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Managing land as a commons to promote sustainable agricultural practices

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MANAGING LAND AS A COMMONS TO PROMOTE SUSTAINABLE AGRICULTURAL PRACTICES

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Résumé : L'accès à la terre est une préoccupation croissante pour les agriculteurs en Europe. L'accès instable et à court terme est un frein aux investissements et aux pratiques agroécologiques au sein des fermes. Plusieurs ONG européennes ont formé un réseau, *Access to Land,* qui acquiert des terres agricoles pour les agriculteurs en situation précaire ou pour de nouveaux intrants. Elles visent également à maintenir la capacité nourricière des terres agricoles. Le réseau favorise la gestion des terres comme un bien commun, pour qu'elles répondent aux besoins régionaux sans compromettre les besoins des générations futures. Ce mémoire se base sur l'étude de sept ONG du réseau pour illustrer comment l'accès à la terre peut servir de levier pour la promotion de pratiques agroécologiques. *Access to Land* promeut un changement de paradigme agricole en sélectionnant des fermes à soutenir selon des critères de certification, de taille, d'éducation, de distribution, etc. Ils mettent en place des contraintes sociales, économiques et environnementales pour les agriculteurs et communiquent sur l'évolution des fermes aux parties prenantes. Dans le cadre du travail effectué pour Terre-en-Vue, une association belge, ce mémoire développe également un cadre pour encourager les pratiques agroécologiques à partir d'une auto-évaluation et une analyse de durabilité menée par des pairs. Le processus est basé sur des indicateurs identifiés avec des agriculteurs, comprenant l'échelle parcellaire, de la ferme et régionale.

Abstract: Access to land is a growing concern for farmers in Europe. Short term, unstable access to land is an impediment to on-farm investments and agroecological practices. Several European NGOs have formed a network called *Access to Land,* which acquires agricultural land for farmers in precarious situation or for new entrants. They also aim to maintain the sustainable use and feeding capacity of land. The network promotes the management of land as a commons, implying that it meets regional needs without compromising future generations. Based on the study of seven NGOs, this thesis details how facilitated access to land for farmers can serve as a lever for agroecological practices. The organizations promote a shift in the agricultural paradigm by carefully selecting farms to support based on factors such as certification, size, education and distribution. They also enforce social, economic and environmental constraints for farmers, and communicate on farm progression to stakeholders. This thesis also develops a framework to encourage sustainable practices through a self-assessment and peer conducted sustainability analysis survey, developed for Terre-en-Vue, a Belgian NGO. The process is based on indicators encompassing the plot level, farm level and regional level.

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TEV: Terre-en-Vue
TDL: Terre de Liens
RWAG: Regionalwert AG
SA: Soil Association
BDLT: Biodynamic Landtrst

1. Introduction

In recent years, land has become valuable to escape impacts of economic crises, leading to speculation and attracting many investors, which are not always part of the agricultural sector. Belgium has witnessed an average loss of 2 000 ha of agricultural land each year over the past 30 years (Direction générale Statistique et information économique, 2012). Only 1% of the agricultural surface is sold each year, resulting in limited buying opportunities and a rise in prices for agricultural land, reaching up to 40 000 euros/ha for arable land and 15 000 euros for pasture land (Terre-en-Vue, 2015). Over 66% of the land is rented by those working it (ibid., 2016), with many farmers forced to rent the land they work on for short periods, leading to precarity and uncertainty. These conditions often discourage investments or impede the development of the farm, and in worst cases can lead to their disappearance. Between 1980 and 2015, an average of 43 farms have disappeared each week and 62 farmers have quit their profession in Belgium (ibid., 2015). The remaining agricultural population is ageing in Wallonia, with 61.6% of farmers being over the age of 50 years old (Direction Générale Statistique, 2016). This phenomenon is observed in other European countries: the viability of small farms has declined, as well as the total number of farms which has fallen by 25,5% between 2000 and 2010 for the 19 members of the EU for which data was available. Furthermore, a concentration of the remaining farmland is observed, with 3% of farms owning 52% of farmland (Sandwell, 2016).

Simultaneously, there have been growing efforts to promote sustainable agriculture in recent years. Ikerd (1993, in Rigby and Cáceres, 2001) defines sustainable agriculture as "capable of maintaining its productivity and usefulness to society over the long run… it must be environmentally sound, resource conserving, economically viable, socially supportive and commercially competitive. (…) Sustainability cannot be associated with any particular set of farming practices or methods." One of the approaches to tackle sustainability in agriculture is agroecology (ibid., 2001). Agroecology has been described in a wide sense as "the ecology of food systems" (Francis et al., 2003), integrating a holistic approach and notions of ecology, landscape, but also actors from fields such as sociology, anthropology, environmental sciences and economics. An agroecological transition requires articulating technological changes, as well as organizational and institutional changes at the farm level, the food chain level and at the territorial and natural resource management level (Duru et al., 2014).

The aforementioned issues are the basis of the work carried out in this thesis. In view of the current trend in which farmers increasingly struggle to maintain access to land and to keep land in productive agriculture, coupled to the existing desire to promote sustainable practices, this thesis tackles two main questions:

1. How do grassroots organizations facilitating access to land serve as a lever for the promotion of agroecological practices?
2. How can a composite group of actors encourage on-farm sustainability through a self-evaluation and diagnosis procedure?

The research in this thesis is based on work carried out with *Terre-en-Vue* (TEV hereafter), an organization that tackles these challenges in Wallonia, Belgium. TEV was created in 2011 by 18 companies or NGOs, independent farmers and citizens with a strong desire to preserve existing family farms or facilitate access to land for new entrants. It was first created as a non-profit association in 2011, since then serving as an intermediary between farmers and land-owners, supporting local agricultural projects, and participating in policy advocacy. In 2012, the organization also became a cooperative to acquire and lease farmland with citizen savings, providing stable, reasonably priced access to land for farmers in the region. TEV's goal is to develop the capacity to collectively manage land, by empowering farmers, owners, consumers, and politicians to ensure sustainable use of land. Finally, a foundation was created in 2015 to receive legacies and donations. TEV is part of a larger European network, *Access to Land*, grouping initiatives with similar objectives and perspectives. Several of those, all created from the 21st century onwards, also remove land from speculation and make it available to agricultural actors.

Annex I illustrates the procedure leading up to an acquisition by TEV. As a cooperative, TEV not only acquires land but also serves as a tool to implement and convey ideological ideas such as socially and environmentally just agriculture through management of land as a commons. Hardin (1968) defines commons as a resource shared by many individuals. The 20th century was dominated by the notion of Homo-oeconomicus, shared by actors of the liberal doctrine. Homo-oeconomicus is a notion designed to explain human behavior: a human is a rational being, seeking to maximize his individual profit in the short term. The concept of overexploitation of resources expressed by the tragedy of commons (ibid.) questions the capacity of local actors to organize themselves to manage natural resources. The solutions to

this problem envisioned by classic economic approaches have been state management and private property.

The neo-institutional approach attempts to transcend the idea of tragedy of the commons. Ostrom (1990), among others, approaches the issue of commons from another angle, trusting users of a resource to create their own systems of governance. Through empirical studies, she shows in her book "Governing the Commons" that communities around the world avoid the tragedy of commons by collective ownership and management. Ostrom defines commons as "systems (…) in which it is difficult to limit access, but one person's use does not subtract a finite quantity from another's use" (Ostrom, 2008). The *user* of agricultural land, a resource required to sustain present and future populations, may be restrictively defined as the individual working the land, but could be extended to the citizens fed with produce originating from the land. In this sense, agricultural land could be defined as a commons in which one generation's use of agricultural produce does not subtract a finite quantity of food from future generations. The IPC for Food Sovereignty (2012) defines commons as resources recognized as being "available to all, and that should be preserved and managed collectively for present and future generations." The type of governance for agricultural land is traditionally private ownership, in which the owner is free to decide, to the extent permitted by national laws, the fate of his [sic] land. This current legal and economic context gives local communities very little power over agricultural land. Privatization of commons can lead to problems such as exclusion of certain actors or injustices and inequalities inherent to current economic markets" (Berthet, 2013). These trends can negatively affect European "food security, employment, welfare and biodiversity, as well as the well-being and viability of rural communities" (Sandwell, 2016).

Including agricultural land to Ostrom's concept of commons could impact current trends, oppose land speculation and promote its sustainable use. Although the access to the land is limited through leasing agreements, ownership and management decisions can be collective. An arising question is how to manage land as a commons, with participation from consumers and farmers, in order to favor the agro-ecological transition. To favor a shift towards sustainability, an array of sustainability assessment tools and academic papers have been developed (Passel et Meul, 2012). A grassroots' method for monitoring and evaluating agricultural practices are Participatory Guarantee Systems (PGS). PGS question the current method of organic certification and quality labelling in general. They are defined as "locally focused quality assurance systems" (IFOAM, 2015). PGS offer an alternative to a form of

governance which delegates the labelling process to a third party, excluding both consumers and producers. This enables local actors to redefine the notion of quality, adapted to their specific context.

The objective of this thesis is to define how to collectively manage the land which is bought by TEV and accompany the farmers in the quest for sustainability and democratic governance of food systems. The contribution of the internship with Terre-en-Vue is to serve as an interface between employees, farmers, and shareholders in order to implement a monitoring procedure inspired by PGS. The previous research questions will be tackled in two parts: firstly, individual and collective characteristics of the diversity of *Access to Land* partners will be analyzed to establish a link between management of land as a commons, follow up procedures and agricultural systems. Secondly, a detailed analysis of TEV's management and acquisitions will serve as the basis for the establishment of a follow-up procedure for the organization's farmers. The end product is a guideline for the procedure and the content of a farm follow-up which should be feasible with limited means and time. The thesis therefore presents results on how the *Access to Land* network promotes sustainability in practice, and how a grassroot organization can implement a participatory assessment procedure with the overarching goal of promoting agroecological practices. Each of these questions are subjected to the following hypotheses:

Question 1:

- The EU network *Access to Land* supports agroecological farming and management of land as a commons.
- The network of farms supported by *Access to Land* provides ecosystem services which are developed through farm follow-ups and evaluations.

Question 2: TEV's farmers are located in different areas of Wallonia, with diverse agroecosystems, production systems and stages of development. The different stakeholders involved are TEV employees and volunteers, shareholders and farmers. Sustainability is also defined through evolving scientific research and findings. Although all of these actors share commons goals, priorities may vary and increase the difficulty of future collaborations. TEV employees and volunteers focus on spreading the use of agricultural land as a commons, citizens may want to limit their involvement to a financial one, farmers may focus on economic viability of their enterprise and scientific data may not always be accessible to all parties or applicable

to local contexts. Despite this diversity, TEV aims to promote agroecological practices as a movement, requiring a certain level of convergence within the network, which leads to the following hypotheses:

- TEV's farms form a movement with common characteristics and values which can be built on.
- It is possible to create an inclusive monitoring tool grouping multiple perspectives and fields of interest in the context of management of land as a commons.

2. Methodology

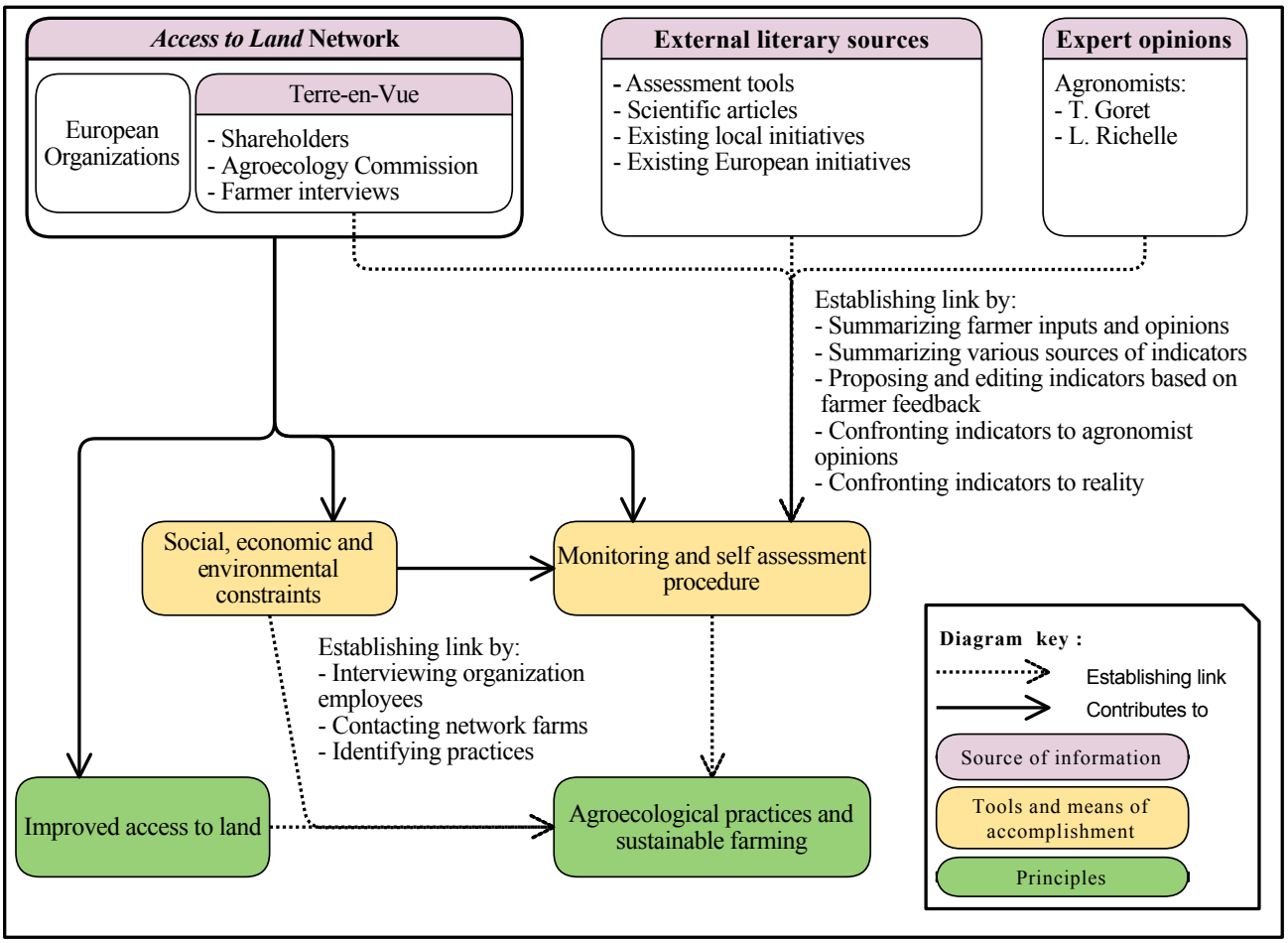


Figure 1: Thesis Methodology

The graph above illustrates the desired results of this thesis (dotted lines), as well as the contributions and sources used to achieve them. The analysis of the *Access to Land* movement and the individual characteristics of its member organizations allows us to develop a monitoring and self-assessment procedure and to draw attention to the link between Access to Land and agro-ecological practices.

2.1. Grassroots organizations: Access to Land

Table 1: Organizations studied in the Access to Land network

Organization, date of creation	Type of structure and number of employees	Number of farms considered in study
Terre-en-Vue, 2009	Non-profit organization, Cooperative and Foundation 6 employees, 4.5 FTE	9
Terre de Liens (TDL), 2003	Association, Partnership company with the legal form of a joint-stock company, and Charitable fund 61 employees	139
Kuturland eG, 2014	Cooperative and Fund 3 employees, 2 FTE	8
Regionalwert AG (RWAG), 2007	For-profit shareholder company 3 FTE + accounting services and Agronauten[1]	6
Soil Association (SA) Land trust, 2007	Charity limited by guarantee: land is donated or pledged /	6
Biodynamic Land trust (BDLT), 2011	Charitable Community Benefit Society 4 employees	5 tenant farms, 1 nursery, 1 partner farm
De Landgenoten, 2014	Cooperative and Foundation 1 FTE	6

The European organizations mentioned in figure 1 are summarized in the table above. In order to better understand the measures and impacts of the various associations on farming systems, qualitative and quantitative data were gathered from a diversity of sources. Interviews or exchanges took place with members from *TDL* (France), *RWAG* (Germany), *Kulturland eG* (Germany), *De Landgenoten* (Belgium), *Biodynamic Land trust* (UK) and the *Soil Association Land trust* (UK). Further data was collected from published articles, websites of the diverse organizations and email exchanges with farmers supported by the structures.

Participating in TDL's training day on the soil assessment procedure, "*Diagnostic Humus*" (or "Humus Diagnosis"), and the two-day seminar on accompanying agricultural projects allowed further insight and information to be acquired. The framework for analysis of the different partners and the table for farm data collection can be found in Annex V.

2.2. Developing a follow-up procedure

The process by which the follow-up procedure was developed consisted of: defining the tool's objectives and the requirements it needs to meet, identifying common values of the movement and becoming aware of pre-existing constraints and obligations for TEV's farmers. Tools and articles relevant to the conception of such a process were selected in order to base the evaluation on recognized indicators of sustainability. Monitoring and assessment can occur through

[1] Research institute for sustainable, regional farming and food systems

predefined measures of sustainability in which a farm is evaluated, or through a participatory and multi-actor process in which scoring does not necessarily appear. Other sources offer frameworks and reflections for the identification of indicators. This thesis attempts to combine existing approaches to assessing farm sustainability and practices. Farmers, shareholders and two agronomists were implicated in the development of the follow-up procedure. Finally, the resulting survey was tested on one of the farms to identify potential areas for improvement.

2.2.1. Identifying common values and constraints

Initial investigative work was conducted to identify the common values on which TEV was created. In the EDAPPA tool ("Évaluation de la Durabilité pour l'Accompagnement des Porteurs de Projet Agricole"), indicators from three main pillars (Socio-territorial, economic and agro-environmental) are assessed using transversal themes or common values, such as but not limited to "Quality of Life," "Autonomy," "Adaptability," and "Food Security and Sovereignty." The impact of practices on these predefined themes is then assessed using a series of indicators.

A long-term follow up requires periodic visits on the farms to gather data. TEV's primary aim is not agricultural consultancy or environmental impact assessment, but rather improved access to land for farmers supporting agroecological principles. Furthermore, the structure is faced with several known constraints, such as limited human and financial resources to conduct such a follow up and short time spans during which farmers are willing to engage in such a process.

2.2.2. Defining an approach and selecting relevant literature

Following the identification of TEV's objectives (developed in section 3.2.1), various tools and articles were selected for their complementary characteristics and alignment with TEV objectives. The literary contributions to the assessment procedure mentioned in figure 1 are the following: Diagnostic Humus, Diagnostic Dialecte, MOTIFS, SAFE, EDAPPA, INDIBIO, IDEA, RWAG, Smyth and Dumanski (1995), Van Passel and Meul (2011), Rigby and Caceres (2000), Rigby et al., (2001), Barbier and Lopez-Ridaura (2010), and Lund (2005). The articles were selected based on the following criteria: a consistent holistic approach, assessment of environmental impacts (positive and negative) of practices on a regional, farm or plot level using qualitative and quantitative indicators (e.g. input use), the possibility of applying such a tool to both new entrants and settled farmers, as well as farmers with diversified on and off-

farm activities. Results need to be comprehensible for the public and easily conveyed. The literature was selected for its scope of offered indicators. These comply with Gallopín's (1997) definition of indicators: "a variable…a parameter… a measure… a statistical measure…a proxy…a value…a meteror measuring instrument…a fraction… an index…something…a piece of information...a single quantity… an empirical model…a sign."

There are few qualitative evaluations and indicators among existing tools (Terrier et al., 2010). The EDAPPA tool (formerly known as EDAMA) has been chosen to favor a qualitative evaluation in which answers are assessed based on pre-established transversal themes and the objectives expressed by the farmers, or based on the consideration of these themes in the farm activities. The resulting collaborative process ensures that the agricultural project is being evaluated while reflecting with local actors (Barbier and Gasselin, 2013). In order to serve their purpose, the selected indicators need to support social learning by extracting data in a form which can be effectively used by the desired end-users (Shields et al., 2002).

Rigby et al., (2001) developed an "indicator of sustainable agricultural practice (ISAP)" but acknowledge that their research does not include social and economic factors of sustainability. Inspired by Taylor et al (1993), they decided to use farming practices rather than other indicators for which unavailable data was required. The indicators are created based on patterns of input use or practices and not measurable impacts. As expressed by Rigby et al., (2001) the latter would be preferable but field monitoring for all acquired farms by TEV is not conceivable. The scoring of practices is based on scientific data and an "understanding of physical, chemical and biological processes."

In addition, suggested measures from local or European initiatives have been taken into account, such as the *Life Prairies Bocagères*, a Walloon project aiming to "restore hay meadows along with several other micro-habitats (hedges, ponds, embankments, orchards...) and to protect six animal species" (lifeprairiesbocageres.eu, n.d.). Elements were also extracted from the Agro-Environmental Measures (part of the Common Agricultural Policy's second pillar) to highlight efforts often already implemented by farmers, promote recognized practices to shareholders and allow for remuneration of certain efforts.

Van Cauwebergh et al., (2007) provide several means to assess indicators, which consist in setting target values, thresholds, comparing with regional averages or describing trends. This implies that reference values are needed, based on scientific literature, policy targets, or comparison with other systems.

The diversity of farming systems creates the need for an array of indicators which vary with the system that is being assessed (Rigby et al., 2001). For instance, grasslands have a particularly high potential for carbon sequestration, biodiversity conservation and other ecosystem services. For these indicators, it is therefore irrelevant to compare practices of grassland management with those of a cropping system (Peeters et al., 2004). TEV requires a procedure that is identical for all farms of the network, that avoids comparing farms and evaluates the trends on each farm as well as the potential improvements to implement. This complicates the possibility of setting threshold values or quantitative objectives for the different farming systems. Rigby et al. (2001) point out the complexity of designing sustainability indicators and raise the question concerning the role of "scientific measurement and prediction in the realm of economic, social, and ultimately political decision making."

2.2.3. Delimiting Scale

Prior to the establishment of an assessment procedure, the scope of analysis needs to be defined. Gibson et al., (2000, in Van Passel and Meul, 2012) define the term scale as the "spatial temporal, quantitative or analytical dimensions used by scientists to measure and analyze processes."

The spatial scale of TEV's follow up procedure is both the plot scale (for the land that was acquired), and the farm scale. In this way, soil fertility and quality is ensured without omitting the context in which it is managed and the reality the farmer is facing. The procedure needs to approach the farm as a whole, in order to provide shareholders with information on the farm they have financially supported, and its potential regional impact. Restricting evaluation to the farm level presents its limits when defining indicators. For instance, the length of hedges can be defined as an indicator to measure the contribution to biodiversity and landscape. However, hedges must be coordinated at a larger spatial scale in order to have maximal impact, which cannot be assessed at the farm level (Terrier et al., 2010). Despite this awareness, it is impossible to extend the analysis to the territorial level in this context.

2.2.4. Structuring data

The SAFE (2007) analytical framework provides a hierarchical framework to assess sustainability, narrowing down from a general goal, towards principles, criterion, indicators and reference values. A similar process was adopted for TEV's tool, successively defining the goal

of the tool, principles, themes to be addressed, criterion and indicators to assess the efforts implemented. Various tools and articles were analyzed using SAFE's analytical framework, and summarized in tables 10, 11, 12 and 13. It is common to divide sustainability themes and indicators into three categories: environmental (or agro-environmental), socio-territorial and economic. Due to the wide variety of themes and structures of the different tools, the principles were sorted according to these three pillars to facilitate integration into the final survey for TEV's farmers.

2.2.5. Developing a participatory monitoring tool through local actor inputs

TEV has successfully completed nine acquisitions, and is in the process of completing another two. Fourteen farmers benefited from these acquisitions, of which ten were interviewed, using a survey which was conceived for TEV. These interviews provided information on why the land was acquired, how it impacted the farm as a whole and main characteristics of the farm. Farmers were also interrogated on soil properties which they find important when assessing their land.

The association has created an "Agroecology Commission," including two TEV employees and all partner farmers, with the occasional presence of administrators. The commission defines the association's values and their implications on the field. It is also in charge of selecting farmers to support, of defining environmental criteria which need to be respected, as well as drafting contracts between the association and the farmers. Two meetings with the commission took place during the internship to discuss the procedure by which TEV will follow-up on farms as well as the content of the survey.

During the association's General Assembly (March 2017), a participatory workshop was organized during which participants were invited to discuss the elements they would like to see in the follow up procedure, based on the themes which were pre-established with the farmers.

Finally, confrontation of the tool to a field experiment also induced further feedback and improvement on the structure of the visit. The Interdisciplinary Group of Research on Agroecology (GIRAF, 2012) sums up the principles of agroecology in 13 groups, and the implemented tool was confronted to each of these in order to ensure coherence with current definitions of Agroecology.

3. Results

3.1. Agroecological practices and the *Access to Land* network

Referring back to Figure 1, this part focuses on establishing a link between the *Access to Land* network and agroecological principles. This was done by analyzing the farm characteristics in the network, gathering data on obligations for farmers and on how farms are followed in the long term. Finally, a focus on the TEV acquisitions gives insight on the link between improved access to land and agroecological practices.

3.1.1. Selected farms

Data on the size of network farms as well as their workforce was gathered in order to compare to national averages. The organization chose to support farms and farmers complying to their standards of sustainable agriculture. Table 2 illustrates the majority of the organizations support farms with a diversity of sizes, with an average size smaller than the average farm sizes in the region or country, which is coherent with the network's aim of supporting small farms.

Table 2: Size and employment of network farms in comparison to national averages
Sources: Agreste, la statistique agricole, 2015; Terre de liens, 2016; Ec.europa.eu, 2017; Ec.europa.eu, 2015; Direction générale Statistique – Statistics Belgium, 2014

Organization	**Average size of farms, minimum and maximum**	**National or regional average (UAA[2] per holding)**	**Employment on farms**	**National or regional Average**
Terre-en-Vue	31.1 ha (15 - 48 ha)	Wallonia: 56.9 ha (2015)	0.1 AWU[3] / ha 3.1 AWU / farm	0.023 AWU / ha (2013)
De Landgenoten	2.5 ha (0.9 – 7.5 ha)	Flanders: 25.4 ha (2015)	1.33 AWU / farm 0.5 AWU / ha	0.066 AWU / ha (2013)
Terre de Liens	24 ha (0.5 – 168 ha)	France: 61 ha (2013)	2.62 active workers / farm 0.10 active workers / ha	0.020 AWU / ha[4] (2010)
Kuturland eg	107 (9 - 250 ha)	Germany: 58.6 (2013)	Insufficient data	0.029 AWU / ha (2010)
Regionalwert AG	22.5 ha (4.6 - 45 ha)	Germany: 58.6 (2013)	2.75 AWU / farm +seasonal[5] 0.1 AWU / ha	0.029 AWU / ha (2010)

[2] Utilized Agricultural Area (ha)
[3] Annual Working Units: corresponds to the amount of time spent working by a full time employee over the course of one year
[4] eurodata.eu
[5] Data could not be collected on hours performed by seasonal workers

Soil Association Land trust	38.9 ha (1.6 - 120 ha)	United Kingdom: 84 ha (2010)	0.03 AWU / ha 1.2 AWU / farm	0.016 AWU / ha (2010)
Biodynamic Land trust[6]	73 ha (13.8 - 202 ha)	United Kingdom: 84 ha (2010)	14 AWU / farm 0.22 AWU / ha	0.016 AWU / ha (2010)

Furthermore, these farms develop employment in their respective regions through complementary activities such as processing, education or direct sales. It is difficult to assess employment generated by such activities, as they are often carried out by the farmers themselves or their family members. By distributing their produce through short supply chains and local stores, the farms also favor regional employment which is not quantifiable using the gathered data. The following table indicates an approximate value of the employment generated by processing, direct sales and education in the TEV farms without considering the time invested by the main farmers. This data applies to personnel who would not be involved without these activities.

Table 3: Employment generated by complementary activities on Terre-en-Vue farms

Farm	Processing	Direct sales	Education
Marion	1 FTE: spouse		
Larock		0,5 FTE	1 FTE
Renaud		0,5 FTE: spouse	
Acremont		0,5 FTE: family member	
Bierleux-Haut			
Bio-Lorraine			
Sainte-Barbe	1 FTE		
Jacquemart			
Sarthe	0,5 FTE		

3.1.2. Leasing agreements and constraints

Table 4 illustrates how the different *Access to Land* organizations promote sustainability among their farms, through binding agreements or contracts. They are presented by level of requirements for the farmers (from most demanding to least). The nature of requirements varies: for instance, TDL is more demanding in terms of environmental clauses whereas TEV is more demanding in terms of social implication. The three pillars for the promotion and implementation of agroecological practices are tenancy agreements, existing certification or labelling schemes and the environmental easement[7] (in TEV's case). They cover a range of

[6] Data on tenant farms

[7] The existing leasing agreements between owners and farmers in Belgium forbid the owner from having a say on the management of the land by the farmer. This measure, called the "liberté de culture", or "freedom of agricultural

environmental, social and economic clauses (in order of frequency). The clauses in the tenancy agreements cover natural and genetic resource conservation, regional development and improved education on food and farming systems.

Table 4: Constraints and regulations within the Access to Land network

Organization	Constraints and regulations for land acquisition	Type of constraint
RWAG	- Organic certification within 4 years	Environmental
	- Participate in maintaining a diversified cultural landscape	Environmental
	- Favor open pollination for fruits and crops	Environmental
	- Active processes of soil fertilization and animal fertility	Environmental
	- Preserving biodiversity	Environmental
	- Inputs of regional origin and exchanges with RWAG actors	Environmental, Social, Economic
	- Participation in company forum every other month	Social
	- Annual reporting, half yearly financial reports and annual financial statement	Economic, Social
Terre de Liens	- Clauses from the 'Bail Rural Environnemental'[8] (see annex III)	Environmental
	- Organic / Biodynamic certification	Environmental
Terre en Vue	- Clauses from Environmental Easement (see annex II)	Environmental
	- Distribution in geographic proximity and short supply chains	Environmental, Social, Economic
	- Participation in Terre-en-Vue movement (yearly general assembly, agroecology commission).	Social
Kuturland eG	- Compliance to EU organic standards, no certification required	Environmental
	- 10 % of surface owned by the cooperative (or equivalent surface) must be natural elements	Environmental
	- 2 of the 6 following community activities[9]:	
	Local or regional marketing (+)	Environmental, Social, Economic
	Educational activities (++)	Social
	Farming endangered breeds/varieties (--)	Environmental
	Access to the public / guided tours (++)	Social
	Cultural events (-)	
	Hiring employees with disabilities (--)	Social
		Social

production" was initially implemented to give farmers freedom to cultivate the land without being manipulated by land owners. However, this also limits the environmentally beneficial constraints which can be implemented on agricultural land. The concept of environmental easements (Annex II) was imagined and created by TEV in response to a lack of legal tools allowing the organization to ensure its social and environmental purpose. The environmental easement in inscribed in the property act when the land is bought and the owner is obligated to respect environmental constraints, protecting the environment and the feeding capacity of agricultural land.

[8] Leasing agreement legally created in 2006 in France with the objective of promoting sustainable practices.

[9] ++, +, - and – express frequency of community activities by network farms

Biodynamic land trust	- Biodynamic (or organic) certification - The agricultural practices, based on but not limited to biodynamic principles should protect the physical and natural environment, as well as the environment of the countryside and natural resources. - Education of the public, but also farmers, both on biodynamic farming and principles as well as land trusteeship. - Support of direct marketing and local food systems	Environmental Environmental Social Economic, Social, Environmental
Soil Association land trust[10]	- Productive land in which biodiversity and the environment are included in the system. Possibility of farming the land organically. - Financially self-sufficient (with or without endowment funding) - Promote education through public access to farms, mainly by supporting tourist activities - Specified clauses in tenant agreements which vary	Environmental Economic Social
De Landgenoten	- Organic certification on land bought by cooperation - Farmers must find 75% of shares themselves	Environmental Economic

3.1.3. Farm evolution and follow up

Although the main binding agreements take place prior to or during the acquisition, most structures have developed a long-term follow up procedure (table 5) in which they maintain a contact with their farms, solidifying their network.

Table 5: Follow-up procedures in the Access to Land network

Organization	**Follow up procedure: monitoring and analysis**
Terre-en-Vue	Prior to 2017: - Situational analysis of natural elements for lease agreements - Verification of environmental easement clauses through periodic soil analyses and farm visits - Agroecology commission on farms
Terre de Liens	- Situational analysis of natural elements for lease agreement - *Diagnostic DIALECTE* (punctual) - *Diagnostic HUMUS* (punctual)
Kuturland eG	Farmer reports to society about results and perspectives for development
RWAG	2008 onwards: Yearly report to shareholders at General Meeting. In 2014, final development of 87 indicators for 12 themes in social, environmental and economic categories (Annex IV).

[10] The Soil Association Land trust acquires land donated or pledged by owners. The land may have existing tenants.

Soil Association (SA) land trust[11]	- Annual evaluation of opportunities for public involvement in collaboration with the tenants (e.g. fundraising for educational events such as school visits, enhancing natural trails and public rights of way around farms, etc) - Annual visit with land agent to assess progress, challenges and opportunities of the farm. Agreement on priorities for the year. - Board meetings with trustees and farmers at least every other year.
Biodynamic land trust	- Yearly report by farmers - Annual General Meeting on or near the network farms
De Landgenoten	No follow up procedure yet, operational on a trust basis

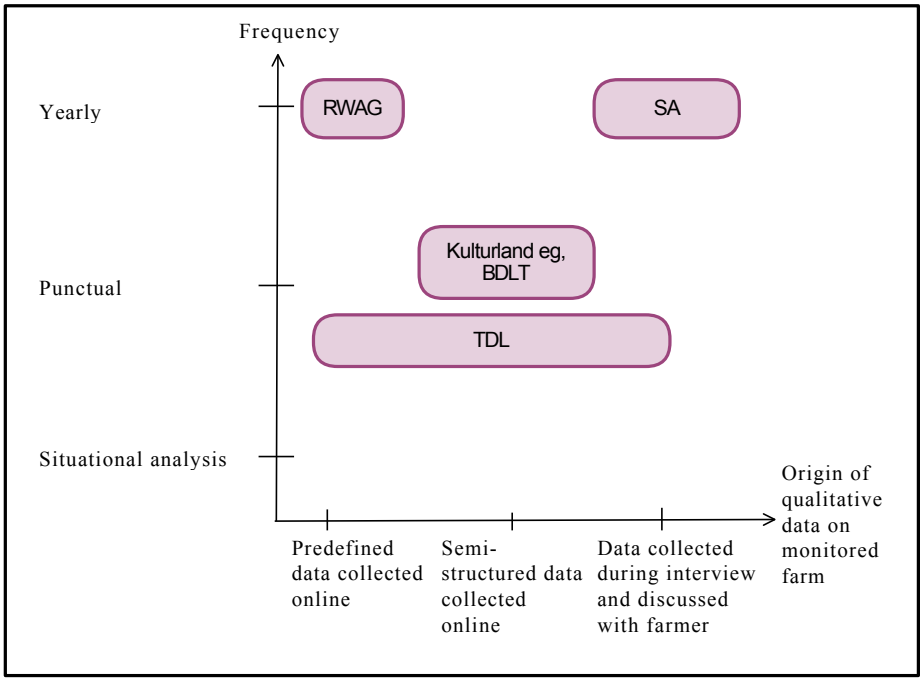


Figure 2: Origin and frequency of qualitative data on Access to Land farms

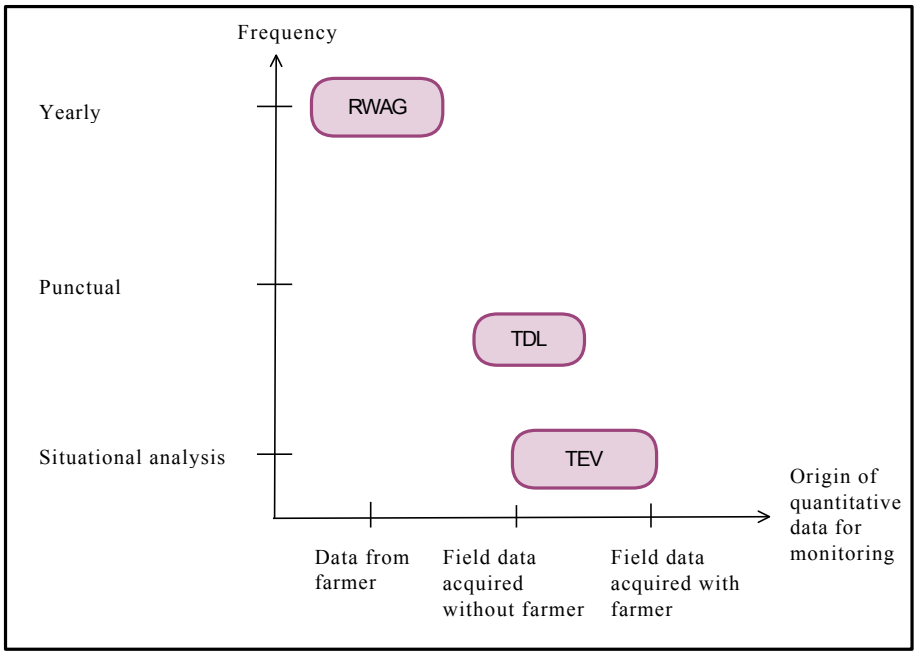


Figure 3: Origin and frequency of quantitative data on Access to Land farms

[11] The soil association land trust acquires land donated or pledged by owners.

The level of verification and farm evaluation depends on human resources and the experience of the different organizations. Table 5 shows that the various follow-up procedures consist in verifying agreements previously mentioned, reporting on results, and evaluating challenges or opportunities at various frequencies (figures 2 and 3). The implemented procedures promote transparency and accountability through board meetings and yearly reports. The level of detail in the analysis also goes along a gradient, from monitoring efforts to assessing results through quantitative indicators and comparing with reference values (e.g. RWAG or TDL). Figures 2 and 3 illustrate the dynamic of the procedures, which range from unilateral transfers of information to bilateral exchanges engaging experts, farmers, and association employees. Finally, the scale of analysis can be as small as the aggregate level in the soil, to a broader plot level, and finally to a farm system and regional level. There is a clear desire from the network to prolong its impact and support farmers in further development. However, these procedures do not guarantee a transition within the farms but rather monitor and facilitate the changes over time.

The two organizations which have developed a detailed protocol for a follow up procedure are RWAG and TDL. For RWAG, the online sustainability analysis tool has multiple functions, ranging from evaluating services of the different enterprises, illustrating long term improvements and providing shareholders with information on their investment in the annual report through both qualitative and quantitative indicators. The indicators provide information on the acquired land, the farm as a whole and its inclusion in regional development. They were developed using expert and shareholder inputs to create a holistic approach of the enterprises. The tool was built progressively and has evolved since its first application in 2008 based on yearly feedbacks (Jákli and Volz, 2014). The tool operates on a trust basis and is effort-based, (time and measures implemented) rather than result based, due to the difficulty of measuring actual results. Results expose the progress, stagnation or regression for the predefined indicators and are published in the yearly reports accessible to all shareholders.

In 2013, TDL implemented MUSE, (*Mission d'Utilité Sociale et Environnementale*, or Social and Environmental Utility Mission) to measure their impact, improve their practices, highlight their accomplishments and contribute to the public debate (terredeliens-iledefrance.org, 2017). TDL farm data was acquired through the *Dialecte diagnosis*, developed by Solagro[12] (with

[12] Association specialised in ecological diagnosis and renewable energies

whom TDL has a partnership) and tested on approximately thirty network farms since 2011 (Terre de Liens, 2016). The diagnosis highlights strengths and areas for improvement in the following areas: vegetable production diversity, diversity of animal production, energy, crop protection chemicals, water, phosphorous, nitrogen and natural elements (Solagro, n.d.). Some TDL members are trained to use it and results can be found in a dataset also including non-TDL farms for comparison.

TDL has also begun implementing a soil and landscape analysis tool called the *Diagnostic Humus,* developed in partnership with the ENSAIA[13]. This tool describes the farm and its territory, analyses the soil based on laboratory results, bio-indicating plants and in-depth observations. In both cases, the results are written and interpreted to give the farm a final score based on a predefined scheme and shared with the farmer. Finally, they have a guideline to establish a TDL farm monograph compiling information about the farm, the farmers, potential for citizen mobilization, territorial integration, and the relationship with TDL. Combined, these different documents offer a holistic and detailed analysis of the farm. However, they have been used punctually on a minority of the farms, their main limit being the need for farmer cooperation and availability.

3.1.4. Services provided by network farms

As was described in the previous sections, the various associations promote services through choice of farms to support, requirements, and farm follow-ups. The various organizations support existing initiatives (Agro-environmental Measures, Stewardship schemes, Natura2000 or organic principles) as well as other beneficial services, illustrated in the text below and summarized in tables 6 and 7.

Several of the SA farms have measures to preserve rare or ancient breeds of cattle (1). Together, Feldon Forest Farm, Manor Organic Farm and Summerhill Farm have Red Ruby (or Devon) cattle, Longhorn cattle, and Shetland cattle. All three farms support on-farm diversity, companion and rotational grazing and also preserve rare or ancient breeds of sheep. These include *Black Welsh Mountain Sheep, Polled Dorset Sheet* and *Castlemilk Moorit Sheep.*

These breeds were chosen for their disease resistance, foraging qualities and ability to thrive in low input agriculture. These three farms are committed to farmland biodiversity (4) by participating in Organic Entry Level Stewardship (OELS) schemes and Higher Level

[13] National Graduate School of Agronomy and Food Industry

Stewardship (HLS) schemes. Collaboration with the SA helped the farms contribute to education (16) in their respective regions: Summerhill farm now has improved facilities to host school visits for all levels. One TEV farmer grows 15 varieties of cabbage and produces his own tomato seeds from ancient varieties such as *tétons de vénus* and *cornue des andes* and the Manor Organic Farm produces seeds for the Doubleday Research Association. These are just two examples of vegetable genetic conservation (3). Education, transparency and natural elements (16, 17, 4) can equally be combined, such as on the Sainte-Barbe farm (Wallonia). The farmer organizes open-farm days and has placed a tourist trail around the 6 ha of vegetable and cereal fields with panels describing crops and management practices. This also provides permanent 3m wide grass-strips and flower strips, both reducing erosion in field slopes (8) and providing wild flowers for local biodiversity (5).

Despite the fact that labelling is not mandatory in all organizations, a majority of supported farms comply to organic or biodynamic regulations. Indeed, 83% of the studied SA farms are certified, 78 % of the TEV farms, 88% of Kulturland eG farms, as well as 89 % of TDL farms (organic certification is only required since 2013).

Resource autonomy (7) is often promoted across the organizations by promoting crop rotations including legumes or on-farm animal feed production. The 9 ha acquired by Terre-en-Vue for the Renaud Farm allowed them to be completely self-sufficient in forage for their cattle and begin cereal production corresponding to 50% of their needs. The remaining 50% are sourced from a farmer 3km away, favoring regional cooperation and supporting complementary activities (13). Energy Autonomy is also a point of attention for the various farms: Both the Marion Farm (Wallonia) and the Chitcombe Farm (UK) provide electricity to their farms through solar panels, while the Chitcombe Farm also uses farm wood to feed the biomass boiler and provide heating to the farm building. The Chante-Terre Farm (Wallonia), limits its energy consumption to 80L of fuel each year for hay making, using animal traction and human labor as a substitute for fossil fuels for the rest of the activities.

Diversity in farming systems (9) is another defining characteristic of the network farms. ‘T Fruitjatje (Flanders) is a one-person farming enterprise supported by *De Landgenoten* that develops high-stem orchards on existing farms. Old varieties of apples and pears (1) such as *Keuleman, Reinette Hernaut, Berglander, Boscoop, Trezeke* and *Meyer* are planted and the fruits processed into juices destined for local distribution (22). The orchard grasslands are

managed by the presence of cattle, sheep, donkeys or horses. The farmer aims to develop ponds and rotational grazing on the land he manages. The partnership with *De Landgenoten* has given the farmer stable access to 1.7 ha of the current 7.5 ha he manages. Complementary activities frequently characterize the network farms. The Larock farm (Wallonia) is a community farm (11) with two families producing fruits, vegetables, beef and on-farm production of cheese (23). Other activities include on-farm sale of produce, a kindergarten for children up to six and participation in the 'farm-school' network in Wallonia. These schools serve as a theoretical and practical teaching facility for future biodynamic farmers two days each week. Many of these farms have a strong supportive group of consumers, developed through direct marketing and sales. The farms have on-farm or online shops, which enable them to sell fresh produce during the entire growing season. Other efforts have been implemented to promote direct sales. For example, the Bio-Lorraine (Wallonia) farmer increased his direct sales by creating an organic market in his home town (24).

Based on the gathered data, we cannot say to what extent these services were enhanced following the partnership with different organizations. However, the data reveals that the network supports sustainable practices and engages in ongoing reflections with partner farms to encourage further agroecological development.

Table 6: Ecosystem services provided by Access to Land farms

Ecosystem services
1. Preservation of rare or traditional breeds
2. Adapting livestock to local conditions through on-farm breeding
3. Genetic resource conservation: seed preservation and production
4. Biodiversity and landscape management
5. Pollination-favoring practices: Beekeeping, Natural elements
6. Respect of production standards: Organic, Biodynamic, *Nature et Progrès*
7. Resource Autonomy
8. Erosion-limiting practices
9. Diversified farming systems
10. Work with public authorities to protect water catchment areas
11. Complementary farm activities
12. Production of renewable energy

Table 7: Social activities and regional economic development of Access to Land farms

Social innovations, activities and regional economic development
13. Local exchanges and sales between food chain actors. Complementarity of regional activities
14. Establishing new entrants
15. Fight against abandonment of rural areas
16. Educational activities and agrotourism
17. Transparency and contact with consumers
18. Community supported agriculture
19. Community farms[14]
20. Development of farmer knowledge
21. Employment-generating farming systems
22. Local (regional) distribution
23. Added value through on-farm processing
24. Improved remuneration: short supply chains

3.1.5. Impacts of Terre-en-Vue acquisitions

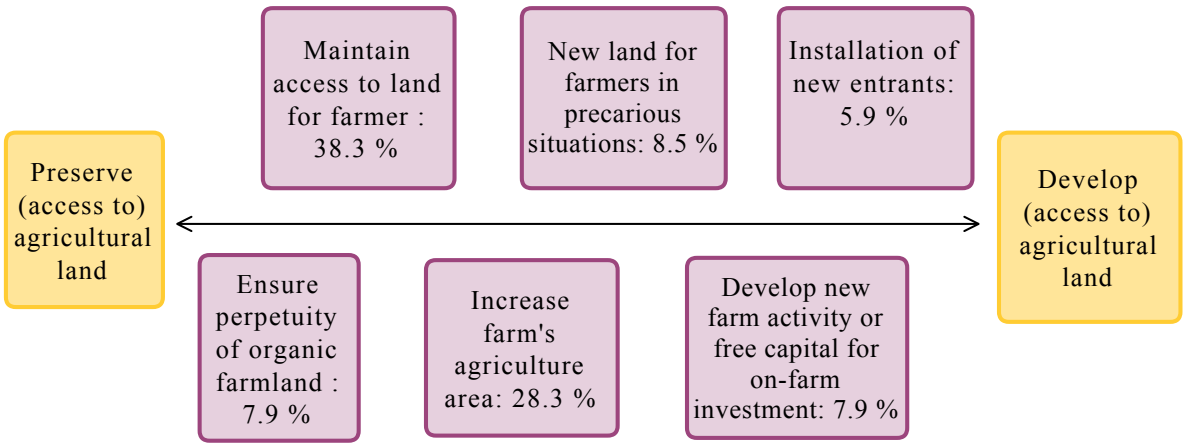


Figure 4: Farmer motivations for Terre-en-Vue acquisitions

This section contributes to an insight on the benefits of improved or facilitated access to land for farmers. Referring to Figure 1, the link between TEV and improved access to land is first established. Annex VI details the various acquisitions, providing information on the type of farm, farm size, size of acquired plot and the reason for the acquisition. Based on this data,

[14] Community farms include: farms managed collectively by a group of families, farms on which complementary yet independent projects take place.

Figure 4 illustrates TEV's potential to preserve and develop access to agricultural land. Among the 73.1 ha acquired or in the process of being acquired, farmers approached TEV for the development, transmissibility or conservation of their agricultural activity. In most cases, returning land to the commons or improving practices is a secondary objective. However, it can be argued that both preserving organic farmland and enabling new actors to enter the field contributes to the preservation and development of new agroecological practices.

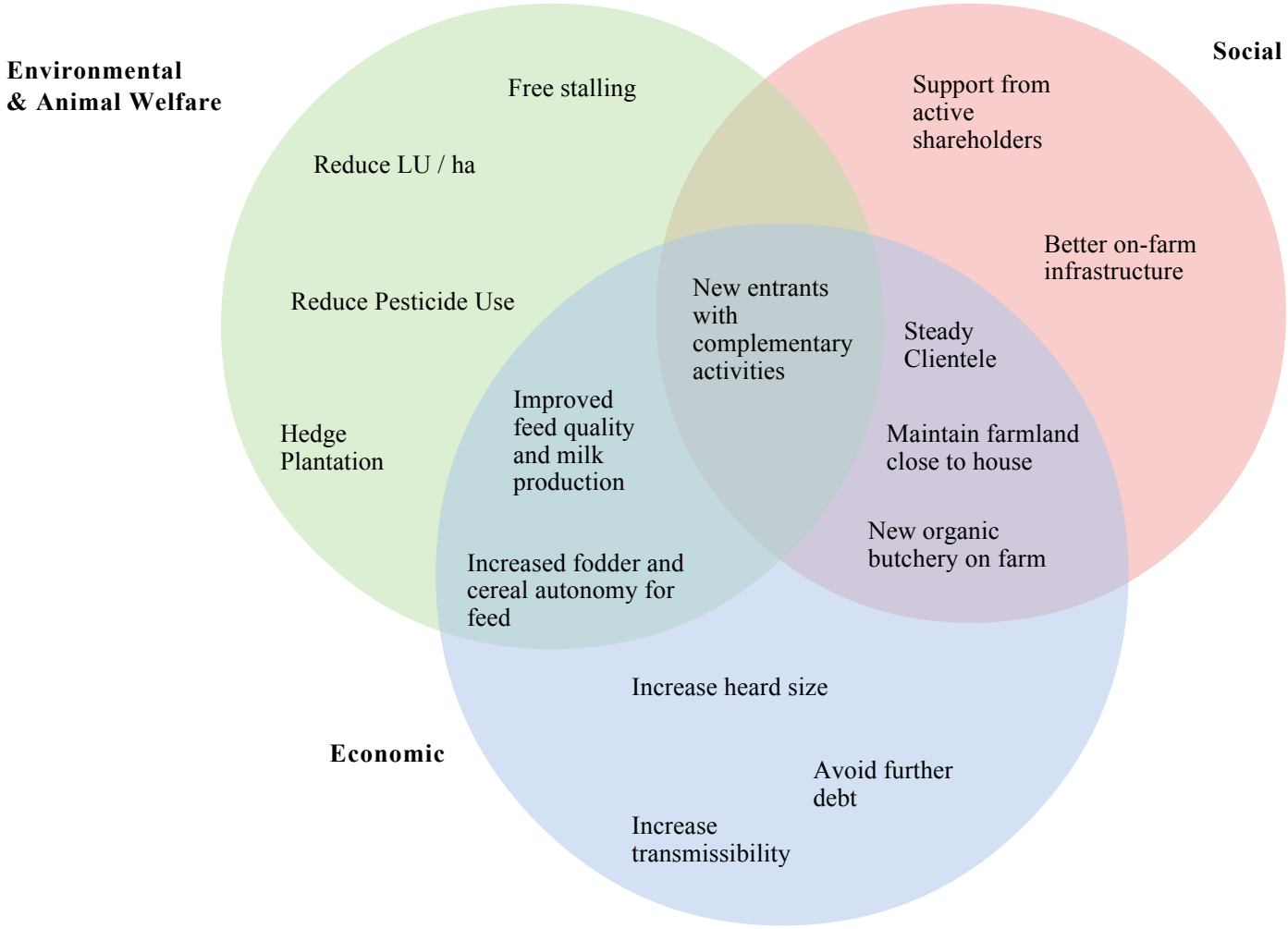


Figure 4: Environmental, social and economic benefits of Terre-en-Vue acquisitions

The second objective is to establish a link between improved access to land and agroecological practices. Farmers reported that unstable access to land inhibits the development of agroecological practices due to lack of certainty that they will benefit from their investments in time. Figure 5 illustrates how collaboration with TEV enabled positive environmental, social and economic changes on the farms based on annex VII which details the impacts of the acquisitions.

TEV owns between 12.5% and 39% of its farmer's land for the time being. This means that beyond the binding environmental easement the cooperative has little to say on farm management and changes in practices must come from the individual farmers. In TEV's case, there is yearly reporting of various developments on the farm but no process aimed at triggering further evolution or assessing socio-environmental benefits. An additional potential lever for the promotion of agroecological practices is the establishment of a sustainability assessment survey, inspired by other European initiatives.

3.2. Encouraging on-farm sustainability in the Terre-en-Vue network

This part describes how the assessment framework was implemented, as well as its defining characteristics and final properties. The process consisted in collectively defining objectives and important themes to be included in the tool. These were the basis for the implementation of an inclusive tool to monitor farm evolution engaging multiple actors. A second step was to confront this data to existing sustainability tools. Further indicators were identified to support farmer preoccupations.

3.2.1. Defining objectives

The overarching goal of TEV's activity is to limit use of land as a commodity, and develop management of agricultural land as a commons. A follow-up procedure can promote evolving practices and provide TEV with justification for their acquisition on the grounds that they provide environmental and social benefits to shareholders. My interactions with TEV employees, reports from previous Agroecology Commissions and conversations during the Agroecology Commissions in which I took part led to a list of objectives to be met by the procedure and tool:

- Provide TEV with a holistic yearly view of the farm in order to witness any major changes and long term trends.
- Provide farmers with the opportunity to reflect on their farming system, leading to a self-evaluation and an action-plan co-constructed with network peers.
- Monitor farms to ensure that they are in line with TEV's values.
- Identify topics to reflect on as a group during the Agroecology Commission.
- Provide shareholders with transparent, understandable information about social and environmental returns on their investment.
- Collect data useable for farm and land transmissions.

The last point is a new step in the management of land as a commons by providing facts on successful and less successful past practices, by documenting traditional knowledge and facilitating its transmission.

3.2.2. Building on common values and farmer participation

TEV identity serves as a lever for change. Network farmers have declared "we are a big family" and referred to "*our* vision of agriculture." This implies a sense of belonging to the movement. The following step towards creating a self-diagnosis tool and follow up procedure was to become familiar with existing values. I identified these through the clauses of the environmental easement and trust contract and compiled them into table 8. The different values guided the conversations during the Agroecology Commission without restricting farmers from broaching new topics. All commissions had one TEV employee in charge of reporting on what had been said. These detailed reports led to the construction of table 9, in which indicators and ideas were structured based on sustainability criteria. The criteria were later grouped by theme, which correspond to the various colors used in the table. The indicators were identified without reference values or ideal answers. We tackled issues which had not necessarily been addressed in the past by the commission and consensus was difficult to reach between the farmers.

Table 8: Identified values inherent to the movement

Movement values
Preserve agricultural land
Promote food sovereignty in Wallonia: Land's primary purpose must be to feed local populations
Autonomy - From oil derivatives. This includes products requiring oil derivatives for their production (e.g. fertilizers) - From fluctuating markets - Financial autonomy
Favor erosion-limiting practices and preserve soil quality
Increase presence of natural elements and biodiversity
Respect of EU Organic charter: Compliance with organic farming
Trust and respect
Collaboration and exchange of knowledge

Table 9: Criteria and indicators for sustainability suggested by farmer network

Sustainability criteria	**Indicator suggestions from farmers**
Autonomy from non-renewable energies Financial autonomy	Calculate energy efficiency (kcal produced/ kcal used) Liters of petrol and water used / month Number of tractor hours / month Kwh of electricity used / month Greenhouse heating Use of biodegradable rather than plastic sheets Steam weeding Origin and method of production of seedlings and seeds Use of F1 hybrid seeds Origin of ingredients for processing Origin of purchase and resale products Use of regional by-products
Biodiversity respected and integrated in landscape	Fauna / flora inventory Overseeding in permanent prairies
Level of diversification	Diversity of products and fraction of total production Cropping rotations
Measures to avoid inbreeding depression	Method of animal reproduction Number of males on farm
Short-Supply chains	Ratio between short and long supply chain Type of distribution, reason for implementation, relevance of their maintenance.
Geographic proximity of distribution	Distance from farm Volume transported Means of transportation
Maintain links with shareholders and local group	Activities organized throughout the year
Education	Development of education and transmission of traditional knowledge
Financial viability of the farm	Use of exterior services Added value of on-farm processed products
Dependence to subsidies	Proportion of subsidies in revenue
Intention of professionalism	Ratio of time on farm and time spent on a secondary job
Workforce	Number of FTE on farm, Level of security of contracts for workers
Provide fair wages to employees Work intensity is reasonable Provide job stability	Salary / hour Number of hours / week Time off / year

	Renewal and stability of contracts
Satisfaction in amount of work and time spent working Recognition from entourage Good physical and health conditions	Awareness of workload
Evolution of soil productivity and fertility in the long term	Humus content

3.2.3. Literary principles, criterion and indicators

The research required the use of literature and existing tools to validate identified indicators and present further indicators to the farmers. Tables 10, 11, 12, and 13 provide principles, criteria and indicators to assess sustainability, which were then used to formulate questions for the survey. These can also be used to encourage an evolution in practices by targeting new results.

Environmental pillar

Farm level

Table 10: Farm-level environmental principles, criterion, indicators and reference values
Sources: Solagro, n.d., Terre de liens, 2015, Meul et al., 2008, Van Cauwenbergh et al., 2007, Lopez and Ridaura, 2010, Gasselin, et al., 2013, Manneville et al., 2016, Viaux, 2010, Jákli and Volz, 2014, Smyth and Dumanski, 1995, Van Passel and Meul, 2011, Rigby and Cáceres, 2000, Rigby et al., 2001, Lund, 2005.

Principle (condition for sustainability)	**Criterion (Resulting state of agroecosystem)**	**Indicator: Variable which can be assessed in relation to a criterion** (Reference value used, if available)
Soil quality and fertility[15] is maintained	Life in soil is favored Toxic substances are avoided Soil organic carbon is increased Nitrogen is fixed from atmosphere	Nature of fertilizers and organic amendments and quantity Nature of weed and pest control Legume surface
Erosion is limited	Winter coverage Overgrazing is avoided Soil structure is developed	% cover of soil LU / ha (2)
Planned and spontaneous biodiversity is favored	Diversity of systems Implemented diversity of species, varieties and breeds Use of ancient / local / endangered breeds and varieties	Plot size (3 – 9 ha) Presence of forage mixtures Presence and surface of legumes Presence and abundance of rare / local species % mowed meadows and pasture meadows % permanent prairie, % temp prairie % semi natural prairie Number of species in prairies Nature and quantity of fertilizer applied on field Plant associations

[15] Soil fertility: Ability of the soil to supply essential plant nutrients and soil water in adequate amounts and proportions for plant growth and reproduction in the absence of toxic substances which may inhibit plant growth. (FAO, n.d.)

	Measures are taken to avoid inbreeding depression Natural elements are maintained Maximize natural biological practices Favor pollination Environmentally sound pest, disease and weed control	 Mowing during foraging hours (5-10%) Refuge areas when mowing (Yes) Presence of grass or flower strips on farm (3 strata) Presence of multi-strata hedges Presence of semi natural prairies[16] Width and length of hedges Nature of preventive and curative measures against pests, diseases and weeds
Autonomy of farmer is encouraged	On farm production of fodder and concentrates Limited input use (from outside farm) Collaborations with regional actors are developed Closed nitrogen and carbon cycles Regional resources are used On-farm water sources are used	Origin of inputs Legume surface Nature of fertilizer Source of water used on farm
Minimal impact on atmosphere	Non-renewable energies are avoided: Proximity of input supply Limited use of fuel and electricity Limited mechanization Energy efficiency is increased Carbon balance is minimal	Origin of inputs Use and quantity of N, P and K fertilizers Share of renewable energy use Recycled waste Production of renewable energies (solar, wind, biomethanisation,) Presence of alternative water sources Use of regional by-products
Water resources are preserved	Limit water consumption Adequate sources are used Protection of watercourses Water pollution is limited	Type of irrigation systems Water sources Presence of natural elements bordering watercourses Distance between cattle and water courses (1 m)

[16] Permanent prairies which have never been seeded, or which have not been seeded for over 20 years

Animal welfare	Animal comfort and animal health are developed on the farm	Presence of lesions Good teat end and udder conditions % thin cows % dirty cows m^2 / animal in stable (EU organic) LU (Livestock Units) / ha (2) Age at slaughter Operations taking place: tail-docking, cutting of teeth, trimming of beaks and dehorning, castration Pain relief and method of operation Access to natural lighting Surface of duckboards in stable Use of antibiotics, vaccines and dewormers
Respect of EU organic standards	Promotion of EU-Organic standards beyond farm level	Certification of purchase and resale products

Plot level

Table 11: Plot-level environmental principles, criterion, indicators and reference values
Sources: Solagro, n.d., Terre de liens, 2015, Meul et al., 2008, Van Cauwenbergh et al., 2007, Lopez and Ridaura, 2010, Gasselin, et al., 2013, Manneville et al., 2016, Viaux, 2010, Jákli and Volz, 2014, Smyth and Dumanski, 1995, Van Passel and Meul, 2011, Rigby and Cáceres, 2000, Rigby et al., 2001, Lund, 2005.

Principle	Criterion	Indicator
Soil fertility is maintained / or enhanced	Life in soil is favored Soil organic carbon is increased Nitrogen fixation	% grass surface Organic matter content Soil acidity N, P, K content Legume surface Compaction Depth of A horizon Presence of plough pan Compaction Water infiltration and drainage Nodule dissection Presence of worms and galleries
Erosion is limited	Soil structure Use of conservation agriculture	Presence of pores, roots in soil Identifying soil structure Period of bare soil during year Nature and % of soil cover in winter Type and depth of mechanical work Physical signs of erosion Presence and thickness of slaking crust
Planned and spontaneous biodiversity is favored	Natural elements are present Soil life is present	% of natural elements on farm Sign of bioturbation Presence of meso and macro-fauna

Social Pillar

Table 12: Social principles, criterion, indicators and reference values
Sources: Solagro, n.d., Terre de liens, 2015, Meul et al., 2008, Van Cauwenbergh et al., 2007, Lopez and Ridaura, 2010, Gasselin, et al., 2013, Manneville et al., 2016, Viaux, 2010, Jákli and Volz, 2014, Smyth and Dumanski, 1995, Van Passel and Meul, 2011, Rigby and Cáceres, 2000, Rigby et al., 2001, Lund, 2005.

Principle	Criterion	Indicator
Quality of life	Farmer is proud of his work Work intensity is reasonable Appropriate distribution of tasks Satisfying recognition and workload for the farmer	Number of hours worked / week Time off taken during the year
Entrepreneurship	Vision Strategy Management Coherence and complementarity of activities	Elaboration of short and long term objectives for the farm
Territorial revitalization	Participation in local political, associative, or educational network Enhance and highlight use of regional resources	Engagement in local networks Development of agrotourism Training of future farmers
Adaptability	Ability to face a bad year	
Food Sovereignty and Security	Solidarity between farmers Diversification and quality of production Contribution to food autonomy of territory Avoid food waste	Cooperation with and assistance to new farmers Outlet for the totality of the production (% of production sold) Fate of products not disposed of on market

Economic Pillar

Table 13: Economic principles, criterion, indicators and reference values
Sources: Solagro, n.d., Terre de liens, 2015, Meul et al., 2008, Van Cauwenbergh et al., 2007, Lopez and Ridaura, 2010, Gasselin, et al., 2013, Manneville et al., 2016, Viaux, 2010, Jákli and Volz, 2014, Smyth and Dumanski, 1995, Van Passel and Meul, 2011, Rigby and Cáceres, 2000, Rigby et al., 2001, Lund, 2005.

Principle	Criterion	Indicator
Farmer Autonomy	Limit risks linked to market dependence and volatility of primary resource markets	Possibility of sales price control Sales margin
Coherence between activities	Coherent allocation of time between on-and-off farm activities	Time spent on distribution
Territorial anchorage	Meet regional demand Favor employment in the region Regional distribution of products	Number of jobs created Presence of committed clients
Long term financial stability	Possibility of financing farm developments Manageable debts and investments Profitability Added value to products	Sales margin Annual revenue Net earnings (without salary) Net earnings (with salary) Yearly yield % revenue corresponding to purchase / resale activities monthly loan reimbursements projected investments upcoming investments % revenue corresponding to subsidies On farm processing Freshness of produce Amount of savings to compensate for a bad year

3.2.4. Adapting the tool to local contexts

As we developed the tool, we confirmed the difficulty of defining reference values for indicators. Indicators were chosen as a reflection point for farmers, to monitor farm evolution and to create a link between farmers and shareholders. This part illustrates the constraints linked to identifying indicators and reference values and how we overcame some of these.

Socio-economic indicators

Debt and monthly salaries figured as a potential indicator to measure economic viability. However, among TEV's farmers, the ones not originating from an agricultural background have higher debt that those who are, which doesn't reflect the sustainability of their practice. Among the farmers who agreed to answer the question, monthly salaries rarely reached Belgian minimum wage (gross salary of 1500 euros / FTE / month), considering that they work more hours than a FTE of 38 hours per week. This is the case for 71% of farmers in Belgium (Levif.be, 2016). In the evaluation, the viability of a farm is determined with the farmer, based on alternative indicators: available capital to compensate for a bad year, activities on the farm which require high capital and generate relatively little income, whether the income of the farm compensates its expenses and reimbursements and if there is sufficient income to provide the family with a salary. Yields, on-farm processing, secondary sources of funding (subsidies, other part-time jobs), existing loans as well as upcoming investments have all also been taken into account to assess economic stability.

Short supply chains are actively promoted in the TEV network. In some cases, this has greatly benefitted farmers: on the Renaud farm, the store shop allows the farmer to receive 90 cents / liter of milk, improving his revenue and avoiding the consequences of the fluctuating milk market. However, farmers of the Sainte Barbe and Bio-Lorraine farms have observed a decrease in direct consumer demand. Bio-Lorraine, a 48ha crop and vegetable farm, now has half of its production sent to central buying offices for supermarket sales in France. Although the percentage of short or proximity supply chains is an indicator in the evaluation, the level of production and geographic situation of farmers limits the possibility of setting a reference value.

Professionalism is also a criteria identified by the farmers as being important. The choice of time spent on a secondary job was chosen as an indicator but should be evaluated over time, rather than compared from one farm to another. One farmer has decreased his time spent on a second job from 30 hours to 19 hours each week, showing his willingness to take

over the family farm but the impossibility of supporting his family on his farm earnings for the time being.

Environmental indicators

An example of divergent opinions among farmers is the surface of biodiversity elements which should be allocated on fields. Some farmers agreed that 10% would be a better amount than the existing 5%, while others argued that on prairies this was fine but they did not want to lose space on cereal plots. Biodiversity elements are therefore pinpointed as crucial, but a reference value was not agreed on.

Farmers also identified points of divergence between their beliefs and practices. For instance, F1 hybrids go against farmer autonomy in their opinion, but F1 homogeneity corresponds to consumer demand, they are often more resistant to diseases (for instance mildew on onion), or more robust, as is the case for fennel and cauliflower. The evaluation therefore inventories the use of hybrids on the farm without setting a target value.

Finally, pedo-climatic conditions vary greatly from one farm to another and limit the possibility of setting reference values. Farmers' needs in fertilizing inputs may be greatly affected by such conditions. For two similar diversified vegetable farms in different regions (Hesbaye and Pays d'Arlon), the nitrogen needs doubled, from 40 to 80 units. Reference values for indicators are therefore based on values at the time of the first assessment. For instance, humus contents should be maintained rather than compared between farms.

3.2.5. Defining characteristics of the tool

The color code in table 9 led to the identification of overarching themes. Based on farmer inputs and gathered data, the survey includes eight themes divided into subsections which are detailed in table 14. The analysis of other evaluation tools led to the addition of themes on pest, disease and weed control as well as animal welfare. The importance of animal welfare was made clear when shareholder participation took place, and appeared as a preoccupation for TEV shareholders and consumers. The underlying principles and values identified in tables 10, 12 and 13 are also included in table 14, illustrating how TEV and farmer preoccupations were met and additional data was integrated. The plot-level indicators in table 11 were addressed in a separate tool which will be mentioned later.

Table 14: Themes, subsections and principles of Terre-en-Vue survey

Theme	Subsection	Underlying principles and criterion
1. Use of inputs	Fertilizer and animal needs Ingredients for on-farm processing Seeds and seedlings Energy	Limited use of non-renewable resources Minimized impact on atmosphere Farmer autonomy
2. Control of pests, diseases and weeds	Preventive measures Curative measures	Maximize biological processes Preserve life and diversity in soils Preserve water sources
3. Diversification of production: management of the genetic and cultural heritage	Diversity and relevance of cultivated species, varieties and breeds Crop rotation and prairie management Product diversity Management of natural elements	Increase planned and spontaneous biodiversity Preserve water sources
4. Economic stability	Profitability of the farm Added value of products External sources of income Investments and debts	Economic stability Adaptability Coherence Territorial anchorage Long term financial stability
5. Links with society and the local active group	Local group Society	Territorial anchorage
6. Distribution: supply chains and geographic proximity	/	Promote food security and sovereignty Territorial revitalization Territorial anchorage
7. Animal Welfare	Living conditions Health	Animal Welfare
8. Human well-being and work management	Labor management Workforce	Quality of life

The survey is composed of both open ended questions and multiple choice questions, in order to obtain comparable data from one farm to another or one year to another. This format also enables us to understand the reasoning behind practices, assess awareness of the farmer on certain topics, report on practices implemented by farmers and the main problems they face.

Some indicators in the literature also call for plot-level indicators, requiring data on physical, chemical and biological properties of the soil. A participatory soil assessment guide, inspired by TDL's *Diagnostic Humus* and the aforementioned indicators was developed. This was done separately to differentiate the analysis of the acquired plot and the farm as a whole. This aspect of sustainability assessment lies in the defining characteristic of TEV, which is to preserve soil quality and fertility. Additional indicators were identified to complement the existing environmental easement and grouped in a soil assessment guide, for which the table of content is presented in figure 6. Shareholders will have the possibility to participate in the soil analysis, which will be a pedagogical and participatory way of assessing soil health and initiating new learning and information exchange with the farmers. Inclusion is ensured through explanatory texts in each sections and easy tests to carry out.

1. **Reading the landscape**
   Representation of the farm
   Respect of the environmental easement

2. **Plot scale**
   Current conditions
   Management of plot over time
   Characteristics of the plot
   Erosion
   Slaking crust

3. **Spade Test**
   Choosing a spot
   Soil extraction
   Soil Texture: *Test 1*
   Horizons
   Defining structure: *Test 2*
   Plough pan
   Water
   Compaction and porosity: *Test 3*
   Soil life *Test 4: Nodule dissection*

Figure 5: Table of contents for plot-level analysis of Terre-en-Vue farms

3.2.6. Procedure

We decided the sustainability assessment should occur annually. Farmer contributions linked the process to the organization's shareholders, expressing the importance of including one local member in the annual visit, and disseminating main findings to the shareholders. Farmers also insisted on a procedure which "allows projects to evolve, and promotes exchanges which leave space for progress," "favors knowledge and material exchanges," "avoids a repressive control

and favors council." In order to preserve a dialogue between farmers and shareholders, we agreed to organize a second less frequent visit with local groups. Shareholders will be able to ask any questions, find out about any changes on the land and take part in evaluating several soil quality indicators.

Figure 7 illustrates the level and nature of analysis for the farm follow up, as well as the desired outputs of each visit. The annual visit can take place at various periods in order to have an overview of the farm in the long term. The data for the evaluation will be gathered based on available documentation and on a trust basis, during a farm visit. We decided this after TEV's employees realized that farm visits were an incentive for farmers to take part in the Agroecology Commission. The long-term aim of the process is to empower the farmers to conduct the evaluation themselves (similarly to PGS), rather than relying on the present TEV employee. TEV members should be in charge of gathering the data and summarizing findings. The evaluation is therefore based on farmer interactions during the visit, in which peer farmers lead the discussion based on the evaluation indicators. The outputs will be the completed follow-up survey, a transmission document (summing up main findings extracted from the follow-up), projected evolutions and subjects which farmers would like to discuss in the agroecology commission. Although the sustainability assessment is carried out by all farmers present, the objectives to be met for the following visit are set by the hosting farmer.

Soil assessment will be conducted by sampling soils for laboratory analysis and will be complemented by the soil analysis guide. The evaluation therefore focuses on the farm level and farmer involvement on an annual basis and plot level and citizen involvement less frequently, although both processes aim to be transparent and produce material which can be shared in the network. This procedure combines input from multiple actors and sources, on different temporal and spatial scales. TEV employees, agronomists, shareholders and network farmers all participated in the construction of a process aimed at encouraging on-farm sustainability.

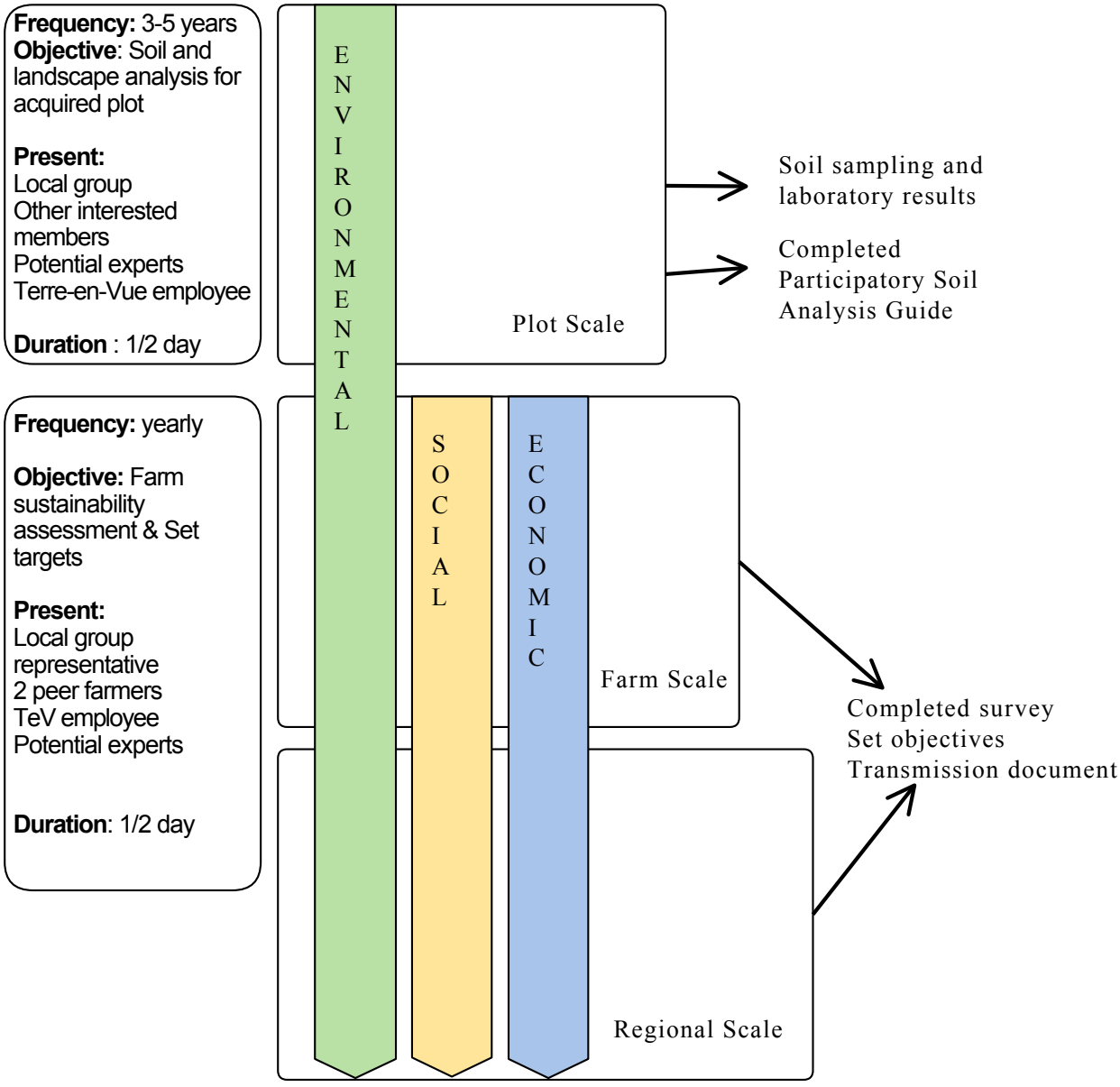


Figure 6: Implemented procedure and scope of action

4. Discussion

4.1. The progression of *Access to Land*

The *Access to Land* network impacts the agricultural scene through different spheres: environmental, social, economic, political. By combining these spheres, they promote agroecological practices in their respective regions.

4.1.1. Motivational underpinnings of the movement

TDL's publications in the *Arpenter* collection describe the reasons for farm acquisitions. The three main elements are: preserving farms from being dismantled, maintaining the agricultural vocation of land and establishing new entrants on land (Terre de Liens, 2017). This is consistent with the thesis research on TEV, which shows that their work both preserves existing agroecological farms and develops new activities or farms. For TDL farms, other, less frequent reasons include environmental and social principles of agroecology: preserving water resources, sustaining collective property, preserving biodiversity and preserving emblematic organic or biodynamic farms (ibid.). Land acquisitions primarily serve three purposes: facilitating entry for new actors, preventing farms from being dismantled as well as contributing to preservation of natural resources. However, the network's impact extends beyond the land acquisitions, and reaches a regional scale or the political sphere.

4.1.2. Agroecological practices in the movement

The results present evidence of grassroots initiatives promoting sustainability through improved access to land for farmers. This occurs through selection of farms to support, binding agreements with farmers and long-term follow-ups. TEV has promoted agroecological practices through their environmental easement, trust contracts and by relieving farmers from pressures associated with unstable access to land or investments associated to access to land. *Access to Land's* aim is to trigger a shift in the agricultural paradigm, highlighting the importance of including landscapes, natural resource conservation or rural isolation in the public debate. Furthermore, the land is held by the associations in perpetuity, extending their influence beyond the existing farms and current farmers, and maintaining the quality of the land and landscape in the long term.

By financially implicating consumers and limiting speculation on the acquired land, its purpose of feeding local populations can be met. Although some associations do not require local or short supply chains for distribution, consumer (financial) involvement is linked to farm

openness, and the majority of contacted farms voluntarily market part of their production through farm shops, community supported agriculture, local markets or stores. Local distribution is one of the various ways to involve communities in the agricultural sector. Community participation is crucial in the notion of management of land as a commons, whether there is financial involvement or not. For instance, the SA is a charity without community shares, but it still values the importance of educating the public about food and farming, as well as raising awareness on the importance of land stewardship which is supported by their pre-acquisition constraints and follow up procedure.

4.1.3. Perspectives and limits of the movement

TDL is the most advanced organization in the network, both in terms of acquired surface, number of farms and age. Overall, the network is still young and long term effects have yet to be reported on. In terms of surface, the network could extend its influence, especially if actors continue their political advocacy and regional involvement. Collaboration with public authorities, when possible, can further increase the positive impacts of the network. For instance, TDL regularly partners with Safer, an organism operating under the state and capable of observing and intervening in the agricultural land market (Fondation Terre de Liens, 2016). TEV actively works with local governments to demonstrate alternative possibilities to private property, and works to influence future policy on lease agreements.

Using the network as an actor in the land market sector could further improve food sovereignty[17] through management of land as a commons. This is coherent with Altieri's (2009) suggestion that "the emerging concept of food sovereignty emphasizes the farmer's access to land, seeds and water while focusing on local autonomy, local markets (…) and farmer to farmer networks." Sustainability assessment tools also include the notion of food sovereignty, such as the EDAPPA tool, which has food security and sovereignty as one of its transversal themes. In their 13 principles of Agroecology the GIRAF group (2012) includes agro-biodiversity as an entry point for the re-conception of food systems ensuring food sovereignty. The terms 'agroecology', 'sustainability' and 'food sovereignty' have been associated in existing literature, which illustrates their connection. In the article "Transforming Food Systems to Sustainability with Agroecology," Gliessman (2011) envisions food systems promoting

[17] "The right of peoples and sovereign states to democratically determine their own agricultural and food policies" (IAASTD)

"meaningful democratic participation that provides access to power for change." The scope of action of *Access to Land* both promotes food sovereignty and agroecology in Europe. TEV and its European partners heavily rely on civic engagement and financial participation, giving consumers tools to be active in the change towards environmentally fair and socially just farming systems. Transparency through periodic reporting and education through selection of farms open to agrotourism are a big part of these tools. Criteria and indicators were identified to promote food sovereignty in the sustainability evaluation created for TEV. These include input source, type and proximity of distribution, diversification of production, and limiting food waste.

The network voluntarily reaches its limits when it comes to impacting existing conventional farms. The efforts are focused on maintaining and developing current initiatives rather than targeting conventional farmers. This is not a constraint for the various organizations, due to the fact that demand is already higher than the assistance they can offer. In 2016, TEV received around 30 requests from farmers or future farmers whereas one acquisition and one donation took place throughout that year.

The identified obstacles for *Access to Land* partners is the difficulty of measuring impacts in the long term, and their limited financial and human resources. Precise data collection is demanding for both the farmers and employees or volunteers. The *Access to Land* network is still young and many of the organizations are still establishing or consolidating their activity, others receive no public funding or subsidies. For the time being, the organisations rely on civic engagement, such as TEV which counts on its local groups and ambassadors for field visits, fundraising and communication. A potential solution that has been developed by RWAG and TDL is to collaborate with universities, research institutes or other local actors to facilitate development of relevant tools (*Diagnostic Dialecte, HUMUS* and RWAG follow up procedure). This is part of TEV's upcoming ambitions for their structure. These constraints explain why the network's ideals are mostly developed through contractual agreements rather than long term monitoring. However, results illustrate the efforts implemented to promote sustainability through follow-up procedures which are constantly evolving. For instance, the SA is planning to review farms in order to develop sustainable strategies for carbon, water and biodiversity management. In 2016 TEV also engaged in a process aimed at evaluating practices over time.

4.2. Promoting change through long-term farm evolution

Although the data does not confirm the hypothesis that ecosystem services are directly developed through follow up evaluations, other existing tools have validated such an approach. The IDEA method is an evaluation that finds its originality in the fact that it does not verify application of regulations, respect of a specific guidelines, or justify subsidies. The tool's aim is to estimate the level of achievement of various objectives (Briquel et al., 2001). The approach promotes an individual follow-up in time, while leading a group dynamic in which discussions are led on how to progress towards sustainability. TEV used a similar approach: the combination of assessing the farm as a whole with other farmers and the subsequent objective of setting targets with the host farmer should reinforce the process's strength in promoting change. Farmers share experiences and practices which could inspire the farmer for future targets or solutions. The qualitative and quantitative collection of data over time evaluates trends in farm performances which allows the structure the assess whether objectives have been met, thus encouraging further change.

4.2.1. Creation of a composite group

The partial ownership of a farm's agricultural land questions the legitimacy of TEV to solely define the good agricultural practices to adopt, and draws attention to the need to involve farmers in the process. This led to the creation of a composite group including consumers, farmers, TEV employees and occasionally research institutes experts. Implementing a self-assessment procedure involving a composite group is a means to further define management of land as a commons without compromising farmer independence. The process is based on long term evolution and farmer participation. It was important to find a formula in which the farmers feel comfortable and desire to participate, rather than a system in which TEV represents an authority. However, scientific and expert inputs are welcome despite the fact that the farmers expressed apprehension or criticism towards institutions (CAP or labelling institutions) and academic research. Many of the farmers in the network expressed a disconnect between academic research and the reality of their fields, and a minority take an interest in scientific research. This survey attempts to combine academic recommendations with a field-based approach. Farmer considerations served as the basis for indicator definitions, instead of confronting scientific indicators to farmer opinion. Reaching consensus on indicators also solidified the sense of identity in the movement.

4.2.2. Choice of indicators

Like the IDEA method, the chosen indicators comply to three dimensions: a systemic approach, a temporal and spatial approach in which effects are susceptible to be visible in space and time, and an ethical dimension (Briquel et al., 2001). The sustainability indicators both in the IDEA method and in the TEV tool are founded on systems of values. In the case of TEV, the values were partly identified using farmer and shareholder inputs. This favors the management of land as a commons, in which both the worker of the land and its indirect users are included.

Existing sustainability assessment tools often focus on quantitative indicators and offer reference values for a series of themes. Many of these tools present a limit, because the type of farming system for which these tools are designed are not necessarily adapted to the TEV farms. For instance, these tools have not been successfully implemented for farms combining farm and non-farm activities (one in three farms in France) as well as new farms (Barbier and Lopez-Ridaura, 2010). TEV has implemented a tool which focuses on causality and dialogue, rather than setting fixed objectives and indicator values. This lack of precision was not identified as a limit for the time being because the aim is not to replace consulting services. Although most of the farms are certified organic, biodynamic or *Nature et Progrès*[18], this survey is complementary and tackles aspects not included in current labelling processes such as autonomy, financial independence, soil erosion and genetic diversification. The procedure aims at evaluating the practices on the farm and attempts to better understand the constraints under which farmers operate, potential impediments to the development of the farm and ways in which TEV or shareholders can further assist the farmers. For further qualitative data and the establishment of more developed action plans, it is possible to collaborate with local actors. For instance, in Belgium, the PAEXA online tool provides a detailed analysis of the farm with referenced indicators and could be carried out if the farmer requests it.

4.2.3. Implications and limits of the approach

The specificity of TEV's approach is the role of farmers in establishing the process and the inclusion of a wider public and engaging consumers in aspects of farming and food systems. Implementation of a periodic opportunity to participate in field visits and dissemination of information on the farms were identified as ways to raise awareness and give consumers a reason to invest in agricultural land.

[18] Nature et Progrès is a label corresponding to the wider definition of PGS

Both the process development and the implementation are limited by farmer availability and participation. During the creation of the procedure, insufficient time with the farmers limited their full appropriation of such a process. Furthermore, all farmers are invited during the agroecology commissions, however, they are not systematically present. This represents one of the main challenges in reaching consensus among farmers, and prolongs the time needed to implement change, such as implementing a participatory follow-up procedure. The movement also continues to grow, with new farmers who will not have had a say in the survey writing. For these reasons, a standardized procedure with reference values was not developed, but rather indicators were chosen to reflect concerns and priorities of the movement. This tool therefore recognizes the complexity and subjectivity of sustainability assessments and aims to integrate farmer preoccupations.

The contractual agreement with TEV favors the implementation of a follow up procedure by ensuring that TEV and its members can access the farm at least once a year. However, the process could benefit from additional farmer implication, prior to and following the visit. Visits have been limited to half a day but could be more complete if they lasted longer. The main constraint is therefore the human resources needed for the evaluation. Another limit of the method is the lack of validation of the procedure. TEV employees, farmers and stakeholders will have to maintain a dialogue in the long term and adjust to any unforeseen constraints.

The tool was inspired by-evaluation based processes but was constructed as a self-assessment process for several reasons. Firstly, as previously mentioned, all farms differ in production systems, size, and stage of development. Creating a standardized evaluation tool with a scoring system in which different farms could be compared did not correspond to TEV's expectations at the time and risked creating conflicts within the movement. Further research and time should be allocated if such an extensive tool is to be created in the future, potentially when the movement grows in size and the number of farms is increased.

5. Conclusion

This thesis tackles the issue of access to land for farmers in Europe. A network of organizations, *Access to Land,* uses the concept of management of land as a commons to facilitate access to land for existing or future farmers. The various structures aim for land management that meets its regional needs without compromising the needs of future generations. The results show that the primary aim of the network is to maintain the agricultural vocation and quality of the land in the long term, but that efforts transcend this initial objective and affect farming systems as a whole. By selecting farms and farmers to support, the different structures attempt to promote a shift in the current agricultural paradigm. The improved long-term access to land for farmers gives them means and incentives to develop activities they could not afford to previously. These activities are maintained and further developed by establishing guidelines such as organic certification, natural resource management, education for the public and for farmers, and regional economic integration. As a result, the network supports a diversity of farming systems presenting a series of social, economic and environmental services to their community. TEV's acquisitions have not only provided secure access to land for farmers, but they have also contributed to the improvement of some of the following factors: financial stability, autonomy, animal welfare, integration of farmers in a consumer network, territorial revitalization, territorial anchorage, education and food sovereignty.

The majority of the organizations share information about the farms to the community, promoting transparency in the network and sharing the accountability for the management of the land. Whether this occurs through farmer reports or assessed during structured follow-ups, there is a desire to gradually improve towards better practices. It appears that only RWAG has effectively implemented a long term follow up procedure for the totality of its enterprises, consisting in an indicator-based assessment of services provided by the regional food chain as a whole. This aspect may be developed with time, when the stability of these organizations is ensured and if sufficient human and financial resources are made available.

Prior to the implementation of the follow up-procedure, TEV presented the farms' evolution through their yearly reports. TEV's new structured approach aims to encourage on-farm sustainability by engaging in a conversation with a composite group of actors on a diversity of themes. These themes were collectively identified by defining values and projecting achievements for the movement. The combination of scientific quantitative indicators,

qualitative considerations and field-based inputs from peers should enable the identification of valuable practices on the farms and aspects to be improved. The sustainability of the system depends on all actors being aware of constraints and their possible role in improving the system. For instance, farmers are not solely responsible for distribution but rely heavily on consumer demand. This approach therefore holds all stakeholders accountable for their impact on sustainability.

Whether or not this monitoring procedure will lead to evolving practices is uncertain, due to its recent implementation and lack of comparative data. However, the model does support the production and dissemination of knowledge through peer construction. On-farm sustainability is encouraged through a learning approach in which exchanges with and between farmers are developed to identify aspects on which they can act (Tourdonnet et al., 2013). At the very least, this sustainability survey will give both the farmers and TEV employees a yearly opportunity to bring up points of concern or of interest and identify points to convey to shareholders, in order to maintain transparency and engagement in the movement. TEV has chosen this method for its potential to break technical and social isolation by organizing situations for collective learning (ibid., 2013).

The scope of action of *Access to Land* promotes both food sovereignty and agroecology by tackling aspects linked to: use of inputs, crop protection, biodiversity, economic viability, social inclusion, short supply chains and geographic proximity as well as animal welfare and human wellbeing. Further research on the effectiveness of managing land as a commons could highlight achievements and limits of the concept. Several research opportunities could tackle this issue: firstly, defining management of land as a commons more precisely could narrow the scope of practices and ensure further coherence in the movement. Currently, management of land as a commons involves an NGO, consumer financial and/or social involvement and an ideal of sustainable farming. Monitoring more closely the evolution of farms subjected to this governance could illustrate the achievements of the movement and its potential shortcomings. Secondly, structures presenting a strong evolution in practices could be more thoroughly analyzed to understand how their models lead to further development.

Such research could further assess the extent to which the management of agricultural land as a commons rather than a commodity left to the liberal market participates in securing food sovereignty and agroecology in Europe.

6. Bibliography

Altieri, M. A. (2009). Agroecology, Small Farms, and Food Sovereignty | Miguel A. Altieri | Monthly Review. *Monthly Review*, *61*(3). Retrieved from https://monthlyreview.org/2009/07/01/agroecology-small-farms-and-food-sovereignty/

Barbier, J.-M., & Lopez-Ridaura, S. (2010). Evaluation de la durabilité des systèmes de production agricoles : limites des démarches normatives et voies d'amélioration, 9 p. Retrieved from http://hal.archivesouvertes.fr/docs/00/51/05/28/PDF/Barbier_and_Lopez_Ridaura.p

Berthet, E. (2013). *Contribution à une théorie de la conception des agro-écosystèmes: Fonds écologique et inconnu commun*. Economie et finances. Ecole Nationale Supérieure des Mines de Paris, 2013. Français. <NNT : 2013ENMP0016>. <pastel-00874630>

Bird, G. W., & Ikerd, J. (1993). Sustainable Agriculture: A Twenty-First-Century System. *Annals of the American Academy of Political and Social Science*, *529*, 92–102. https://doi.org/10.2307/1048627

Briquel, V., Vilain, L., Bourdais, J.-L., Girardin, P., Mouchet, C., & Viaux, P. (2001). La méthode IDEA (indicateurs de durabilité des exploitations agricoles) : une démarche pédagogique. *Ingénieries*, *25*, 29–39.

Combien gagne un agriculteur en Belgique? (n.d.). Retrieved May 15, 2017, from http://trends.levif.be/economie/entreprises/combien-gagne-un-agriculteur-en-belgique/article-normal-518947.html

De Tourdonnet, S., Brives, H., Denis, M., Omon, B., & Thomas, H. (2013). Accompagner le changement en agriculture: du non labour à l'agriculture de conservation. *Agronomie & Environnement & Sociétés*, *3*(2), 19–27.

Demsetz, H. (1967). Toward a Theory of Property Rights. *The American Economic Review*, *57*(2), 347–359. Retrieved from http://links.jstor.org/sici?sici=0002-8282%28196705%2957%3A2%3C347%3ATATOPR%3E2.0.CO%3B2-X

Direction Générale Statistique et Information économique. (2012). Chiffres clés de l'agriculture, 27.

Direction générale Statistique. (2016). Chiffres clés de l'agriculture - L' agriculture en Belgique en chiffres. Statistics Belgium. Retrieved from http://statbel.fgov.be/fr/binaries/FR_Kerncijfers landbouw_2016_Web_tcm326-279479.pdf

Duru, M., Fare, M., & Therond, O. (2014). Un cadre conceptuel pour penser maintenant (et organiser demain) la transition agroécologique de l'agriculture dans les territoires, 23, 84–95. https://doi.org/10.1684/agr.2014.0691

FiBLand IFOAM. (2015). *The World of Organic Agriculture: Statistics and Emerging Trends, p29*

Fondation Terre de Liens. (2016). *Rapport Annuel de la Fondation Terre de Liens*.

Francis, C., Rickerl, D., Lieblein, G., Salvador, R., Gliessman, S., Wiedenhoeft, M., … Poincelot, R. (2003). Agroecology: The Ecology of Food Systems. Journal of Sustainable Agriculture, 22(3), 99–118. https://doi.org/10.1300/J064v22n03_10

Francis, C., Rickerl, D., Lieblein, G., Salvador, R., Gliessman, S., Wiedenhoeft, M., … Poincelot, R. (2003). Agroecology: The Ecology of Food Systems. *Journal of Sustainable Agriculture*, *22*(3), 99–118. https://doi.org/10.1300/J064v22n03_10

Gasselin P., Dalmais M., Terrier M., Le Blanc J., Barbier J.-M., Hannebicque J.-B., Massein G., Pigache M., Vétois Y., 2013. "Guide d'utilisation de l'outil Edappa" in Gasselin P., Tallon H., Dalmais M., Fiorelli C. (Eds.). Trois outils pour l'accompagnement à la création et au développement d'activités : Trajectoire, Cartapp et Edappa. Application à l'installation en agriculture. Montpellier : INRA, CIRAD, ADEAR LR, Montpellier Supagro, AIRDIE, Région Languedoc-Roussillon.

Gliessman, S. (2011). Transforming Food Systems to Sustainability with Agroecology. *Journal of Sustainable Agriculture*, *35*(8), 823–825. https://doi.org/10.1080/10440046.2011.611585

Hardin, G. (1968). The Tragedy of the Commons. *Science*, *n°162*(3859), 1243–1248.

International Planning Committee (IPC) for Food Sovereignty. (2012). *People's Manual on the Guidelines on Governance of Land, Fisheries and Forests*.

Jákli, J., & Volz, P. (2014). *The sustainability indicators of the Regionalwert AG and their potential further use*.

Life Prairies Bocagères. (n.d.). Retrieved April 23, 2017, from http://www.lifeprairiesbocageres.eu/

Lund, V. (2006). Natural living—a precondition for animal welfare in organic farming. *Livestock Science*, *100*(2–3), 71–83. https://doi.org/10.1016/j.livprodsci.2005.08.005

Manneville, V., Michel, N., & Amiaud, B. (2016). INDIBIO : Elaborer des indicateurs relatifs aux effets des pratiques agricoles sur la biodiversité dans les systèmes d'exploitation d'élevage. *Innovations Agronomiques*, *49*, 83–97.

Meul, M., Van Passel, S., Nevens, F., Dessein, J., Rogge, E., Mulier, A., & Van Hauwermeiren, A. (2008). Original article MOTIFS: a monitoring tool for integrated farm sustainability. *Agronomy for Sustainable Development*, *28*, 321–332. https://doi.org/10.1051/agro:2008001

Ostrom, E. (1990). *Governing the Commons, The evolution of institutions for collective actions*. (H. U. James E. Alt & W. U. in S. L. Douglas C. North, Eds.). Cambridge University press. Retrieved from http://wtf.tw/ref/ostrom_1990.pdf

Ostrom, E. (2008). The Challenge of Common-Pool Resources. *Environment: Science and Policy for Sustainable Development*, *50*(4), 8–21. https://doi.org/10.3200/ENVT.50.4.8-21

Peeters, A., Maljean, J. F., Biala, K., & Brouckaert, V. (2004). Les indicateurs de biodiversité pour les prairies : un outil d'évaluation de la durabilité des systèmes d'élevage. *Fourrages*, (178), 217–232.

Rigby, D., & Cáceres, D. (2001). Organic farming and the sustainability of agricultural systems. *Agricultural Systems*, *68*(1), 21–40. https://doi.org/10.1016/S0308-521X(00)00060-3

Rigby, D., Woodhouse, P., Young, T., & Burton, M. (2001). Constructing a farm level indicator of sustainable agricultural practice. *Ecological Economics*, *39*, 463–478.

Sandwell, K. (2016). Access to Land for Farmers in the EU: Conference Report. Brussels.

Smyth, A. J., & Dumanski, J. (1995). A framework for evaluating sustainable land management. *Revue Canadienne de La Science Du Sol*, *75*(4), 401–406. https://doi.org/https://doi.org/10.4141/cjss95-059

Solagro. (n.d.). *DIALECTE: Manuel d'évaluations des impacts de l'exploitation sur son environnement*.

Stassart, P. M., Baret, P., J-Cl, G., Hance, T., Mormont, M., Reheul, D., Stilmant D., Vanloqueren G.,Visser, M. (2012). L'agroécologie : trajectoire et potentiel Pour une transition vers des systèmes alimentaires durables, 1–21.

Taylor D.C., Abidin Mohamed Z., Nasir Shamsudin M., Ghazali Mohayidin M, ChiewE.F.C. (1993) Creating a farmer sustainability index: aMalaysian case study, Am. J. Alternative Agr. 8, 175-184.

Terre de Liens. (2015). *Outil de diagnostic environnemental pour les fermes de Terre de Liens*.

Terre de Liens. (2016). Mesurer l'Utilité Sociale et Environnementale. *Arpenter*, *1*, 1–46.

Terre de Liens. (2017). Accompagner l'Accès à la Terre. *Arpenter*, *2*, 1–25.

Terre-en-Vue. (2015). Enjeux. Retrieved April 23, 2017, from https://terre-en-vue.be/presentation/article/constats
Terre-en-Vue. (2015). Syllabus Foncier agricole - pour les ambassadeurs de Terre-en-Vue, 7p

Terrier M., Gasselin P., Le Blanc J., 2010. Evaluer la durabilité des systèmes d'activité des ménages agricoles pour accompagner les projets d'installation en agriculture : la méthode EDAMA. ISDA International Symposium, Montpellier, June 28-30, 13p

Van Cauwenbergh, N., Biala, K., Bielders, C., Brouckaert, V., Franchois, L., Garcia Cidad, V., Hermy, M., Mathijs. E., Muys, B., Reijnders. J., Sauvenier. X., Valckx. J., Vanclooster. M., Van der Veken. B., Wauters. E., Peeters, A. (2007). SAFE-A

hierarchical framework for assessing the sustainability of agricultural systems. *Agriculture, Ecosystems and Environment*, *120*(2–4), 229–242. https://doi.org/10.1016/j.agee.2006.09.006

Van Passel, S., & Meul, M. (2012). Multilevel and multi-user sustainability assessment of farming systems. *Environmental Impact Assessment Review*, *32*(1), 170–180. https://doi.org/10.1016/j.eiar.2011.08.005

Van Passel, S., & Meul, M. (2012). Multilevel and multi-user sustainability assessment of farming systems. *Environmental Impact Assessment Review*, *32*(1), 170–180. https://doi.org/10.1016/j.eiar.2011.08.005

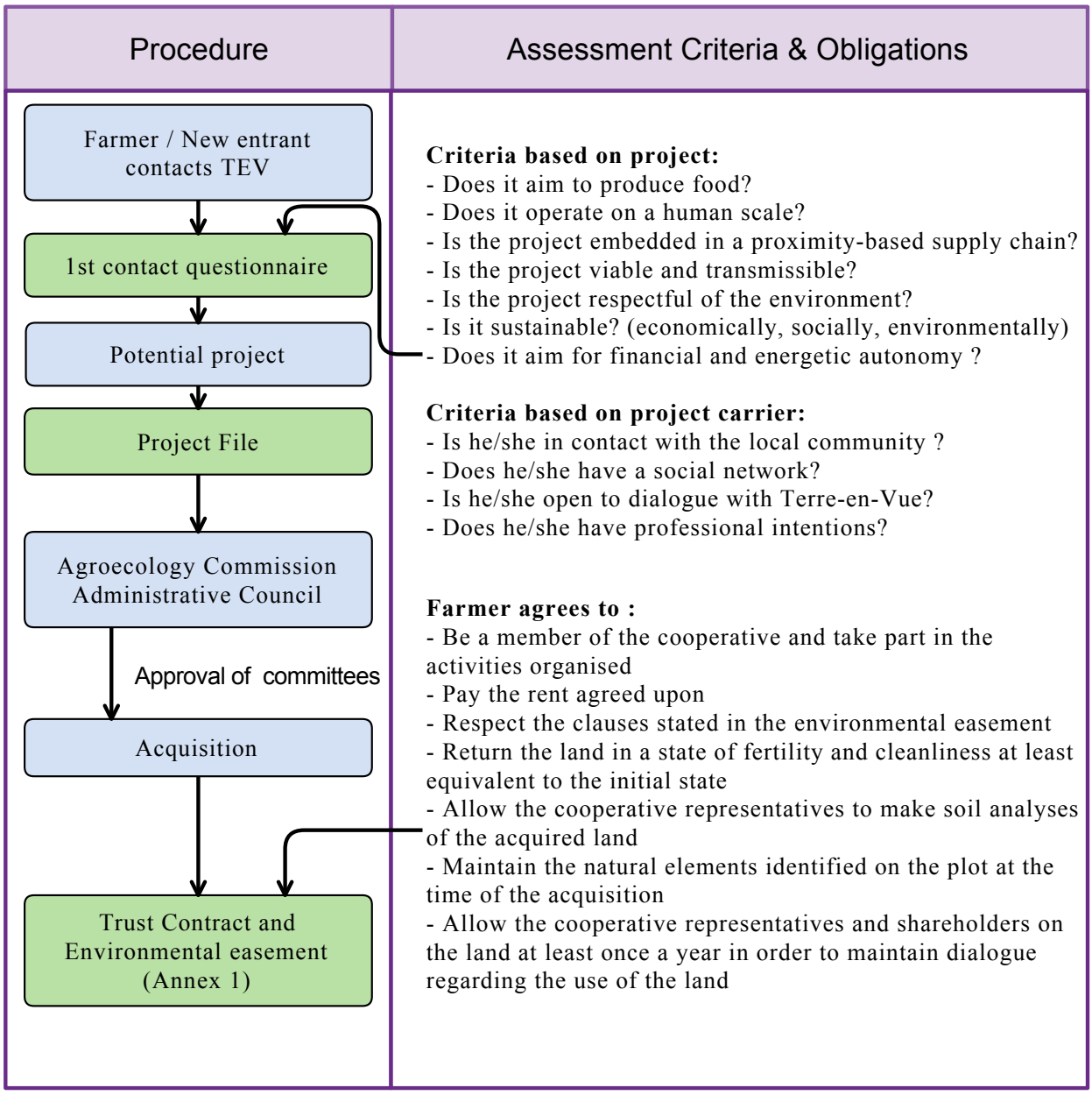
Viaux, P. (2000). La méthode IDEA (indicateurs de durabilité des exploitations agricoles) : une démarche pédagogique, 29–39

WCED (World Commission on Environment and Development) (1987) Our Common Future, Oxford University Press, UK

7. Appendices

Annex I: Acquisition process by Terre-en-Vue

Projects are selected by the employees based on the criteria listed in the figure. A project file is presented to the administrative council and must be approved before any action is undertaken. The current network farmers also have the opportunity to express their opinion on potential acquisitions during the Agroecological Commissions which take place four or five times each year. These different elements are the backbone of the cooperative, setting a common set of values, creating space for trust and dialogue with and between farmers.



Annex II: Clauses of the Terre-en-Vue environmental easement

Obligations:

1) The plot cannot be abandoned and must be managed conscientiously
2) The practices respect existing legislations aimed at protecting the environment
3) The following are forbidden:

- The spreading and pouring of synthetic chemicals on the land
- The use of synthetic plant protecting agents
- The use of genetically modified organisms on the land
- The deposit of any waste

4) Soil fertility, described in the initial assessment to be established, must be maintained or improved on average during the rotation. It is estimated by the humus content and organic matter content, the levels of biogenic minerals and the indices of biological activity recognized by scientific research. The maintenance or improvement of soil fertility is evaluated progressively, with reference to the preceding analysis and taking into account the time and place of the analysis. In the case of a structural decrease in soil fertility, crop management will be adapted to restore the long-term soil fertility potential.
5) In order to promote nitrogen autonomy in the agricultural system, a minimum of 50 kg of nitrogen per hectare per year on average must be fixed by legumes on the property. The calculation of the 50 kg is estimated on the basis of scientific literature and, for rotations, the average is calculated over the rotation period.
6) Practices likely to induce soil erosion are prohibited. For cropland, areas harvested before September 1st and followed by a crop after January fist should be covered between September 15th and November 15th (cover crops, cereal regrowth, nitrate trapping crops).
7) At least 5% of the surface must be dedicated to natural elements. Such elements include: hedges, isolated and in-line trees, groves, shrubs and bushes of indigenous species, fruit trees, ponds, pits, stone walls, grass or flower strips, and rocky outcrops. These 5% are calculated based on projections to the ground and the optimal size the element can reach.

Annex III: Clauses of the “Bail Rural Environnemental” (France)

« Droits et obligations du preneur en matière d'exploitation

« Art. R. 411-9-11-1. - Les clauses pouvant être incluses dans les baux ruraux dans les cas prévus aux troisième, quatrième et cinquième alinéas de l'article L. 411-27 portent sur les pratiques culturales suivantes :
« 1° Le non-retournement des prairies ;
« 2° La création, le maintien et les modalités de gestion des surfaces en herbe ;
« 3° Les modalités de récolte ;
« 4° L'ouverture d'un milieu embroussaillé et le maintien de l'ouverture d'un milieu menacé par l'embroussaillement ;
« 5° La mise en défens de parcelles ou de parties de parcelle ;
« 6° La limitation ou l'interdiction des apports en fertilisants ;
« 7° La limitation ou l'interdiction des produits phytosanitaires ;
« 8° La couverture végétale du sol périodique ou permanente pour les cultures annuelles ou les cultures pérennes ;
« 9° L'implantation, le maintien et les modalités d'entretien de couverts spécifiques à vocation environnementale ;
« 10° L'interdiction de l'irrigation, du drainage et de toutes formes d'assainissement ;
« 11° Les modalités de submersion des parcelles et de gestion des niveaux d'eau ;
« 12° La diversification de l'assolement ;
« 13° La création, le maintien et les modalités d'entretien de haies, talus, bosquets, arbres isolés, mares, fossés, terrasses, murets ;
« 14° Les techniques de travail du sol ;
« 15° La conduite de cultures suivant le cahier des charges de l'agriculture biologique.
« Art. R. 411-9-11-2. - En ce qui concerne les parcelles mentionnées au cinquième alinéa de l'article L. 411-27, les clauses retenues par le bail sont choisies parmi les pratiques culturales énumérées à l'article R. 411-9-11-1 conformes au document de gestion officiel de l'espace protégé considéré.
« Art. R. 411-9-11-3. - En dehors de ces parcelles les personnes morales de droit public et les associations agréées de protection de l'environnement choisissent parmi les pratiques énumérées à l'article R. 411-9-11-1 celles qui répondent aux préoccupations environnementales du lieu de situation du bien loué.
« Art. R. 411-9-11-4. - Le bail incluant des clauses mentionnées au troisième alinéa de l'article L. 411-27 fixe les conditions dans lesquelles le bailleur peut s'assurer annuellement du respect par le preneur des pratiques culturales convenues. »

Annex IV: Regionalwert AG sustainability themes and indicators

Social themes	**Underlying principles**
Employment structure	*Quality of workplace*
Remuneration	*Fair wages*
Quality of workplace	*Quality of workplace:*

Ecology themes	**Underlying principles**
Soil Fertility	
Biodiversity	*Diversification of planned and spontaneous biodiversity*
Application of the EU Eco regulation	
Development of organic farmland	
Resource use	*Limited use of non-renewable resources*

Regional Economy themes	**Underlying principles, criterion and indicators**
Distribution of value	
Value added in the region	*Food security and sovereignty*
Commitment in the region	
Dialogue in the value chain	

Annex V: Framework for analysis of Access to Land network

Theme	
Legal Status / Date of creation	
	Indicators
Sustainability of farm practices	Protection of biodiversity and environmental services Promotion of ecosystem services Management of territories and a dynamic occupation of landscapes Limited use of chemical inputs Efforts to limit use of fossil fuels Support of peasant farming, meaning a system promoting: - Autonomy - Role of nature - Know-how and skills - Promoting multi-functionality - Limiting commodification (Van der Ploeg, 2014) Support of "small scale" farming
Civic Participation and implication	Participation of shareholders Activities / boards in which they can take part
Revitalization of local socio-economic environment	Favorable to employment Promotes local food systems Maintains cultural heritage
Access to Land	Limit precarious Access to Land Promote integration of a new generation of farmers (including those not coming from an agricultural background) Enable transmission of farms
Commons	Approach towards commons

Farm data:

Farm	Size (ha)	Workforce	Certification	Production	Structure role	Processing	Distribution	Other

Annex VI: Details of Terre-en-Vue acquisitions

Farm and year of acquisition/ donation	Aim	Hectares acquired by TEV	Land previously part of the farm? Proportion of farmland (today)	Type of farm Size
Marion 2012	Increase agricultural surface	7,2	No 19,5 %	Beef production 37 ha
Marion 2013	Preserve Access to Land already in use by farmer	2,9	Yes: 7,8 %	Beef production 37 ha
Larock 2013	Free capital for farm development and ensure perpetuity of organic land	0,8	Yes 3 %	Diversified horticulture Milk and cheese production 27 ha
Renaud 2014	Increase agricultural surface (following loss of land)	9	No 18,4 %	Dairy production and transformation, cereal 49 ha
Bergerie d'Acremont 2015	Increase agricultural surface	4,5	No 26,5 %	Sheep breeding and sheepmilk processing 17 ha
Bierleux-Haut 2016	Ensuring perpetuity of organic land after dissolution of citizen association in ownership → donation to TEV	2,9	No 20 %	Diversified horticulture 15 ha
Bio-Lorraine 2016	Preserve Access to Land already in use by the farmer and adjacent to the farm building	6,3	Yes, 12.5 %	Diversified horticulture 49 ha
Larock 2017	Free capital for farm development and ensure perpetuity of organic land	5,0	Yes 19,6 %	Diversified horticulture Milk and cheese production 27 ha
Sainte Barbe 2017	Preserve Access to Land already in use by farmer	4,3	Yes 14,8 %	Diversified horticulture with livestock 27 ha
Jacquemart Farm Sarthe Farm Expected for 2017	Preserve Access to Land already in use by farmers Installation of 3 entrants	24	Yes 39% Yes 35,7 %	Cereal and bread production, beef and porc production 30ha Cheese production 30 ha
Rebaix Unknown date	New land access for farmers in precarious conditions	6,2	100 %	6,2 Diversified horticulture

Annex VII: Benefits associated to Terre-en-Vue acquisitions

Farm Name	Result from acquisition
Renaud	- Increase herd and profitability - Autonomy in fodder - Increased autonomy through cereal production - Steady clientele for new farm shop
Bio-Lorraine	- Maintain farmland close to the house - Support from local group for major decisions - 300 m hedge planted on farm
Marion	- Increased herd and profitability - Free capital for new stable with free stalling - Opportunity for organic certified farm shop and butchery - Stable local clientele
Bergerie d'Acremont	- Closer to EU certification for LU / ha - Reduce pesticide treatment on the farm - Fresh grass for lambs rather than hay - Additional investments: Mowed raw grass for ewes. Investment of 45 euros per day + self-loading mower ➔ limit purchase of hay and grain + Increase in production by 5000 L over 3-month period. - Additional investments: infrastructure for milk transportation from barn to parlor - Shares still coming in for future buying opportunity
Jacquemart & Sarthe Farms (owned by two brothers)	- Jacquemart: Maintain farm viability. Ensure farm financial stability after poor harvest in 2016 by avoiding further debt - Supportive shareholders - Sarthe: Avoid further loans and ensure farm viability - Allow installation of 3 new entrants with complementary activities (local goat breeds (2.8 ha) for cheese production, vegetable production (0.5 ha) and ducks (1ha)) and offering opportunity for expansion in long term. - Opportunities for cereal and manure exchanges, cross-grazing.
Farm-School Bierleux-haut	The land was acquired by another organization and later donated to Terre-en-Vue, but it was initially bought to maintain Access to Land for the farmer after the owner's death.
Sainte-Barbe	- Ensure farm viability and transmissibility: maintain farmland close to house - Hedge to be planted in fall 2017
Rebaix: 2 farmers	- Secure Access to Land for 2 vegetable growers - The surplus of land will serve as starter farms [19] for new farmers, favoring exchanges of practices between more and less experienced farmers.
Larock	- Ensure organic quality of land in perpetuity - Free capital for development of other ventures ➔ cheese production on farm

[19] Starter Farms, or Espaces Test Agricole (ETA) are areas on which entrants can try out their activity for a couple of years with access to markets, infrastructure and resources without any financial risks.

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