties that promote soil health, it helps to reduce the need for pesticides, reduce the need for tillage, have good nutrient uptake capacity, are able to transfer carbon and nitrogen compounds from the air to the soil. This would also provide guidelines for plant breeders.

2) support the use of seed of the species/varieties described above.

In the Table 2, the last two policy instruments support the production of certified seed in the METK SK and thus their business model, which among other things will support the health of their customers' soils.

In the policy instrument “Environment friendly production eco plan” is required to use winter vegetation (30% of eligible land) a grass strips (flowering strips). These requirements encourage seed markets for crops that overwinter well or could be used to create flowering plants. These are also elements that support soil health.

Recommendation to policy makers is to encourage and support:

- 1) breeding of the above-mentioned varieties,
- 2) research of plant species for the above-mentioned purposes, and
- 3) composing of the recommendations for use of these species and varieties.

These measures are addressed to ecosystem services for soil health:

- provide food and biomass production in agriculture;
- absorb, store and filter water and transform nutrients and substances, thus protecting groundwater bodies;
- provide the basis for life and biodiversity, including habitats, species and genes;
- act as a carbon reservoir.

Table 3 Description of the policy narrative (based on Lehmann et al, 2020)

Policy narrative (and scale of action)	Policies and incentives in place	Land tenure and contracts	Management strategies applied	Soil functions interested	Ecosystem services addressed
Local, national	environmentally sound management eco-plan, Basic income support payment	part of the land is rented but the conditions do not stipulate soil management.	Crops and seed production, reduced and plough-based tilling, crop rotation, lack	Primary productivity, carbon sequestration, habitat	- provide food and biomass production



			of organic fertiliser	provision, nutrient and water cycling	act as a carbon reservoir
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4 Mapping exercise

4.1 Synthesis of the value mapping

Aim of the value mapping is to understand level of awareness of and purpose towards soil health as framed by the business model (Barth et al, 2015).

Looking at the business model, please describe the following elements:

a. Value proposition

- **What are the causes of degradation?**

Poor soils structure on production fields is result of intense tillage without use of manure. The crop rotation contains mostly cereals and little share of legume crops like red clover and pea. The seed production requires that fields must not contain any weed and other crops/varieties. Therefore, intense mechanical weed control is used in addition to chemical weed control.

Water damages on crops on early spring or after heavy rainfalls is result of bad soil structure and insufficient melioration.

Drought damages on crops on late spring is partially result of bad soil structure and insufficient melioration.

Excessive nutrient content in soil on production fields is result of overuse of fertilizers. This rises risk of leaching of nutrients and polluting of water. It can cause also acidification of soils, what can impair some soil functions in longer perspective.

- **What are the socio-technical solutions proposed (BM)?**

Raising awareness of the importance of soils would make it possible to raise the price of production and, at the cost of additional income, to increase the land fund, which would make it possible to diversify crop rotation and integrate grasses and legumes to a greater extent than today. Adequate funding for research on soil, plant protection, plant nutrition and agrometeorology will help to find solutions to the problems. Also, stronger funding for education and extension in these



areas. A strong agricultural advisory system needs to be built up, which also attaches importance to soil health.

- **Why do soils matter in the BM?**

Soil is the farmer's main means of production, a factory which, if in good condition, enables efficient, economical and sustainable production.

b. Value creation and delivery

- **What soil ES are targeted by the business model? (list based on soil strategy)**

Provide **food and biomass** production, including in agriculture and forestry - Seed production is not directly food production but it is the basis for it, and the same applies to biomass.

- **What soil ES are not provided / neglected?**
- **absorb, store and filter water; transform nutrients and substances, protect groundwater**

Growing winter crops helps to keep the soil covered for longer periods of time and supports soil structure, but ploughing for mechanical weed control and the use of pesticides to grow clean forage does not support groundwater protection. There are many ways of looking at this issue - having vegetation is better than nothing and environmental requirements limit the over-use of pesticides but intensive production is not an activity that directly supports a given ecosystem service.

- **provide the basis for life and biodiversity, including habitats, species and genes;**

A limited number of crops does not support natural biodiversity.

- **act as a carbon reservoir;**

Cultivation of peat soils, low organic fertiliser availability and regular ploughing do not support carbon storage in soils.

- **provide a physical platform and cultural services for humans and their activities;**

Open landscapes offer scenic beauty but the land base is not directly usable for wider public recreational activities.

- **act as a source of raw materials;**
Difficult to attribute to a given business model
- **constitute an archive of geological, geomorphological and archaeological heritage**
Difficult to attribute to a given business model



- **Public/private - who can benefit from that values?**

The Seed Centre is a state-owned enterprise, and its beneficiaries are different groups in society.

- **What trade-offs emerge? Are the causes addressed?**

The production of quality seed is vital for food production but the process involves a number of techniques that deplete soil properties. In a market economy, especially in agriculture where margins are low, price plays a major role and it is difficult to offer a competitive product if the activities that improve soil condition led to higher cost prices or significantly lower yields.

c. Value capture

- **What soil ES are targeted by the incentives?**

In Estonia, the best support for the functioning of ecosystem services provided by soils is provided by the **Environmentally sound management eco-plan** (beneficiaries are obliged to carry out the following activities: nitrogen balance, crop rotation and leguminous crops, use of certified cereal seed, no use of glyphosate-containing plant protection products, restriction on the use of plant protection products, beneficiaries must participate in training courses and take soil samples from the beneficiary fields at least once every five years). This incentive support the following ES:

- provide food and biomass production, including in agriculture and forestry;
- absorb, store and filter water; transform nutrients and substances, protect groundwater
- provide the basis for life and biodiversity, including habitats, species and genes;
- act as a carbon reservoir;

In addition, there is the basic income support, the purpose of which is to use agricultural land for agricultural purposes. This incentive mainly supports food production only, as there are no specific restrictions on production and soil health is not a factor.

4.2 Solution mapping synthesis

Answer to the following questions is to be found in the table 4 below, where solutions are synthesized and placed in a timeframe of pathways.

- a. What innovations and changes are we looking for?
- b. What regulatory and policy conditions would we need?
 - What regulations (binding or not) and resources (new incentives) are needed?
 - Are there some contradictions between tools and/or policies?
 - What could be the effect of the soil monitoring law?



- What contractual solutions and terms and what kind of guarantees are needed for business model implementation? (e.g. certification)
- c. What resources could facilitate the change?

The most impactful change would be a new way of thinking and valuing economic profitability instead of yields. Good management of soils can significantly reduce input costs, and lower yields can lead to higher productivity.

4.3 Pathways mapping

Based on what discussed above, complete the table below (i.e. not all categories might be applicable, in case not please write n.a.). If relevant point emerges also indicate what trends and divers as well as activities and resources might be needed.

Table 4 Pathways mapping

	Short term (up to 3 years)	Medium (3 - 7 years)	Long term (after 7 years)
INNOVATIONS			
Regulations and binding policies			
Incentive instruments	Subsidies for reduced tillage	Usage of recycled fertilizers	
Contractual solutions		Supply chain contracts.	
Infrastructure		Investment support for composting equipment	
Product			
Services planning /		Recycled fertilizers producers and consumers community	
Technology technical /	Investment support for reduced tillage equipment		



Technology farming techniques	/			
Institutions				
Actors' configuration				
Coordination mechanisms and partnerships		Partnership for matching pasture offers and herders		
RESOURCES				
skills, knowledge, R&D		-Platform for matching pasture offers and herders -Lack of knowledge how to choose and qualify the equipment for reduced tillage		
DRIVERS: social habits, economic, environmental		Economic, environmental drive		

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