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Social Innovation in Magház (Seed House) Farmer Seed Network in Hungary

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ABSTRACT OF THESIS submitted by:

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As the awareness of the threat of crop diversity loss increased in the scientific and public discourse, in the 1980s self-organized farmer seed networks were set up worldwide in order to conserve crop diversity. These grassroot networks started to challenge the ruling practice of the industrialized agriculture and they also started to shape the discourse around seed challenging its dominantly understood objectified commodity characteristics. However the meanings associated with seed in relation to farmer seed networks have only begun to be researched. One of the first farmer seed network in Hungary, Magház, only emerged after 2013. Their appearance was extremely significant in the country considering that their innovative activity creates the potential to spread the knowledge on agrobiodiversity to broader audiences and to challenge the dominant understandings of industrialized agriculture.
Using qualitative methods, this thesis identifies a variety of meanings associated with seed in Hungary, showing that the concepts forming around seed are very rich. It emphasizes that the perspectives of a wide range of actors should also be taken into account, not only the discourse of the formal seed system. The thesis also analyses the types of social innovation achieved by Magház farmer seed network and six local communities dedicated to agrobiodiversity conservation, particularly in relation to dominant institutes. The research expands the current studies on Magház and local communities with more specific knowledge by identifying four barriers that reinforce the status of dominant structures and three opportunities that may empower the network and may help them to further achieve innovative changes that shape discourses around agrobiodiversity in Hungary.

Keywords: farmer seed networks, Magház, Hungary, crop diversity, transformative social innovation, agrobiodiversity conservation, meanings of seed

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List of Abbreviations

EU – European Union

NGO – Non-governmental organizations

FAO – Food and Agriculture Organization of the United Nations

US – United States

CBD – Convention on Biological Diversity

ITPGRFA – International Treaty on Plant Genetic Resource for Food and Agriculture

UPOV - International Union for the Protection of New Varieties of Plants

CBGC – Center for Biodiversity and Gene Conservation

NöDiK – Center for Plant Diversity

TSI – Transformative Social Innovation

TRANSIT – TRANsformative Social Innovation Theory

SZÖSZ – Union of Organic Farmers in Szer

EISD – Ecological Institute for Sustainable Development

CEU – Central European University

NÉBIH – National Food Chain and Safety Office

GDP – Gross Domestic Product

HSA – Hungarian Seed Association

GMO – Genetically Modified Organism

ÖMKi – Hungarian Research Institute of Organic Agriculture

1. INTRODUCTION

1.1. Problem definition

In 1996, *The State of the World's Plant Genetic Resources for Food and Agriculture* report published by the Food and Agriculture Organization of the United Nations (FAO) shocked the public opinion on the state of agrobiodiversity,[1] estimating that 75% of plant varieties has disappeared by the end of the 20th century (FAO 1996). The estimation was based on a 1983 study that assessed plant varieties found in commercial seed catalogues in the US from 1903. Therefore, this percentage of disappearance does not cover all plant varieties worldwide, but still raises concerns on the state of agrobiodiversity. Especially considering that, according to FAO estimates, only 30 crops are cultivated as a source of food, of which "only nine account for 66% of the total crop production" worldwide (FAO 2019, 114). As a result, the majority of plant species have become neglected and forced out of agricultural production and as a food source.

The worldwide underutilization of traditional, ancient varieties that adapted to specific local conditions is alarming since they not only ensure the livelihood of small-scale or marginal farmers and maintain a highly diverse gene pool for farmers and breeders, but also possess cultural and historical significance (Almekinders 1994; Tripp 1996; FAO 1996; Tscharntke 2005; Chamaco Villa 2005). However, the conservation of local varieties, just as agrobiodiversity, is threatened by multiple factors: the replacement of traditional varieties by modern, improved varieties,[2] the industrialization and globalization of agriculture; restrictive seed regulations; land use change; climate change, or urbanization. The conservation and appropriate management of agrobiodiversity is considered an important issue in the reduction of crop diversity loss (FAO 1996; FAO 2019; Donald 2004). Farmers have always had a significant role in agrobiodiversity conservation as they are able to maintain these traditional, old varieties, landraces, or heirloom varieties adapted to local conditions in their agricultural production systems.

[1] Agricultural biodiversity is a subcategory of biodiversity that as defined by the FAO as "the variety and variability of animals, plants and micro-organisms at the genetic, species and ecosystem levels that sustain the ecosystem structures, functions and processes in and around production systems, and that provide food and non-food agricultural products" (FAO 2019, 10).

[2] Specifically bred to be genetically uniform so they can fit into the control environment and modernized production practices of the farmer (Tripp 1996).

As the awareness of the threat of crop diversity loss increased in scientific and public discourses, in the 1980s self-organized farmer seed networks were set up worldwide in order to conserve crop diversity. These grassroot networks started to question the dominant practice of the industrialized agriculture by fighting against restrictions on seed usage and by defending the interests of small-scale farmers. They also started to shape the discourse around seeds, challenging its dominantly understood, objectified commodity characteristics. However, as the scientific literature on the discourses around seeds is very scarce, it is important to identify the different meanings farmer seed networks associate with seeds, as these meanings may significantly influence the activity of these networks.

The issues surrounding agrobiodiversity only emerged in Hungary after 2008, when the first farmer seed network dedicated to pomology (Gyümölcsész) was established. While the second farmer seed network – the focus of my research – Magház emerged in 2013, focusing on vegetables, fruits, and herbs. The establishment of Magház was extremely significant considering that the status of agrobiodiversity is not properly assessed by any state institute in Hungary. According to the status analysis of the Strategy for the Conservation of Biodiversity in Hungary adopted in 2015, more than 90% of the original ecosystem services that existed in Hungary in the past have already disappeared due to intensive agricultural and industrial production and urbanization (MA 2015). Only the *ex situ* conservation of plant genetic resources – preservation outside of natural habitat – has a history of practice, but the crop conservation done by farmers or farmer seed networks (on-farm conservation) was still absent in 2008 (MA 2008). Therefore, due to the lack of available knowledge on the status of agrobiodiversity in the country, together with its relatively new emergence, the development of the Hungarian network is still slightly lagging behind its international counterparts.

Consequently, the innovative activity of the Magház farmer seed network is an under-researched topic, and the current literature is very limited. Nevertheless, the topic is very relevant considering that the network was established in 2013 and is still in a grassroot form.

1.2. Research questions and objectives

Building on the problem definition, I first argue that identifying different meanings of seeds among the actors of farmer seed networks will help better understand their activity. Second, however recent the formation of the network, I argue that their connection to different local

communities and civil organizations dedicated to agrobiodiversity in the country creates the potential to spread knowledge on agrobiodiversity to broader audiences, to challenge the dominant understandings of industrialized agriculture, and to grow into a strong network that can eventually join in the international community of farmer seed networks. In order to examine this potential, the aim of my study is to analyse the activity of Magház farmer seed network and related stakeholders through the lenses of transformative social innovation theory, which helps to analyse the dynamics within initiatives, networks, and individuals who are leading transformative change in society by new ways of doing, organizing, knowing, and framing (Hexaltine *et al.* 2016). Therefore, I formulate my three research questions:

1. What does the seed mean to Magház and the related stakeholders in agrobiodiversity?
2. How do Magház and the related local communities achieve social innovation?
3. What are the main factors that help or hinder the socially innovative activity of Magház?

The three major objectives of the research are: (1) to identify different categories of meaning among stakeholders that contribute to framing their activity related to agrobiodiversity; (2) to analyse the socially innovative potential of Magház and the local initiatives and individuals through their new ways of knowing, doing, organizing, and framing; and (3) to identify the main factors that may help or hinder the socially innovative activity of Magház in Hungary.

Apart from transformative social innovation theory, the method of discourse analysis (Fairclough 1992) is applied to analyse the first and third objectives of the research which puts discourses in the broader context of social relations by analysing texts, interpretations and events as instances of socio-cultural practice.

1.3. Thesis structure

In Chapter 2, I will discuss the current discourse on agrobiodiversity conservation, the characteristics of formal and farmer seed systems with special regards to farmer seed networks in Europe. I will also review the status of agrobiodiversity in Hungary by examining its agricultural and political context. Then, I will introduce the case of the Hungarian farmer seed network, Magház. In Chapter 3, I will explain the theory of Transformative Social Innovation which I apply as a theoretical framework to analyse the case of Magház. In Chapter 4, I will present my methodological approach with the qualitative methods. In my analytical chapters

(fifth to seventh), I will identify the different meanings of the seed that emerged among the stakeholders of agrobiodiversity from my data, and I will make a detailed analysis on the social innovation potential of Magház and its network. Moreover, I will present the main barriers and opportunities that hinder and help the future development of Magház. Finally, in the conclusion I will summarize the main findings and consider possibilities for further research.

2. LITERATURE REVIEW

2.1. Agrobiodiversity conservation

As stated in the introduction, the conservation of agrobiodiversity significantly contributes to the reduction of crop diversity loss. One form of agrobiodiversity conservation is the management of plant genetic resources. "The term plant genetic resources for food and agriculture refers to genetic material of plant origin of actual or potential value for food and agriculture" (FAO 2019, 10). This section will present the current state of plant genetic resource management focusing on the international cooperation achieved through global policy frameworks, and how crop diversity is achieved through *ex situ* and *in situ* conservation. From the perspective of farmer seed networks, on-farm conservation and management of plant genetic resources (*in situ*) is the most important activity; however, they often also rely on the collections of *ex situ* conservation. Therefore, I will put the emphasis on the complementarity of these two approaches, which may significantly boost the on-farm conservation activities of farmer seed networks.

2.1.1 Global policy frameworks on plant genetic resources

In the last decades, international attention on plant genetic resources, agrobiodiversity, and rural livelihood has been increasing. In 1983, the Commission on Plant Genetic Resources was established as an intergovernmental body within the secretariat of the FAO. Ten years later, in 1992, the Convention on Biological Diversity (CBD), a legal framework for the preservation of biodiversity and its sustainable use was created. The CBD is considered a successful milestone as it was signed by 196 countries and legally bound them (UN 1992). The role and importance of plant diversity became globally known when the first report on the status of the world's biodiversity was published in 1996, pointing out the irreparable decline and damage of plant genetic resources. In 2001, specifically plant genetic resources got into the focus of attention, as the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) was adopted (FAO 2019). The ITPGRFA had great significance in terms of introducing the notion of Farmer's Rights which became an internationally accepted concept without a strict terminology – meaning that the parties are free to determine what they understand by these rights. Paragraph 9 recognizes that "farmers have the right to produce,

multiply, conserve, exchange and sell their seeds, the right to protect traditional knowledge, the right to participate equitably in the sharing of benefits, and the right to participate in relevant decision-making at the national level" (FAO 2017, 60). In 2010, the Strategic Plan for Biodiversity 2011-2020 was issued, which obliged the parties to create their own national strategies for the conservation of biodiversity (FAO 2019).

My focus, farmer seed networks, are intrinsically linked to Farmers' Rights to save, use, exchange and sell farm-saved seeds. However, the realization of these rights is heavily affected by other international and national regulations, such as domestic seed laws, seed certification, or plant breeders' rights. The implementation of Farmers' Rights has seen contradictory results since their declaration. India is considered a success story, as it incorporated these rights into its national legislation in the form of the Protection of Plant Varieties and Farmers' Rights Act in 2001 (Brahmi *et al*. 2004). Whereas in the EU, the situation is rather disappointing. In the EU, the 1991 International Convention on the Protection of New Varieties of Plants (UPOV) Convention gave breeders comprehensive rights in the form of intellectual property, therefore farmers are not allowed to save, exchange, and sell the seeds of protected varieties unless a license is paid. Furthermore, the EU seed law requires every propagating material (both traditional or protected) to be officially registered and certified in order to be offered on the market (Andersen 2016).

These two legislations are highly detrimental for the realization of farmers' rights to save, use, exchange, and sell their own seeds in the EU. These legislations were originally implemented to ensure seed health and quality, but paradoxically became the major obstacles for the realization of farmers' rights – which essentially contributes to plant genetic diversity that ensures plant health (Andersen 2016). The UPOV model was met with widespread resistance in some countries, such as France, where the Kokopelli seed saver organization won a European court case against a seed company (Bocci 2014), which opened the way to a more radical criticism of the current seed legislation. However, so far, the attempts to change legislation have failed, which only contributes to rapid crop diversity decline in Europe – since farmers, the custodians of plant genetic resource conservation are not supported by the law.

In the following sections, I will discuss the two major strategies to conserve plant genetic resources and explain why they are important for farmer seed networks.

2.1.2 Management of plant genetic resources

Agrobiodiversity conservation can be achieved with two strategies: *in situ* and *ex situ* conservation. *In situ* conservation is the preservation of plant species, varieties, landraces, or wild types in their natural habitat. *Ex situ* conservation is the preservation of plant species, varieties, and landraces outside their natural habitat which usually happens in gene banks, zoos, botanic gardens, and their maintenance is very costly (FAO 2019).

The major difference between the two strategies is that *in situ* maintains species in a dynamic relationship with their environment which enables ecological processes to occur and supports adaptability to changing environments. It allows to maintain a large amount of genetic diversity in a cost-effective way (Zegeye 2017). Conversely, *ex situ* collections only reflect the genetic variation in individual populations at the time of collection, which means that they are fixed – as opposed to being in a dynamic relationship – and they could deteriorate over the years if they are not kept properly. Therefore, *ex situ* is not able to support evolutional and ecological processes, thus it limits adaptation to changing environmental conditions. Nevertheless, *ex situ* collections are an important source of research, for example breeding purposes (Bellon 2017).

A special type of *in situ* conservation is on-farm management – which is the maintenance of traditional, old varieties, landraces or heirloom varieties adapted to local conditions through agricultural production. As opposed to high-input agriculture, on-farm management is only successful in low-input agroecological practices, such as organic production or permaculture, agroforestry, etc. (Zegeye 2017). Moreover, the knowledge and practices of farmers all around the world play a significant role in the management of agrobiodiversity. The importance of *in situ* and on-farm conservation in the conservationist discourse and practice is highly supported, as this form of preservation ensures the continuous adaptability of plants, and thus their potential for evolution (Maxted *et al.* 1997). However, keeping genetic resources frozen under a roof without any evolutionary opportunity in a natural habitat greatly restricts *ex situ* collections in their ability to adapt to changing environmental stresses. Since *in situ* conservation allows plant varieties and species to naturally adapt to altering agricultural practices or newly emerging food preferences through selection, it should be made available for farmers to facilitate production diversification.

The number of on-farm conservation cases have been increasing worldwide thanks to national programmes (e.g., European Cooperative Programme for Crop Genetic Resources Network)

and civil initiatives dedicated to agrobiodiversity (FAO 219). However, many countries do not consider it a priority, like Hungary, and the absence of coordination in national policies due to the lack of information and data on on-farm management is staggering (MA 2015).

Thanks to the activity of these initiatives, the knowledge on the characteristics and dynamics of local, informal farmer seed systems and seed exchange networks has been increasing. My thesis, also, aims to add to this growing knowledge by showing how the Hungarian farmer seed network contributes to seed conservation through its activity.

There is an urgent need to preserve species and ecosystems threatened by diversity loss and continuous change (Pritchard *et al.* 2011), and both *ex situ* and *in situ* strategies have a significant role to play in the preservation effort. So-called "complementary approach," (Maxted *et al.* 1997, 34) combines the two strategies in order to stop or at least to slow down diversity loss. One method can support for the other in times of need, emphasising the opportunity to create strategies that apply a combination of techniques and tools of both *in situ* and *ex situ* methods to achieve plant genetic resource conservation (Maxted *et al.* 1997; Arndorfer *et al.* 2009; Zendeye 2017). Certainly, working together in an integrative way may prove more effective than widening the gap between the two alternatives.

Although farmers can effectively achieve crop diversity through on-farm plant genetic resource management, they can rely on the gene collection stored in private or public gene banks when it is necessary. However, there is no exact data on the number of farmers (and farmer seed networks) worldwide who apply to receive seeds of ancient, traditional varieties or landraces which have already disappeared from their production and are only stored in these gene banks or private collections. *Ex situ* conservation is as important as *in situ* management since it serves as a final repository farmers and breeders can turn to in order to start their on-farm conservation – or to breed new varieties. In this way, farmer seed networks do not just become able to obtain traditional seeds, but they can save, use, and exchange within and outside of their network.

I would also like to highlight in this review that the scientific discourse on the conservation of agrobiodiversity uses the concept of plant "genetic resource" instead of "seed." *Ex situ* conservation refers to it more as a material that should be used as a future investment, whereas *in situ* understands it in continuous connection with evolving ecosystems. This difference between the two concepts among different stakeholders related to agrobiodiversity makes the different discourses around seeds important for research.

After reviewing the global policy frameworks affecting the state of plant genetic resource conservation and its two main strategies in relation to farmer seed networks, I will discuss the emergence of farmer seed networks dedicated to on-farm management of agrobiodiversity in Europe.

2.2 Farmer seed networks in Europe

This section aims to present the current knowledge on the two major seed systems, which are sometimes referred to as the formal seed system and the farmer (informal) seed system. I will place special emphasis on the characteristics and issues of farmer seed networks as it is a focal point of this thesis. Several existing researches related to the discourses around seeds will be addressed.

2.2.1. Seed systems

Farmer seed systems presumably have existed ever since humans started cultivating the land, but they differ regionally and locally, and their activity is not necessarily deliberate. Throughout the centuries, crop varieties and species were bred and maintained by farmers, communities of farmers, or families solely using their own skills, knowledge, and cultural practices. Therefore, diverse cultivation and seed exchange by farmers most likely has existed for a long time – otherwise, old varieties and landraces would have disappeared by now (Puatasso *et al*. 2012).

In farmer seed systems, farmers preserve crop varieties through their own selection based on individual preferences. The result of this selection is called landrace, that has adapted to the local environmental stresses through years. The yield stability provided by landraces proves to be significant for ensuring the survival of the farmer in difficult times. Since the farmer works with several varieties of a species, the introduction of new genes into the population results in new genetic diversity. The crop production is primarily achieved to maintain household food consumption or other purposes, not only for the purpose of selling. Farmers rely on seed saving, i.e., a portion of the harvest will not be processed or consumed but will be kept for the next year (Almekinders 2002; Devkota *et al.* 2014). Therefore, this system not only incorporates crop

production, but enables crop development and the maintenance of genetic diversity (*in situ*) which is extremely valuable for agrobiodiversity (and absent from the formal breeding process).

The formal seed system is considered to be a complex production system deliberately established after the Green Revolution[3], which consists of a series of activities resulting in certified seed. These activities start with industrial breeding, creating high-yielding, usually hybrid seeds which will be registered[4] and certified[5] according to certain quality parameters. However, hybrid seeds strongly restrict farmers' seed saving activity as hybrids are not able to reproduce the seeds that would be as productive as their parents, therefore they have to be bought each year. Then, the certified seeds will be traded and marketed by multinational agrochemical or seed companies to (mainly large- or medium-scale) farmers. Consequently, this system is strongly market-oriented, commercialized and highly structured, and relies on immense technological input (Almekinders 2002; Devkota *et al.* 2014; Sperling 2013).

The main principle within the system is to maintain the identity and purity of the varieties, therefore they have to be physically and physiologically uniform, distinct and stable.[6] The system is controlled by private or public quality certifications or authorities (which are very expensive processes) within related regulatory frameworks. This enabled the proliferation of patenting in certain countries and the ownership of intellectual property rights over plant varieties (UPOV) mainly by large companies (Almekinders *et al.* 2002)These complex processes create a unique competitive advantage for the formal sector and marginalizes the agrobiodiversity conservation of farmer seed systems. More importantly, the formal system is supported by governmental structures through agricultural subsidies which have resulted in the heavy industrialization of the sector and the spread of hybrids and modern varieties among farmers.

[3] Green Revolution during the 1960-70s can be briefly described as the great boom in the production of food grains (rice and wheat) mostly in the developing countries due to the introduction of high-yielding varieties, excessive application of fertilizers, chemicals, irrigation and heavy mechanization (Trip 1996).

[4] Registered seed is "the progeny of the foundation seed grown by selected farmers, handled to maintain genetic purity and identity, and has undergone field and seed inspections to ensure conformity with standards" (FAO 2016,66).

[5] Certified seed is "the progeny of foundation, registered, or certified seeds, handled to maintain sufficient varietal identity and purity, grown by selected farmers under prescribed conditions of culture and isolation, and subjected to field and seed inspections prior to approval by the certifying agency" (FAO 2016,66).

[6] DUS testing determines that a newly bred variety differs from existing varieties within the same species (Distinctness), that the variety's characteristics uniformly conform to the same description (Uniformity) and that the variety does not change from generation to generations (Stability)" (FAO 2016, 61).

As farmer seed systems have become increasingly marginalized, several misconceptions have emerged in relation to their function. Farmer seed systems are often referred to as "informal" seed systems to be distinguished from formal seed systems. But Coomes *et al.* (2015) emphasise that using the word "informal" denotes a sharp distinction between the two systems, whereas in reality they are quite permeable, and a certain extent of exchange exists between the systems.

Another misconception is related to seed quality. Seed certification institutes shape the meaning of seed quality allowing negative interpretations to take root regarding the seed quality in farmer seed systems (i.e. that the latter are of low quality). Although research on seed quality in farmer seed networks is very rare, Bishaw *et al.* (2012) presents evidence that very little difference exists between the quality of formal and farmer seed systems. Aistara (2011) also points out that institutional interpretation of quality is strongly linked to purity and varietal purity in seed certification was established by "tracing the genealogy of the seed." Purity has multiple requirements and criteria according to seed certification (UPOV Convention in Europe) frameworks, and seeds that fail to fulfil these criteria cannot be certified, therefore they are not considered quality seeds. This excludes breeding capabilities occurring in farmer seed systems and only widen the gap between farmers and breeders.

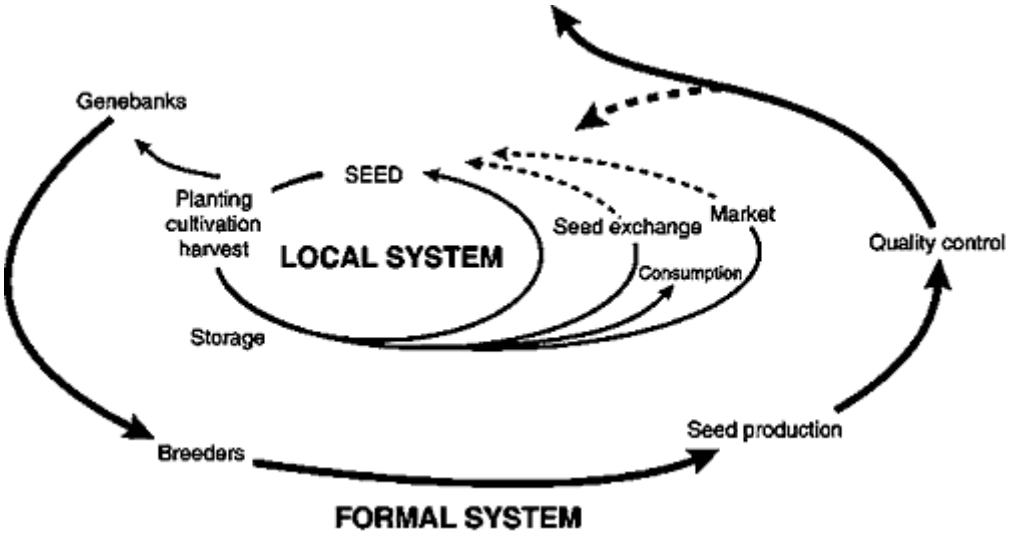

Figure 1. The two linkages between formal and farmer seed systems (Almekinder 2002)

Thanks to the growing body of research targeting farmer seed systems, there have been attempts to integrate the two systems knowing that together they could achieve more. Almekinders (2002) explains that the formal system operates as a chain, in a one-directional process, whilst farmer seed systems are integrated systems in which the act of seed exchange links household units and farmer communities. The link exists between the starting points (gene banks) and the end points (seed distribution) of the two systems (Figure 1).

The discourse on the possible cooperation between the two systems emphasizes the necessity of strengthening farmer seed systems in order to understand their needs and preferences, link their crop development activity through participatory breeding and supporting their capacity for seed production, storage and distribution (Sperling 2013; Almekinders 2002).

2.2.2 Discourses around seeds

The above seed systems review is also connected to my first research question, even if there is little concrete research explicitly on the meanings of seeds related to farmer and formal seed systems. But I emphasize that the discourse around seeds for the formal seed system is related to institutional purity and the certification process, which certainly restricts the understanding and meaning of seeds envisioned by other groups like farmers or non-professionals. However, the scientific community widely uses the concept of "genetic resource" in relation to seeds. Fenzi and Bonneuil (2016) show that the scientific discourse around "genetic resources" first evolved from the concept of "stock of genetical material" access to which is restricted to breeders or experts, to the concept of an "ecological vision" (Fenzi and Bonneuil 2016, 72), that combines agrobiodiversity and ecosystem services involving a wide range of actors from farmers to civil organizations. This suggests that seed as a genetic resource had been considered more of an object for a long time in the scientific community and in the formal seed system, rather than a living organism. This objectifying notion is supported by the previously mentioned *ex situ* discourse around seed which refers to it more as gene pool source which highly limited the possibility of other understandings forming around it.

Ducottet (2018) studied the visions and concepts around genetic resources of a variety of stakeholders related to agrobiodiversity around Europe in her thesis titled *Genetic resource, a scientific concept emblematic of the relationship to the 'living'*. She found that the use of "genetic resources" still reminds the majority of the respondents of an objectified material exclusive to genetics. This suggests that seeds are considered living beings for most of the actors involved in agrobiodiversity, which ultimately questions the ruling paradigm on seed of the formal seed system.

Moreover, the concept of "peasant seed" has been evolving in farmer seed networks in Western Europe due to the innovative activity of the French peasant network, Réseau Semences Paysannes. This concept acknowledges the seed both as a material for reproduction and also as

a variety that is altered by history and continuously adapts together with the peasant farmer and its practice (Bocci 2009). This concept denotes a more holistic connection between the farmer and the seed than just regarding it a simple material resource waiting to be exploited. Therefore, this farmer network consciously wants to change the discourse around seeds in opposition to the formal seed system which limits seeds to the level of genetic resource or a commercialized commodity.

It seems that the dominant discourse around genetic resources does not reflect the true understandings of other actors related to farmer seed systems. Moreover, the limited communication between the two systems precludes narrowing the gap between their different understandings. Therefore, my first research question aims to address the gap between the different concepts and meanings of seeds among a wide range of actors related to farmer seed systems. In order to avoid misunderstandings, I use the more general "seed" instead of "genetic resource". Therefore, my research on the meanings of seeds will contribute to the current knowledge on how actors related to farmer seed systems conceptualize seed and how this conceptualization shapes their activity.

After the review of the formal and farmer seed systems and the emerging discourses around the seed, in the next section I will discuss the importance of farmers seed networks in Europe.

2.2.3. Farmer seed networks in Europe

Farmer seed networks belong to the category of farmer seed systems as they operate within the confines of unwritten social norms and rules of exchange. As opposed to hybrid seeds, the farmer seed networks typically use old, traditional varieties, landraces or heirlooms, but a diverse range of different seeds of domesticated and non-domesticated plants are circulated within the network, too. The source of the seeds varies: they can come from the farmer's own garden, from their neighbour, from the local market, from the network's own common collection or seed pool, from NGOs, from gene banks, research institutes or from traders (Coomes *et al.* 2015).

Seed exchanges (which can be farmer gifting, exchange events, bartering or purchasing outside of the formal systems) are considered the most significant social activity among farmers, which facilitates the circulation of seeds, information, knowledge or other goods (Puatasso *et al*. 2012;

Devkota *et al.* 2014). Moreover, due to seed exchanges, farmers can refresh their seed collection by replacing degenerate seeds. Seeds from many places containing different characteristics enter the system as a result of seed exchanges between farmers, relatives, strangers (Almekinder 2002). Even if some farmers would rather save their own seeds without acquiring them somewhere else, they are still part of the network of exchanges through social contacts and interactions.

As public awareness about agrobiodiversity increased, more and more farmer seed networks started to emerge in the form of grassroot civil initiatives, non-profit associations, foundations, NGOs, or local communities in the 1970-80s; first in the US, then Australia, India, and a few countries in Europe. The first European networks were Pro Specia Rara in Switzerland (the oldest in Europe) and Arche Noah in Austria, due to similar agricultural trends as in the USA. In the rest of the EU, farmer networks first emerged after the 2000s: the Réseau Semences Paysannes in France; Red de Semillas in Spain, and Rete Semi Rurali in Italy (Balázs *et al.* 2015).

Seed networks appeared in response to complex social, agricultural, political, and cultural issues which affected farmers collectively: the need for protecting agrobiodiversity in light of the intensification of agroindustry; the protection of knowledge in relation to conservation techniques or seed saving, the facilitation of knowledge and seed exchanges among farmers, limiting the loss of traditionally or culturally important crops and tastes; or the limited access to seeds due to restrictive seed legislations (Balázs and Aistara 2018). Réseau Semences Paysannes or Red de Semillas emerged in response to restrictive measures (the UPOV Convention and EU seed laws[7]) significantly endangering the realization of farmers' rights, and mobilized in order to harmonize the legislations with international treaties.

These networks have been making efforts for several years now to create a common platform to organize the different national networks in order to lobby for alterations in EU legislation. However, the sharp difference between national networks in terms of agrarian history and culture as well as language barriers hinder the establishment of an international organization (Balázs *et al.* 2015). At the same time, their operation all around Europe suggests that they have

[7] The EU seed law requires the registration of all types of varieties in the EU Common Catalogue with some exceptions for non-commercialized usage, small quantities for end-users, economically insignificant varieties, or maintaining diversity through seed swaps and local commercialization (Balázs and Aistara 2018).

been actively reframing the role of farmers and shaping the issues of agrobiodiversity and farmers in Europe, which suggests a strong potential for social innovation.

After reviewing the characteristics of farmer seed networks and their emergence in Europe, I will discuss the gaps in the current literature on farmer seed networks in relation to social innovation, the focus of my second research questions. In the next section, I will present the case of Magház farmer seed network with the consideration of the Hungarian agricultural and institutional context.

2.3. Magház (Seed House) farmer seed network in Hungary

In this section, I will narrow down my scope to Hungary and present briefly the main characteristics of the agricultural production along with the present state of agrobiodiversity. I also give an overview of the Hungarian seed legislation, which fundamentally influences the activity of farmer seed networks in the country. I will draw a parallel between Magház and the values and activities of local communities that work to conserve agrobiodiversity in Hungary. Finally, I will present the case of Magház building on the study of Balázs *et al.* (2015).

2.3.1. The state of agrobiodiversity conservation in Hungary

Hungary has been blessed with excellent agroecological characteristics, as 80-85% of its soil is suited for agricultural production. Currently, 57.4% of the country's 9.3 million hectares territory is under agricultural production (MA 2013, MA 2015).

After the Green Revolution, the state socialist regime supported the development of industrial agriculture, therefore the productions soared. However, the overexploitation of natural resources, the spread of invasive species, inappropriate and harmful chemical-driven agrotechnology, the desertification of lands and the absence of sustainable production had its toll on the country's biodiversity. Even after the change of regime in 1989 and the EU accession in 2004, the production technology did not change much, only the ownership and average size of the lands (MA 2013). The number of corporate farms has been increasing (9000 farms, currently) which dominate 70% of the total agricultural area (CSO 2018).

According to the status analysis of the Strategy for the Conservation of Biodiversity in Hungary adopted in 2015, more than 90% of the original ecosystem services that existed in Hungary in the past have already been disappeared due to intensive agricultural, industrial production and urbanization. The urban population is continuously growing while the rural population is declining. The quick disappearance of small farms and homesteads poses a serious threat to the country's food security and plant diversity (MA 2015).

In Europe about 1.7 million plant samples are stored in *ex situ* conservation, of which 150.000 can be found in Hungary, which is a significant collection compared to the country's small territory (MA 2013). The National Center for Biodiversity and Gene Conservation (CBGC) located in Tápiószele – the biggest gene bank in the country, formerly called Center for Plant Diversity (NöDiK) – is responsible for the coordination of plant genetic resources since 2010. The Center stores 94.000 plant accessions including 48.000 samples that are unique only to Hungary (MA 2013).

In Hungary, the Convention on Biological Diversity was incorporated into national law in 1995. In 2003, a governmental decree on the Conservation of Plant Genetic Resources came into effect, followed by a governmental decree on the certification of plant varieties and seed production in 2009. Then, in 2011, another governmental decree on the certification and trading of vegetable and fruit landraces and farmers' varieties was adopted, which was a significant step toward the recognition of on-farm seed conservation (MA 2015). However, in the 2019 National Inventory of Registered Varieties only 13 vegetable landraces, 11 vegetable amateur varieties, and one arable variety (maize), and no amateur varieties are officially listed, as well as 66 fruit landraces (NFCSO 2019). But the listed number of landraces has not significantly changed since 2011, which suggests that the low supply of official landraces could have created disinterest in farmers for producing and managing landraces in the country. Also, it signals a disinterest in decision-making to alter seed certification processes that would support farmers' capacity (and breeding activity) to manage traditional varieties.

In 2013, the government adopted the first *National Strategy for the Conservation of Plant Genetic Resources for Food and Agriculture 2013-2020* in accordance with the European plant genetic resource conservation strategy – which was a huge step toward mainstreaming the importance of plant diversity in the country. Additionally, the strategy formulates targets and goals toward the realization of on-farm management by farmers seed networks.

National Strategy for the Conservation of Plant Genetic Resources for Food and Agriculture 2013-2020

In 2008, when the National Country Report on the State of Plant Genetic Resources for Food and Agriculture (MA 2008) was published, it did not mention on-farm conservation or farmer seed networks (only listed civil organizations that are engaged in nature protection and preservation of biological diversity in Hungary). Therefore, it failed to provide adequate information on the status of on-farm management done by farmer seed networks, suggesting that a very little is known about their activity in the country. Thus, reviewing the Strategy could help to understand the government's position on on-farm management of plant genetic resources.

The aim of the Strategy is to create and adequately finance an integrated plant genetic resource conservation system in Hungary and linking local and regional plant conservation areas while promoting landscape farming practices (MA 2013). In order to do so, it aims to integrate the activities of many different plant conservation institutes into a centralized system. More than 12 conservation institutes operate in the country independently in the form of research institutes, universities, or national parks. The Ministry of Agriculture monitors the implementation of the Strategy, but it is implemented by CBGC. It promotes on-farm management by launching nationwide projects to propagate gene bank samples, landraces, old varieties in farmers' production systems. It recognizes the importance of informal farmer seed systems and supports seed exchanges and civil initiatives to establish civil seed collections by state tenders (MA 2013). However, the strategy lacks appropriate status analysis and the definition of measurable targets to achieve by 2020.

All in all, in the absence of a status analysis it can be observed that there is virtually no baseline data to assess the status of on-farm management in the country. However, the government seems to be supportive of farmers' rights to save, use, exchange their own propagating materials as Hungary is the contracting party of related policy frameworks. The legal environment does not prohibit the organization of seed exchanges in the country. Overall, specific aspects of the Strategy are significant improvements compared to the state of on-farm management in 2008. Nonetheless, official reports have not yet been made publicly available about the results. Therefore, a more detailed understanding is necessary on the status of on-farm management in the country and the activity of relevant institutes in relation to farmer seed networks.

2.3.2. Local communities for conserving agrobiodiversity in Hungary

Before presenting the case of Magház, it is important to understand the specific characteristics of Hungarian local communities that are interested in self-mobilization to conserve agrobiodiversity in their production systems. Some of them are connected to Magház and function as its local hubs, some work independently. The literature on these Hungarian local initiatives is scarce, therefore this overview serves as a starting point to understand their characteristics and motivations that may influence Magház.

Védegylet Association – a Hungarian green NGO – conducted seven case studies on local communities interested in agrobiodiversity conservation in 2012. The terminology on local communities is very loose in the study: these initiatives can range from civil organizations to smaller profit-oriented local companies. Case study participants were: Agricomplex Kft., Polyán Association, Gyümölcsész Network, Union for the Living Tisza (SZÖVET), the Institute of Agriculture of the Hungarian Academy of Science, Biokultúra Association, and the Chamber of Agriculture in Bács-Kiskun county. Védegylet's study (2012) points out that these Hungarian local communities are interested in conserving agrobiodiversity for the following reasons: (1) Traditionalism: the traditional ways of the old Hungarian rural life and related agricultural heritage. For instance, the organic farmers of Biokultúra Association are encouraged to try out old landraces; emmer and einkorn are very popular among arable farmers even if they do not yield much. (2) Food self-sufficiency: local communities aim to be self-sufficient and autonomous in their food supply. Through the Sustainable Village Program started by Polyán Association jointly with Biokultúra Association, farmers primarily produce for their own provisions using sustainable methods, with some exceptions to the farmers' markets as well. (3) Landscape stewardship and climate change mitigation: Agricomplex carefully chooses the varieties and landraces for their production that are able to survive in extreme conditions such as drought and desertification tendencies in the region of Homokhátság. (4) Rural development: Polyán Association initiated a program in Mikóháza in which local products[8] produced through agroecological methods are marketed in order to support the livelihood of the local community.

These four concepts among the Hungarian local communities seem to be the driving force behind their activity. Since Magház is composed of several local communities, these concepts

[8] Since local products are marketed only within the catchment of their production area (50-70km), several local touristic and hospitality services build on local products (Védegylet 2012).

serve as a comparative basis for my research targets to see whether they show up during the social framing process of my research subjects as well and how they shape the innovative activity of Magház.

Moreover, I have to point out the offensive approach of the government towards civil organizations, which creates a significant barrier for the existence and activity of these communities and Magház in the country. In 2014, the government attacked the Norwegian Civil Fund – the NGO Programme of the European Economic Area/Norway Grants in Hungary – claiming that the Fund had unevenly allocated the financial support favouring those civil organizations that have political activity and had discriminated those who are supportive of the ruling government (GPA 2014). Although the two parties officially came to an agreement eventually, the government in return launched an aggressive propaganda campaign against civil organizations. They government also confirmed to have a list with the data of those organizations which receive large amounts of financial support from foreign sources – as many agrobiodiversity-related civil initiatives do in the country. Unfortunately, this list contains the name of several green, nature conservation associations (GPA 2018). As a result of the list, financial support and tenders are all cut away from many green organizations; and without international connections, the smaller organizations have very limited opportunities to finance their work.

2.3.3. Magház (Seed House) farmer seed network

As the Magház farmer seed network only formed around 2013 and even today is still in a grassroots form, their activity has not yet been the focus of much research. Balázs *et al.* (2015) conducted a case study on Magház, analysing the transformative social innovation potential of the network. They found that Magház has the difficult task to "re-valorise" the concept of crop diversity in the country. Agrobiodiversity and the importance of landraces are relatively new issues for Hungarians compared to the popularity of agrobiodiversity in Western Europe. Individuals or initiatives interested in crop diversity have just started to emerge, and Magház target its message to them. Therefore, spreading the knowledge on the importance of crop diversity in a grassroot form is a very slow process.

Magház is a decentralized network without a legal background which aims to help and connect local communities and civil initiatives forming around agrobiodiversity through seed

exchanges, even though many initiatives operate in isolation (Balázs *et al*. 2015). The study of Balázs *et al*. (2015) provides a firm basis for my research to closely look at the socially new ways of how this revalorization happens through the framing of their mission, how knowledge creation and circulation within and outside of the network shape their activity, or how decentralized organization takes place through their local initiatives.

As mentioned above, the network still struggles on a grassroot level without effectively reaching out and connecting with other initiatives linked to agrobiodiversity. However, in order to effectively connect with these local initiatives, their individual activity, which reveals their potential for social innovation, should also be considered. Bringing forward and comparing these initiatives' activity could, first, reveal the very social innovation of the whole network, and, second, identify those connections and commonalities that may help to strengthen the network. In order to gain a more detailed picture of the networks' activities, in my research I distinguished between those initiatives that has a firm connection to Magház (referring to them as local hubs) and those who host seed exchanges but have no relation to Magház yet (referring to them as individual initiatives).

Thus, my research builds on but differs from Balázs *et al.*'s (2015) case study conducted on Magház, as I frame my analysis using only the theory of social innovation. Furthermore, in my methodology I broaden the scope of my understanding of the network and interview several local initiatives, individuals related or not related to the network as research subjects beyond the main Magház organizers. Therefore, the study approaches the whole network from the point of view of several related initiatives, individuals, organizations which are integrative parts of agrobiodiversity conservation in Hungary. In this way, the study has the potential to illuminate the social innovative potential of the whole network in Hungary and to point out supporting and hindering factors standing in the way of their activity. Moreover, no research has been conducted so far in Hungary on the socially innovative potential of local initiatives dedicated to the conservation of agrobiodiversity, or other stakeholders in agriculture.

3. THEORETICAL FRAMEWORK: TRANSFORMATIVE SOCIAL INNOVATION

The theory of transformative social innovation (TSI) serves as a conceptual basis for framing my analysis on the Magház network. Transformative social innovation theory helps to unravel the dynamics within initiatives, communities, networks and individuals who are leading transformative change in society and are often disregarded by traditional leaders or established institutions (Haxeltine *et al.* 2016).

This relatively new theory emerged in 2015 through TRANSIT (TRANsformative Social Innovation Theory), which was an EU-funded research project that aimed to study how social innovation can generate empowerment and transformation within the society. As a result, the theory of transformative social innovation was developed building on the public and political discourse of social innovation that aims to discover and expand opportunities to challenge and alter dominant structures (TRANSIT 2014).

The social innovation process within TSI (Figure 2) consists of four pillars: new ways of (1) knowing: how knowledge is produced or learning processes are developed in initiatives; (2) doing: how collective practices or technologies are created and maintained; (3) framing: how meanings, missions, and belief systems are defined; and (4) organizing: how the collective governs and structures itself that opposes the dominant structures (Haxeltine *et al.* 2016).

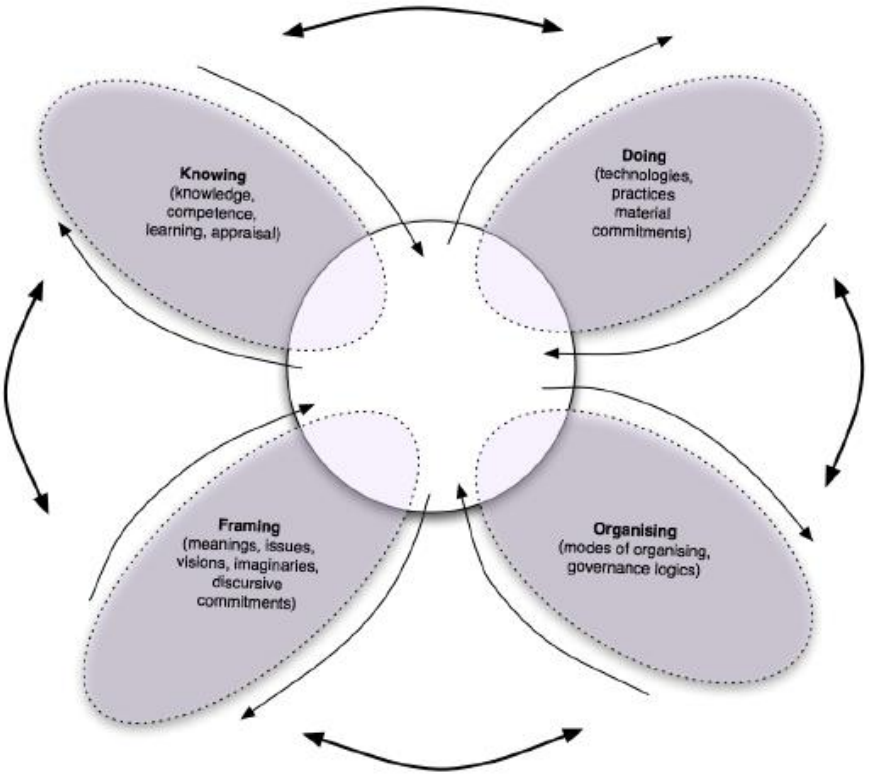

Figure 2. Four dimensions of social innovation: knowing, framing, doing and organizing. (Haxeltine *et al.* 2016)

In order to track the transformative potential of the initiatives and networks, the social innovation process is characterized by three aspects: a) emergence of the networks: in what social context they emerged, how they move and expand; b) dynamics of the network: how relations exist within the network, and outside of the network in relation to the broader social context; c) agency of the network: the perceived potential of the network to create change which empowers it (Haxeltine *et al.* 2016). Building on this brief explanation of the theory, Figure 3 depicts the transformative social innovation process of networks and its relation dynamics in entirety.

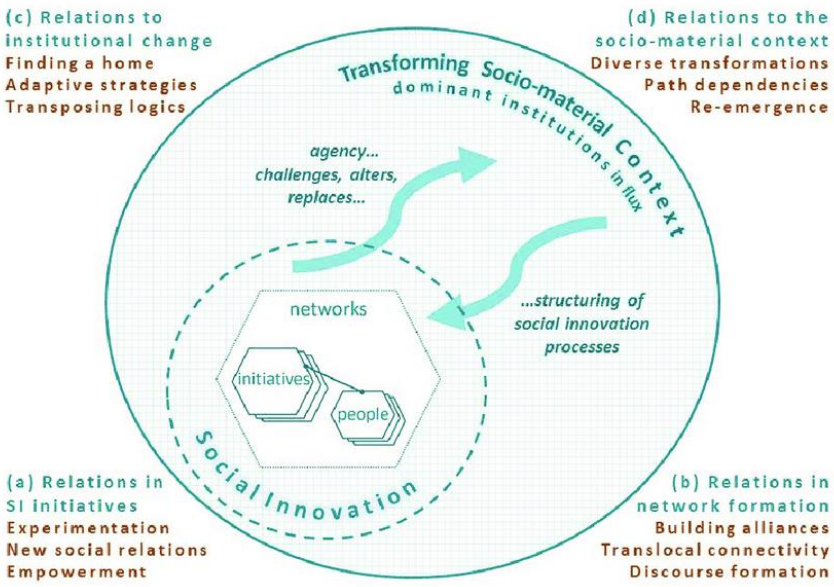

Figure 3. Transformative social innovation process (Hexaltine *et al.* 2016)

In order to link the transformative activities of initiatives that challenge and shape dominant structure, I will use Fairclough's *Discourse and Social Change* (1992) as an analytical framework to analyse discourses in their broader context of social relations.

To better understand how social innovation can be achieved in farmer seed networks, in the next section I will show how the new ways of knowing, doing, organizing and framing manifest themselves in three farmer seed networks from Europe, building on the work of Balázs and Aistara (2018).

3.1. Social Innovation and Farmer Seed Networks in Europe

Only Balázs and Aistara (2018) have connected social innovation to the activities of farmer seed networks, analysing the transformative social innovation potential of five networks: Pro Specie Rara in Switzerland; Red de Semillas in Spain, Rete Semi Rurali in Italy, Magház in Hungary, Seedy Sunday in the UK, and Arche Noah in Austria.

Since my aim with the second research question is to demonstrate how Magház with other local initiatives achieve social innovation, I can build on their research and demonstrate how other farmer seed networks in Europe show potential for new ways of doing, knowing, framing and organizing.

Arche Noah in Austria, for instance, emerged to safeguard biodiversity and they started conserving endangered plant species and started making them available for individual or commercial use (Balázs and Aistara 2018). Building on this, regarding the socially novel way of the framing process, their name "Arc of Noah", as a biblical metaphor suggests that they build their activity around the concept of "guardianship". Consequently, their framing process shows that they consciously challenge the notion that farmers are just simple producers who grow our food. Arche Noah shifts public opinion toward the understanding that farmers are actually the guardians of agrobiodiversity and their activity involves experimentation, breeding, and variety adaptation besides food production.

Arche Noah connects private seed savers in the country, and the network connects Austrian organic farmers as well incorporates them into the network (Balázs and Aistara 2018). This cooperation has resulted in a new way of organizing with organic farmers by achieving an organized reintroduction of crop diversity into medium or large-scale organic production practices. In this way, they serve as an alternative example for farmers who produce for the market, namely that diversification of production can be achieved by relying on local varieties.

Furthermore, the French Réseau Semences Paysannes network reintroduced the word "peasant" into the public discourse through their name and framing of the network: "The Network of Peasant Seeds" (Bocci 2009; Demeulenaere 2014). Instead of the widely used word "farmer", they liberate the word "peasant" from its pejorative meaning and re-signify it as an ancient, noble activity of which all farmers should be proud. Through this socially innovative way of knowledge creation related to peasant farming or peasant seeds within the network, they are able to shape the ruling discourse around seeds and farmers, challenging dominant narratives.

Essentially, all farmer seed networks organize seed exchanges as a new way of doing. I explained their benefits in the previous section as a form of material exchange among farmers that boosts crop diversity. However, seed exchanges are important for their socially innovative aspect, too.

Balázs and Aistara (2018) find that seed exchanges are convivial events dominated by a friendly atmosphere where the social exchange of experiences, knowledge, and values intertwines with the physical exchange of seeds. In this way, the seeds "become the intermediaries that transform social relations across time and space" (Balázs and Aistara 2018, 349). Thus, seed exchanges strongly contribute to the creation of new types of social relations and personal connections

between people, facilitating networking. More importantly, through the flow of alternative or newly framed knowledge, seed exchanges become the place where people collectively challenge the ruling agricultural practices and concepts around seeds.

Through these examples, I highlighted how the existing literature on the activities of farmer seed networks in Europe reveals a deeper understanding on the socially innovative ways (of doing, organizing, framing and knowing) within these networks. In the next chapter, I will present my methodological approach with qualitative methods. Then, in the analytical chapters (fifth to seventh), I will analyse how Magház and related local initiatives achieve social innovation by new ways of framing, knowing, organizing and doing.

4. METHODOLOGY AND CASE STUDY

As the aim of my study is to gain deeper knowledge on the dynamics within and outside of Magház and the local initiatives that help them to achieve their socially innovative ways of knowing, doing, organizing and framing, I found the interpretive qualitative approach to be the most suitable for my research. "Qualitative research studies phenomena or humans in their natural settings, attempting to make sense of it or interpret it in terms of the meanings people bring to them" (Denzin and Lincoln 1994, 2). In order to unpack the meanings and concepts used by the participants, to explain the dynamics and linkages within and outside of local initiatives that contribute to social innovation, to understand their environment and complex problems such as barriers or helping factors affecting their activity, I applied the qualitative method from Chapter 5-7.

Dynaversity case study

In the case of the Magház farmer seed network, the process of data gathering was conducted in March 2019 in a form of a case study within the framework of the Dynaversity EU-funded project, which aims to analyse the actors involved in plant genetic conservation for agriculture in Europe in order to suggest management and governance models and to construct new forms of networking (Dynaversity 2017). Transformative Social Innovation (TSI) theory serves as the theoretical framework for the Hungarian case study and the related interview guide as well. Therefore, the data gathered for the Dynaversity case study is used in Chapter 6 (my second analytical chapter), "Social innovation in Magház and Its Network". I also used similar questions on social innovation as in the Dynaversity study for structuring my interviews; however, I added my own questions in order to reveal the meanings of the seed, the background of the participants, and to discover helping and hindering factors of their work (Appendix 2).

Position of the researcher

I also spent four months volunteering for Magház, attending their meetings, workshops, informally talking to the coordinators and local hub leaders. During these months, I visited and documented seed exchanges for Magház (pictures and articles can be found on their Facebook

page). I also represented the network at local seed exchanges as an exhibitor to gain a deeper understanding of their dynamics.

Moreover, my interest in seeds and farmer seed networks was motivated by my professional experience, during which I worked more than a year with farmers and researchers – ranging from small to large-scale and organic to conventional – and gained knowledge on the agricultural, socio-political context in which they operate in Hungary. I was also involved in the Hungarian implementation of the LIVESEED EU-funded research project, which focuses on boosting organic seed production and breeding in Europe (LIVESEED 2017). I believe this professional experience helped me to gain the trust of my research subjects – instead of considering me as an outsider – which created an open and receptive atmosphere for the interviews and for my volunteering period.

Three data collection methods were used:

1. Semi-structured interviews with the representatives of key stakeholder groups
2. Questionnaire
3. Participant observation.

4.1. Semi-structured interviews

In order to understand the diverse socio-political and cultural characteristics of the stakeholders, I conducted 14 semi-structured interviews, of which 11 were face-to-face and three were Skype interviews. These include representatives of six local initiatives, Magház, the Center for Biodiversity and Gene Conservation, one NGO (Védegylet) and the Hungarian Seed Association, plus two independent farmers, one private breeder, one landrace trader group. Eight stakeholder groups were distinguished as main actors in the Hungarian seed network: Magház and its local hubs, individual initiatives, farmers, breeders, the gene bank, NGOs, seed associations (a symbol for formal seed networks), traders. Therefore, I tried to interview at least one representative from each such group in the agricultural sector and relevant for the conservation of agrobiodiversity in Hungary. The open-ended questions were tailored to the stakeholder groups, therefore each group received slightly different questions. Figure 4 depicts the spatial distribution of interviewed stakeholders in Hungary.

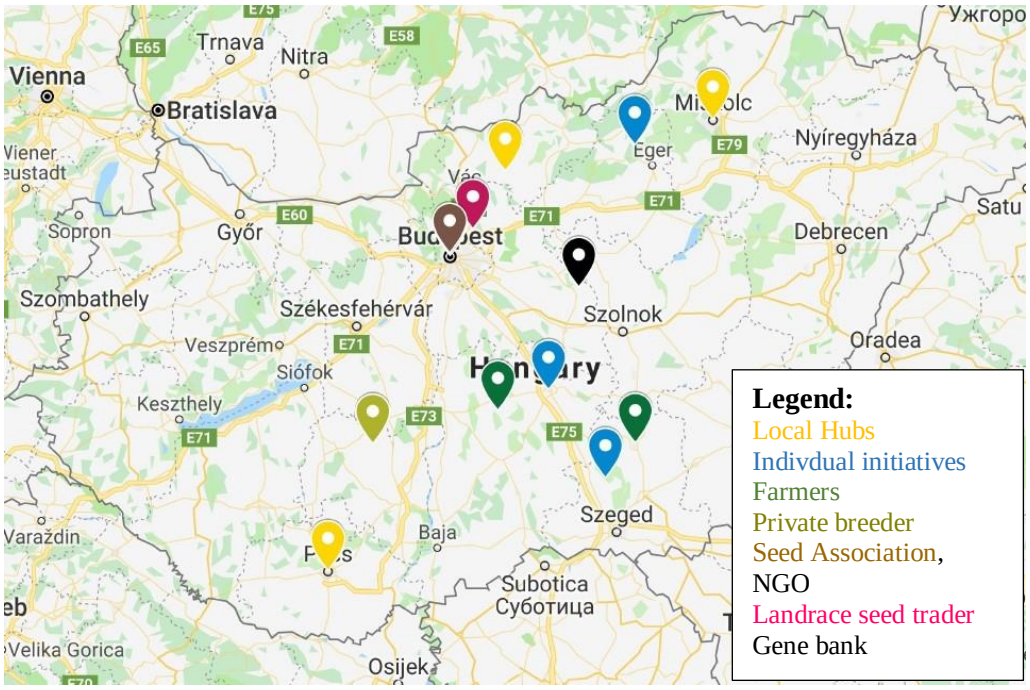

Figure 4. The map of key stakeholder groups participating in the study

The questions were aimed to find out how Magház and local initiatives achieve social innovation through new ways of knowing, doing, organizing and framing; the attitudes of other stakeholders outside of the network to seed exchanges and to the work of farmer seed networks; the different meanings the stakeholders attribute to seeds; and the barriers and opportunities related to the activities of Magház (Appendix 3-9).

In the case of local hubs, my selection was based on the suggestions of Magház representatives. Of these, I selected hubs located in different regions or counties in order to gain a variety of perspectives across the country.

The selection of individual initiatives happened through the map of seed exchanges found on the website of Magház. The criteria of selection were based on: the "age" of seed exchange (how long it had been organized by a given community), geographical distance between seed exchanges, and accessibility by public transport.

The farmers, the breeder, the NGO and the landrace trader group were suggested by the representatives of Magház and selected from my own professional connections (I chose those who grow landraces and are familiar with seed saving). Table 1 shows the different characteristics of the locations of local hubs, individual initiatives, independent farmers and breeder location.

Table 1. Characteristics of local initiatives by location, climate and soil type, agricultural production specific to the region and agricultural production of the local initiative

Stakeholder pseudonyms	Relation to Magház	Location	Climate and soil type	Agricultural production specific to the region	Agricultural production of the local initiative
Union of Organic Farmers of Szer (SZÖSZ)	Local hub	Ópusztaszer, close to Szeged (Bács-Kiskun county)	Flatland with sandy soil (dry and hot climate)	Intensive vegetable and fruit production (pepper) and arable production (wheat, barley) on better soils	Organic farmers, mixture of vegetable, fruit, and arable production with extensive animal husbandry
Banya-tanya	Local hub	Bátor (Heves county)	Mountainous, covered with forest, not suitable for arable production (cooler climate with -5°C)	Suitable for grazing livestock, grape production	Mixture of permaculture and organic methods, vegetable and fruit production
Szatyor	Local hub	Kecskemét (Bács-Kiskun county)	Flatland with loess and sandy soils (dry and hot climate)	Intensive vegetable and fruit production, and arable production (wheat, barley) on better soils	Sustainable and organic methods, vegetable and fruit production
Ecological Institute for Sustainable Development (EISD)	Local hub	Miskolc (Borsod-Abaúj-Zemplén county)	Mountainous valleys, not suitable for arable production (humid and warm climate)	Heavily polluted region due to intensive industrial activity. Grape production	Small backyard gardens and city vegetable gardening (sustainable methods)
Eco Community	Individual initiative	Bercel (Nógrád county)	Mountainous covered with forest (humid and cool climate)	Intensive arable crop production and animal husbandry	Mixture of organic and permaculture, vegetable backyard gardens and fruit orchards
Permaculture gardener	Individual initiative	Pécs (Baranya county)	Hilly region with valleys (hot and humid)	Grape and fruit production, on flatlands intensive arable production	Small backyard gardens and city vegetable gardening (permaculture and sustainable methods)
Farmer 1		Szentes (Csongrád county)	Flatland with chernozem soils (hot and dry)	Intensive arable crop and vegetable production	Organic vegetable production
Farmer 2		Izsák (Bács-Kiskun county)	Flatland with sandy soils (hot and dry)	Intensive vegetable and fruit production, and arable production (wheat, barley) on better soils	Certified organic vegetable and arable production
Private breeder		Nagyszékely (Tolna county)	Hilly region with alluvial and chernozem soils	Intensive arable crop and vegetable production	Mixture of permaculture and biodynamic production

4.2. Participant observation and questionnaire

Schensul et al. (1999) define participant observation as "the process of learning through exposure to or involvement in the day-to-day or routine activities of participants in the researcher setting" (Schensul *et al*. 1999, 91).

I conducted participant observation at events organized by Magház or by other initiatives, and in five seed exchange events I visited from February-April 2019 in Szeged, Pécs, Kecskemét and twice in Budapest. I volunteered at three out of five seed exchanges as an organizer and exhibitor of Magház. The participation in these events helped me to personally experience the atmosphere, to observe and to connect with the participants through personal conversations. The personal stories and opinions contributed to my better understanding of people's motivations to visit seed exchanges or their relations to seeds and seed saving. Thus, I experienced the seed exchanges from the point of view of the participants. Additionally, organizing seed exchanges with Magház volunteers was important for me to examine these events from the perspective of the host and the exhibitor: what kind of seeds were preferred, what advice the participants sought, how many people actually brought seeds to exchange, or what technicalities are important to be prepared for.

Besides participant observation and informal discussions, I distributed questionnaires at all five seed exchange events. The questionnaire contained ten open-ended questions related to the participants' personal connections to seeds and their impressions about seed swaps (Appendix 10)

I made field notes about my impressions after each event, focused on the general characteristics, atmosphere, approximate participant number, characteristic seed varieties, participants' motivations, satisfaction, and emerging conversation topics specific to each seed exchange. My notes will be incorporated into my results in the following analytical chapters. Table 2 contains the general characteristics of the seed exchanges I visited.

Table 2. General characteristics of visited seed exchanges

Place	Role of the Researcher	Date	Host community	Number of participants	Number of questionnaires collected
Pécs	Observer	17/02/2019	Permaculture gardener	40-50	16
Budapest	Organizer and Exhibitor	24/02/2019	Plant Together	120-130	34
Kecskemét	Observer	02/03/2019	Szatyor Association	100-120	15
Szeged	Exhibitor	09/03/2019	Vackor Association	40-50	20
Budapest	Organizer and Exhibitor	23/03/2019	Center for Biodiversity and Gene Conservation	130-140	28

Since sometimes I was just attending and sometimes I was acting on behalf of Magház, the results might have been influenced by the two different roles that I took on.

4.2.1 Ethics

The interviews were conducted in accordance with the CEU Research Ethics Policy and Guidelines. Only adult stakeholders participated in the research, on a volunteer basis. The results are treated confidentially and anonymously using pseudonyms for clarification. The researcher is a student without any connection to political, governmental, or non-governmental organization. This information was included in a consent letter (Appendix 1) and was emphasized before the face-to-face and Skype interviews.

4.3. Data analysis

I used Fairclough's *Discourse and Social Change* (1992) as the analytical framework for discourse analysis to analyse my interview data, which puts discourses in the broader context of social relations by analysing (spoken or written) texts, the processes of text production, and analyses events as instances of socio-cultural practice.

In Chapter 5, I identify the keywords which emerged in association with seeds in the interviews, then categorize them according to their meanings or their context of meaning. In Chapter 6, the stakeholders' answers to open-ended questions and comments are coded based on four main

aspects of social innovation concepts: knowing, doing, framing, organizing. Finally, I frame Chapter 7 around the emerging themes related to barriers and opportunities in the responses of the participants.

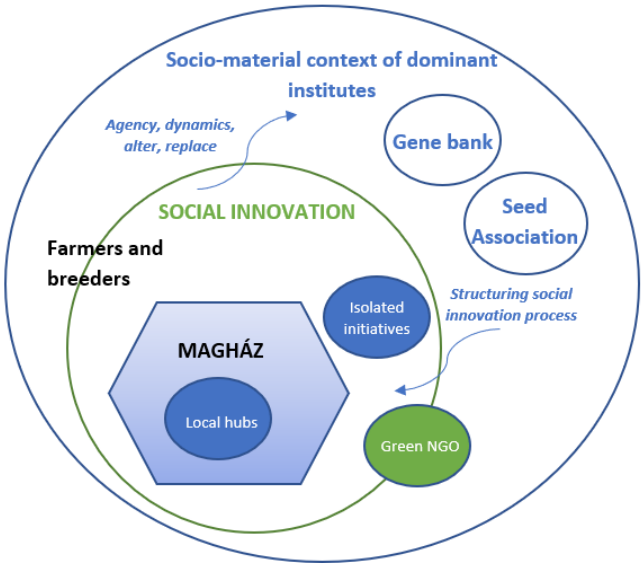

Figure 5. Key stakeholders of the study situated in the transformative social innovation process (modified by the author after Haxeltine *et al.* 2016).

In this way, I approached the whole study from the point of view of Magház, which I placed in the transformative social innovation framework (Figure 5).

4.4. Limitations to the study

The study aims to analyze Magház in its complete national socio-political context, which is why the eight stakeholders were chosen. However, due to snowball sampling, my results cannot be interpreted as representative of these groups, and interviewing other participants may have yielded other results. The limitation to reach the distant, rural parts of Hungary by public transport resulted in a relatively modest sample size of local initiatives.

Furthermore, the Ministry of Agriculture refused to be interviewed for the study, which hindered the better understanding of the motivation of dominant structures with respect to farmer seed networks and seed exchanges. Therefore, articles, reports publicly available were used to understand their approach to farmer seed networks and agrobiodiversity.

"***Everything begins with a seed, it is a spiritual story***."

– representative of Banya-tanya (Witch Farm)

5. DISCOURSES AND MEANINGS OF SEEDS

As I pointed out in the literature review, the seed is widely understood as a "genetic resource" in the scientific community. I outlined how the concept of genetic resources changed during the decades until it reached a more encompassing ecological vision (Fenzi and Bonneuil 2016). Ducottet (2018) specifically uses the word "genetic resources" instead of "seeds" in framing her question to find out the different concepts associated with it among a wide range of stakeholders in Europe. The analysis showed that this vocabulary still evokes the idea of an object in the respondents rather than of a living being. The usage of genetic resources limits the associated meanings to the world of genetics and scientific discourse, excluding broader understandings that include farmers or other groups dealing with seeds.

I intentionally stayed away from the usage of genetic resources assuming that it is too formal and scientific, and thus could alienate my research subjects, since it is not the general term they use in their everyday life. Therefore, my first research question *What does the seed mean to you?* seeks to find the various meanings that are associated with the seed among the stakeholder groups, if there are any. The purpose of this chapter is not to contest the definition of genetic resources, but to discover the different discourses and associations that are evoked by the different stakeholders related to farmer seed network since no research has specifically targeted the meanings of seeds in farmer seed networks.

The identification of possible meanings of seeds may contribute to a better understanding of the social process of framing within the local initiatives and other stakeholders. In order to identify, clearly define, and communicate the mission, the community, civil organization or an individual focused on the seed must be aware of its meanings to explain or justify their existence, beliefs, visions within and outside of their reach. The meanings they associate with seeds influence their beliefs and basic values (Hexaltine *et al*. 2015), therefore I aim to understand how the activities of these communities shape these meanings or try to influence broader popular understandings of seeds. Therefore, the results of this chapter may be connected to the second analytical chapter dealing with the broader social innovation in Magház and local communities in which I analyze the framing process.

As my analytical approach is based on Fairclough's discourse analysis (1992), I identified the key words which emerged in association with seeds in the interviews, then categorized them

according to their meanings or their contexts of meaning. Therefore, I framed this chapter based on the resulting categories of meaning.

5.1. Emerging categories of meanings

After coding the interviews, the results are summarized in Table 3.

Table 3. The different meanings of seed sorted by indicating the identification of respondents and the number of stakeholder groups

Meanings of seed	Identification of the participants used the same word	Number of stakeholder groups
Life	**SZÖSZ*, Eco Community, Szatyor, EISD*, NGO, Farmer1, HSA***	**5**
Traditional values	**Szatyor, SZÖSZ, NGO, Breeder, CBGC***	**4**
Food source	**Banya-tanya, SZÖSZ*, NGO, Breeder**	**3**
Food sovereignty	**SZÖSZ*, Farmer2, Banya-tanya, Breeder**	**3**
Future	**Eco Community, Farmer1, Landrace trader**	**3**
Miracle	**Banya-tanya, Pécs*, EISD***	**2**
Culture	EISD*, CGBC*	2
Cyclical process	Farmer1, Breeder	2
Beginning	Banya-tanya	1
Preservation	SZÖSZ*	1
Subsistence	Farmer2	1
Food security	AM*	1
Revenue generation for farmers	AM*	1
Value	Breeder	1
Genetic resource	CBGC*	1

*Abbreviations: Union of Organic Farmers of Szer (SZÖSZ), Ecological Institute of Sustainable Development (EISD), Hungarian Seed Association (HSA), Ministry of Agriculture (AM), Center for Biodiversity and Gene Conservation (CBGC), Permaculture gardener (Pécs)

I identified fifteen different meanings associated with seeds from the interviews. The meanings are the following in order of importance: life, tradition preservation, food source, food sovereignty, future, miracle, culture, cyclical process, beginning, preservation, subsistence, food security, revenue generator for farmers, value, strategic and genetic resource. One interviewee could mention more meanings of the seed.

In Table 3, I also included the identification name of the participants who used the same word to see in which stakeholder groups the same word appears. So, if a word appears in 4 or more than 4 groups, it would suggest that concept has a defining significance regarding the meaning of seeds, since it can potentially link the different stakeholders in creating a common ground for understanding the same meaning associated with it.

a) Seed is life

As Table 3 shows, the word "life" appeared in the majority of responses, indicating that the seed is ultimately the symbol of life for these participants. Ducottet (2018) also analyzes the concepts and visions revolving around plants (not just genetic resources) and her results show that some of the respondents talked about plants as "living beings" or "part of a bigger community" (Ducottet 2018, 55). Just as the concept of "seed is life" indicates that the seed is not an object but a living organism. I find this comparison relevant since the seed is the source of a plant, therefore our findings can be interpreted as a similar.

The phrase "seed is life" was very common in itself without any kind of explanation, as it was considered self-evident. The seed is regarded as a living material which brings every other living being to existence, and even after maturation it remains the basic element that is necessary for creating life. Therefore, it would be difficult to single out a sentence from the answers of the interviewees which is only dedicated to the explanation of life. However, it is interesting that "life" goes together with a particular association, the "cycle of nature" or a "cyclical process". Only two interviewees used "life" and "cycle" in the same sentence, but they are worth mentioning, as these are the only ones that help to understand life, as they have more nuance beside "seed is life". An organic farmer from Szentes put it this way:

> It is the most beautiful thing when I save seeds because this is the way I know that I am part of the cycle of nature. Seed is life, it symbolizes my past as I sowed it last year or in spring. It became my present harvest and food and it contains my future since I am aware that I cannot eat everything that I produced at once, I must save seeds for next year. It [saving seeds] is a kind of alliance with nature, it reminds me that I am living part of its cycles.

This quote also shows that the farmer understands the seed-life association as if it were analogous to the passage of time within the cycles of nature.

The respondents talked about the meanings of seeds with awe, understanding their connection to seeds as something spiritual; but only the representative of Banya-tanya said it out loud: "Everything begins with a seed, it is a spiritual story." Similarly, in Ducottet's (2018) findings on another concept, a "plant is a cosmic being, a meeting between earth and the light," (Ducottet 2018, 53) which also reflects the deeply spiritual understanding of the respondent.

b) Tradition preservation

The second most common associations was "tradition preservation". In the literature review, I pointed out that Védegylet (2012) argues that the interests and motivations of local communities that aim to conserve agricultural biodiversity in Hungary are strongly influenced by traditionalism; food sovereignty, nature protection, adaptation to climate change, and rural development. My results confirm that the preservation of traditions may indeed play a significant role in the motivations of these communities as the meaning of seeds is associated with the concept of "preserving traditions". As the representative of Szatyor explains:

> The seeds are very important. The work we do with them is tradition preservation, it is our heritage. Our grandparents saved seeds the way we do today. They did not have modern breeding technologies but they were able to preserve many varieties, they exchanged or bought seeds from each other. We just want to go back to our roots.

The NGO, the breeder, CBGC and one of the local hubs associated the seed with the respect for the past and the preservation of traditions. They strongly cultivate the thought that our ancestors carefully took care of seeds for years, they sowed them, saved them every year. It was part of their everyday activity – ultimately, today's generation can exist and eat thanks to their work.

c) Food sovereignty and source of food

"Source of food" is the third most common term that appeared, which is not completely a surprise considering that food is a physiological necessity for all living beings, and eating is also a culinary delight for humans. The representative of SZÖSZ explains: "The very existence of seeds ensures our food. Without it, we cannot grow anything, we cannot produce, therefore we cannot exist. It is an essential element and preservation of this element is an ancient instinct."

"Food sovereignty" shares the third place with the "source of food". Food sovereignty was defined in the Declaration of Nyéléni in 2007 as "the right of people to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems" (Nyéléni 2007, 1). Magház builds its whole mission on the concept that seed equals food sovereignty, since without seeds people would lose their freedom to cultivate their own crops and eat the food they find appropriate. Magház considers seeds as the source of agrobiodiversity, which is reflected in their slogan: "Magház – civil network for boosting agrobiodiversity". However, agrobiodiversity as a concept associated with seeds did not come up in any other conversation with stakeholders.

Interestingly, the phrase "food sovereignty" was used but the abovementioned definition emerged focusing on one particular aspect of the concept: farmer autonomy and self-sufficiency. One of the participants, a plant breeder in Nagyszékely, emphasized that seeds create the opportunity to be independent of traders and multinational seed corporations:

> Nowadays, clean seeds are in short supply. However, these seeds make me feel secure. If you are self-sufficient, you can produce your own food without relying on seed corporations, then you have autonomy. This means you can freely save your seeds, you can decide what you eat, therefore you will have always your seeds to hang on to.

The two opinions promote autonomy and independence from current economic processes that enmesh industrial agriculture and which often make farmers dependent on seed corporations. But for the participants, food sovereignty is not only about autonomy, as it is also connected to trust. The interviewees only trust in what they grow and sow with their own hands, and are very skeptical of seed corporations and even of small seed traders. My research shows that seven out of eight participants are self-sufficient (in terms of acquiring seeds from seed saving, seed exchanges, or gene banks) in 50% or more in their seeds supply (Table 4). Four out of eight are

self-sufficient in 80% or more (Seed Association, NGO, the landrace trader, and CBGC are excluded, as in their case this question is not relevant, which is why the total number is not 14.)

Table 4. Comparison of the local hubs, initiatives, farmers and the breeder by occupation, residence, seed self-sufficiency and by purchase from formal seed market

Identification	Occupation, background	Residence	Seed self-sufficiency (seed saving, seed exchanges, gene bank)	Purchase from formal seed market
Banya-Tanya	Teacher with botanical background	In a village with a garden	80%	20%
SZÖSZ	Horticultural engineer	Farm near a village	95%	5%
Eco Community	No agricultural education	In a village with a garden	75%	25%
Permaculture gardener in Pécs	Graphic designer	County capital, has a garden	60%	40%
Szatyor	No agricultural education, but grew up maintaining the garden	County capital with a garden	n/a	n/a
EISD	Teacher, later became environmental consultant	County capital with a garden	50%	50%
Farmer1	Agricultural technical school, no higher education, organic farmer	Homestead near a city	70%	30%
Farmer2	Plant Protection Engineer, certified organic farmer	Lives in small town, but has a farm	80%	20%
Breeder in Nagyszékely	Agricultural engineer with plant breeding major	Homestead in a village	90%	10%

These results indicate that there is an increasing tendency among civil organizations, farmers, and hobby gardeners in Hungary to care about their seed self-sufficiency and to be autonomous in their production. Additionally, actors related to agrobiodiversity are aware of the activities of the formal seed system, they even associate the meaning of seeds with it. Therefore, this knowledge could give them sound basis to better organize and mobilize themselves in order to lobby for farmers' interests in the same way as their Western European partners do.

d) Seed as future and a miracle

Seed as "future" resembles the usage of "seed is life" meaning that it appeared together with the "cyclical process" representing the passage of time as I showed in the previous example at the beginning of the chapter.

The phrase "seed contains the future" appeared twice in different stakeholder groups. As the representative of Eco Community adds: "I am aware that I cannot eat everything at once that I produced, I must save seeds for next year," exemplifying that seeds drive long-term thinking and planning. Seeds must be cared for in a way that the healthiest seeds should be planted for saving purposes which ensures successful harvest for the next year. This requires precise planning and technical knowledge from the farmer.

"Miracle" shares the fourth place with "future". Interviewees only from member hubs used this association, it did not appear in any other stakeholder groups. As the permaculture gardener in Pécs expressed it,

> It is a miracle, I am spellbound every time when I think about it that a huge plant could spring out of a small seed which provides my food. Those who brought up in the countryside it is so basic, but for me, for a half-city kid is new and fantastic.

I found a possible explanation for the appearance of "miracle" in association with the seed when I looked at the background and occupation of the participants. The common ground was the absence of any kind of agricultural or natural science education (see Table 4). They graduated in arts, social sciences, or had no higher education, and none of them were taught about farming or agriculture until they were 25. Plus, one of them was brought up in the capital and two of them in county capitals, meaning that they had never worked – or only as a very little child – in the garden until their 20s. When they got to know about agroecology or permaculture, these concepts hit them by surprise and they were awed by the forces of nature which can resemble a miracle. I assume that in the absence of scientific and academic idioms related to seeds or agriculture taught at universities, their associations were influenced solely by their own hands-on experiences and observations acquired in their gardens.

e) Seed as culture

Seeds associated with "culture" appeared twice, once by a hub member and once by CBGC. Culture relates to tradition, but I did not want to discuss it together with the association of traditionalism, because, as the examples will show, seed as culture in these cases can be understood in itself. However, I would like to emphasize that in these cases the seed does not symbolize culture per se; culture is rather the social space in which the different meanings of seeds can be presented or conserved.

The gene bank's director emphasized the cultural aspects of seeds in Hungarian folklore:

> When we go on trips to collect landrace seeds in the Carpathian basin, we not only collect the seeds, but everything that is or was culturally important for the people in association with a given seed: folk songs, recipes, tales, nursery rhymes, embroidery patterns, coats of arms or seasonal references. The culture of seeds is extremely rich.

This means that in culture, seeds hold the memory of different eras and the everyday life of different people. CBGC remained neutral in its explanation, it only put it in the context of preservation, whereas the representative of EISD drew a parallel between past and present culture:

> Back in the old days, our culture guarded the meaning of seed. Culture had an educative role, children were brought up knowing these things. The culture of seeds was particularly strong in the Hungarian countryside, seeds entwined with the respect for life and soil. Now? In the blocks of flats?! How can our culture teach us these things? It cannot. Seeds have become detached from our culture.

CBGC only pointed out that the meanings of seeds are rooted in the Hungarian (peasant) culture and seeds were an important tool to pass on knowledge and meanings from generation to generation, whereas EISD added that in the era of urbanization, the increasing number of people in the city know less and less about seeds. The meaning of seeds has disappeared from the current culture. People can buy fresh and ready-to-eat products from the supermarkets, therefore the process of growing a vegetable is not self-evident. Convenience and fast-paced lifestyle blur these cultural aspects until they eventually fade away.

f) Other meanings

I created this category to group the results that are scattered and appeared only once or twice in the interviewees' answers. However, I do want to mention some of the associations that reinforce the "genetic resources" and objectified commodity discourse of the formal seed system.

Judging from the publicly available articles, the Ministry of Agriculture approaches the concept of the seed from strategic and economic points of view. The Ministry – together with the National Food Chain Safety Office (NÉBIH) – understands seeds as a basic input for agricultural production which is only safe if it is officially certified, labeled, and registered by NÉBIH. This is the most secure way that the state can ensure food safety and this is how Hungarian seeds can enter the international seed market (NÉBIH 2019).

Consequently, the seed is not emphasized as a "living organism" (similarly to case of "genetic resources" understood by the formal seed systems), but rather as an objectified tool that determines the revenue generating activity of Hungarian farmers. The revenue generated by the seed sector or agricultural production constitutes 31.3% of the GDP, the Hungarian seed sector maintains a 100 billion Ft (€3 million) export value, as was pointed out by the director of the Seed Association. Essentially, it adds significant added value to the national economy. The state does not need to add spiritual or philosophical dimensions to the meaning of the seed, because its very existence and function are for maintaining and boosting the national economy, just like an object or commodity. Consequently, the concept of the seed is strongly related to economic development and national food security.

Referring back to Ducottet's (2018) and Fenzi and Bonnueil's (2016) findings, the director of CBGC emphasizes – besides the previously mentioned cultural dimensions – that "seeds are genetic resources, therefore their strategic importance is indisputable, even if it is not so evident for some right now." This statement can be connected to seed as future meaning as well. Moreover, a parallel can be drawn with one of respondents from Ducottet research (2018) who also works in a gene bank understanding genetic resources as the means of survival for human kind that needs to be taken care of. This similarity between the two *ex situ* conservationists suggests that the scientific community does not relate to the concept of seed as it were a living organism rather a gene pool for future strategic purposes.

5.2. Comparison of interview and questionnaire results

In the previous sections, I only discussed the results of the semi-structured interviews regarding my first research question. However, the question *What does the seed mean to you?* was also included in the open-ended questionnaire which I distributed during all five seed exchanges I took part in. In this section, I will present the results of the questionnaire and compare it with the data I decoded from the interviews.

I participated in five seed exchanges, and 113 attendees filled out the questionnaire in total.

Five respondents did not answer this question, which is indicated with N/A. Just as in the case of the interviews, the participants could give more meanings to the seed than one. The participants did not give any explanation for their choice of words.

Figure 6 shows the seven most common associations given to the seed. It can be clearly identified that "life" is the most commonly occurring association, followed by "source of food" and "beginning". In total, I identified 44 different connotations, however, the majority of them appeared just once by one participant in the questionnaire. The complete list is presented in Appendix 11.

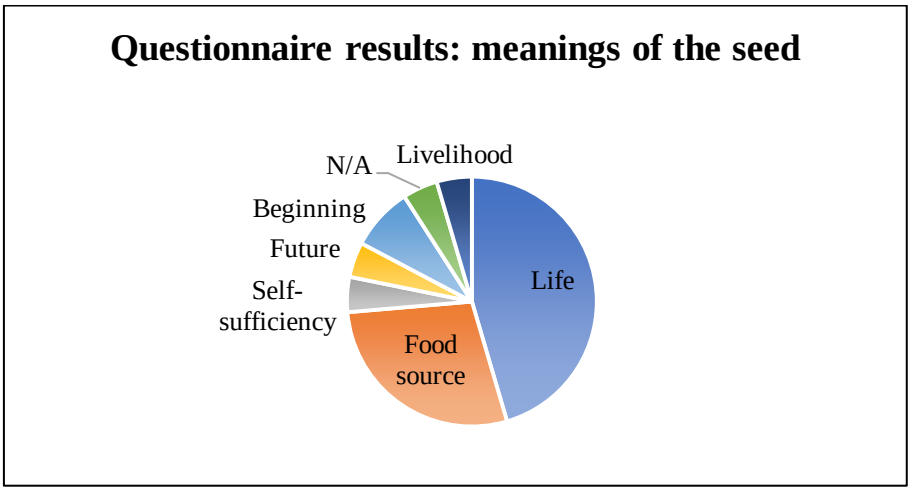

Figure 6. The most frequently occurring meanings of seed identified in the questionnaires

Comparing the two sets of data, I conclude that the two methods have similar results. Associating seeds with life is by far the most common meaning in the mind of the respondents. "Food source" comes as second and "future" as fourth, the same way as in the interviews; while other meanings occurred sporadically once or twice.

It seems that the same symbolism for seed exists in the head of the research participants that associates seed with “life” or with the “food source”.

5.3. Discussion

This chapter presents the results of my first research question: *What does the seed mean to you?* I was looking for various meanings of the seed among the eight stakeholder groups related to the farmer seed network in order to see how it differs from the formal seed system’s materialistic and the scientific community’s “genetic resource” scientific concept, as no research has been done on the meanings of seeds. My results clearly show that numerous meanings associated with seeds exist, of which “seed is life” and seed as the “source of food” appeared most frequently during the interviews and in the questionnaires. This suggests that the majority of research participants specifically regard seeds as living organisms which are the source of life. In this way, this finding adds to the results of Ducottet (2018), in which participants disapproved of the concept of the objectified genetic resource, suggesting that they rather conceptualize seeds as living beings.

Therefore, first, my analysis successfully addresses a gap in the scientific discourse pointing out that the seed holds a variety of meanings and concepts among a wide range of actors in agriculture that should be considered, not only the understandings of the formal seed system.

As a result, my findings also challenge the ruling paradigm held by the formal system, that seeds are just commodities and objects, demonstrating that the meanings attached to seeds are, in fact, conceptualized more around the notion of living beings, for a wide range of participants. This emphasizes the need that the discourse around seeds dominated by the formal seed system should be re-evaluated and should be opened to broader and more holistic understandings involving every stakeholder in agriculture. Thus, my findings are a basis for further research on the different meanings of seeds.

Second, my analysis also highlights that not only the “living being” concept or “seed is life” exist. In fact, the meanings forming around seeds are very rich and diverse, ranging from the discourse of “tradition preservation” to “food sovereignty”, or from pragmatic concepts like “food source” to more spiritual ones like “miracle”. These concepts have never emerged in the scientific and academic discourses related to seeds, therefore these findings can be the basis for further research; for example, whether similar or diverging concepts exist in different countries among different stakeholders.

Third, the results of this chapter are strongly connected to the analysis of the next chapter, involving the socially innovative ways of framing in Magház and related local initiatives. "Life", "food sovereignty", and "tradition preservation" emerged as the dominant meanings in relation to seeds among local initiatives, suggesting that these meanings may influence their mission framing processes; thus, they reflect the activity of these initiatives. Furthermore, regarding the seed as a living organism – and having a variety of meanings – Magház and its network openly challenge the "profit generator" and "genetic resource" concepts of the dominant Hungarian institutes. In the next chapter, I will analyze how these concepts around seeds are framed by Magház and its network, and how they achieve social innovation through new ways of knowing, doing, and organizing.

"We are sowing seeds in the minds of the people, not just in our soils."

- ***Representative of Szatyor (Shopping Bag) Association***

6. SOCIAL INNOVATION IN MAGHÁZ AND NETWORK

In the literature review, I presented how the key aspects of social innovation may occur within farmer seed networks through the examples of Arche Noah, Réseau Semences Paysannes, and Rete Semi Rurali. In this chapter, I analyze how the Hungarian case of Magház, its local hubs and other individual initiatives, achieve social innovation through their new ways of framing their mission against the ruling agricultural or social paradigms; new ways of organizing their community and the network through new relations; new ways of creating practices within the community or network; and new ways of producing and circulating knowledge within and outside of the network that supports their activities (Figure 7).

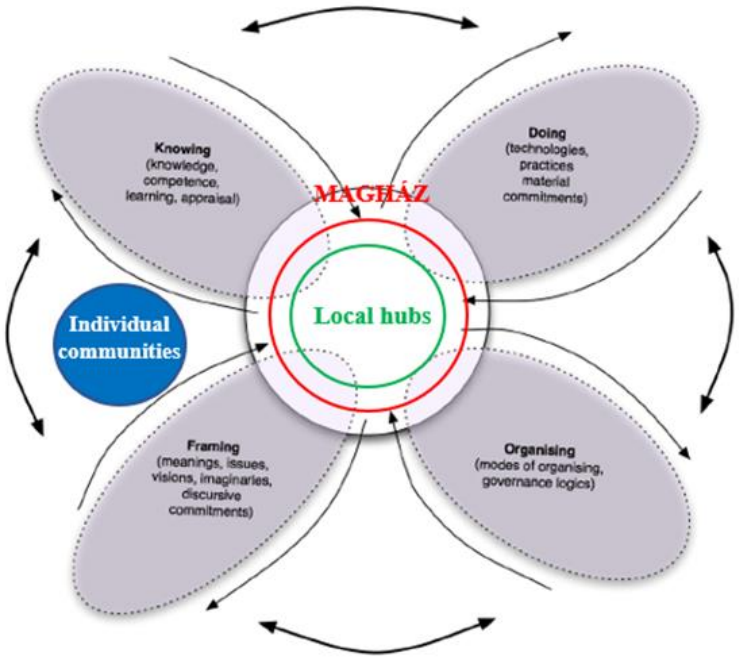

Figure 7. The interactions between Magház, local hubs, and individual initiatives through the four key aspects of social innovation (modified by the author after Hexatline *et al.* 2016).

I also examine how the meanings of the seed, discussed in Chapter 5, shape and influence the activity of the network. Moreover, I compare the concepts which emerged in relation to agrobiodiversity conservation in the Védegylet (2012) case study with the concepts identified through this analysis of the activities of Magház and its network in order to find similarities or differences. In order to gain insight into the broader socio-political context surrounding agrobiodiversity conservation and farmer seed networks in Hungary, first I present the approaches of three related dominant institutes.

6.1. Dominant structures

Before I analyze the social innovation within Magház and its network, I will present in a more detailed way those dominant structures and institutes that determine the social, political, and material context specific to Hungary. I am interested in the approaches and attitudes of dominant institutes related to agrobiodiversity conservation, seed saving, and the farmer seed network, as well as in the dynamics between the different dominant institutes and between Magház and these institutes. I will build the following brief analysis on my interviews that I conducted with the director of the Center for Biodiversity and Gene Conservation (CBGC), the director of the Hungarian Seed Association (HSA), and on articles and reports issued by government authorities.

Ministry of Agriculture

As presented in the literature review, the approach of the state to seeds is primarily based on strategic and economic considerations, as the very existence of the National Strategy proves. The government only deals with the issue of genetic resources and agrobiodiversity through CBGC, as the gene bank is responsible for the implementation of the strategy.

Seed exchanges are allowed and welcomed by the government, as seed swaps organized by the auspices of the state indicate. This is a positive example in the EU, considering that several member states interpret the seed law as restriction on seed exchanges. The first seed swapping event occurred in 2016 during the agrobiodiversity event series dedicated to the "International Year of Pulses" where CBGC was the only exhibitor, therefore the participants could only get seeds from the gene bank (GPA 2016). In 2018, CBGC decided to organize a stand-alone event dedicated only to seed exchange together with thematic presentations in Tápiószele (NöDiK 2018). These official events were opened by the agricultural minister expressing the importance of agrobiodiversity and genetic resources for the Hungarian government. In light of EU seed laws, these gestures by the Hungarian government are openly supportive of seed exchanges.

Seed production and multiplication in the country is bound to membership in the Hungarian Seed Association (HSA 2019). The cooperation between the government and HSA is officially recognized by a strategic agreement. The HSA has been lobbying the government very actively,

e.g., they are invited to express their opinion on draft proposals and can propose modifications for alteration.

Seed production is a very lucrative business (€3 million) according to the director of HSA; and Hungary's specialization is in arable crop production of which maize seed export is the most significant. This suggests that in Hungary, just as in many other countries, the support of intensive seed production is more important than the management of local varieties and agrobiodiversity. This reflects the economic priority of seeds in the country over agrobiodiversity-related values, as locally adapted varieties do not generate profit for the agricultural sector. Still, compared to other EU countries, the Hungarian government's positive stance on seed exchanges creates a welcoming atmosphere for the related activity of Magház.

Hungarian Seed Association (HSA)

HSA is a non-profit organization which aims to harmonize the interests of the Hungarian formal seed sector and to ensure representation towards the state institutes (HSA 2019).

In the literature review, I mentioned the wide gap between formal and farmer seed systems and the possibilities for integration. In Hungary, the influence of the formal seed system is so strong that it does not even know about the existence of the other. When I asked the director of HSA about the farmer seed network, the answer I got was: "I do not know what you are talking about, but I am sure NAV (National Tax Office) will swoop them down soon."

This indicates that after explaining what farmer seed networks are, the first assumption was that their activity must be illegal just to avoid taxes, therefore contributing to the black seed trade, confirming the fact that very little is known about farmer seed networks and diverse forms of on-farm management in the country. He also confirmed that there has been no connection between the HSA and seed networks so far.

HSA member farmers are all very protective of their use of varieties, they do not supply data on them, therefore HSA has no information on how diverse the production of an average large-scale farmer is. Yields and prices are the determining factors for the members. Farmers do save seeds for their own purposes, however, but exchange between farmers is not a common practice since the largest profit of the farmer results from certified seed production.

Regarding the UPOV rules, HSA stands for breeders' rights and for intellectual property protection. According to the director of HSA,

> The certification system was established for a reason. If a good variety was created by a breeder, he dedicated his life to his activity, it is his right to protect it, it's his work. What else should they do?! Starve to death? Because others want to produce their variety for free?!

The financially unbeneficial nature of exchanging seeds (for free) explains why this activity is so incomprehensible for the formal seed sector.

Indeed, the magnitude, the methods, and the target group of the formal system differ so much from those of the farmer seed network, that HSA does not even consider their existence as a contributing factor to the national seed production. HSA mainly focuses on arable crop production, while Magház targets small-scale farmers, hobby gardeners producing vegetables, herbs or fruits. Furthermore, the HSA targets farmers' compliance with legislation, e.g., the new EU decree on plant health, lobbying for the acceptance of gene editing, or illegal seed falsification. Contesting these actions of the formal seed system is one of the main activities of Western European farmer seed networks – however, as pointed out in the literature review, Magház has not yet been openly vocal against them since they are focused on the greater issue of reintroducing the practice of seed saving and the knowledge on local varieties into the public discourse.

Centre for Biodiversity and Gene Conservation (CBGC)

CBGC – formerly known as Centre for Plant Diversity - is the biggest gene bank in Hungary, and its primary activity comprises of *ex situ* gene conservation and storage. Its budget is allocated by the central government controlled by the Ministry of Agriculture, but the management of the budget is independent from the government.

As mentioned before, CBGC is responsible for the national implementation of every international treaty related to agrobiodiversity conservation as well as the development and adhering to national respective strategies. In sum, 130.000 samples of 53.000 varieties of 1200 species are stored in the gene bank, which makes it the 8th biggest gene bank in Europe. The great majority of the collection consists of arable crop varieties (40%) due to the traditional significance of arable crops in Hungarian food provisioning.

The director of CBGC confirmed that the gene bank has been purposefully boosting the *in situ* conservation of its collection through on-farm management since 2013. They have created an online system for handing out seeds two times a year for interested gardeners since the demand was so high in previous years. On average, they have 2200-2600 applicants/year and they hand out about 10-12.000 samples/year.

They also organize an on-farm project every year during which they cooperate with farmers – this year 12 farmers – throughout the country in order to advance the conservation of old varieties by *in situ* multiplication of the Centre's seed collection. CBGC and Magház have been cooperating for years now, but it became official when they signed an agreement this year which also involves financial support for Magház. This is a huge step in acknowledging the work of the farmer seed network. CBGC has always been very supportive of Magház: they work together on creating publications on seed saving, organizing seed exchanges together, or giving presentations on seed swapping events. Even one of the volunteers of Magház is the employee of CBGC and responsible for the on-farm project management.

In sum, governmental interest in agrobiodiversity conservation is increasing, but the actual work supporting the farmer seed network is mainly done by the gene bank. Significant progress can be observed since the 2008 status analysis on on-farm management. Even if the HSA deems the activity of Magház insignificant, increasing acknowledgment from some dominant institutes creates an encouraging socio-material context for the network to gain influence and strength for their socially innovative activity.

6.2. Social Innovation in Magház and its local hubs

In the following section, I will analyze the framing, doing, organizing and knowing within Magház and its local hubs to highlight how they are able to achieve social innovation in a local and in a wider sense as well. The analysis is based on data from interviews with the representatives of Magház (within the framework of Dynaversity EU-funded project), Banya-tanya (Witch-Farm) in Bátor, Union of Organic Farmers in Ópusztaszer (SZÖSZ), Szatyor (Shopping Bag) Association in Kecskemét, and Ecological Institute of Sustainable Development in Miskolc (EISD). A short description of the characteristics of Magház and its local hubs is collected in Table 5.

Table 5. Description of the activities of Magház and its network

<table>
<tr><td colspan="2">Magház (Seed House)
Established in 2013 by five individuals (no legal background).
Aims:
to preserve the biological diversity of cultivated plants in the Carpathian basin,
to promote ancient, neglected and exotic plant species and varieties as well as the possibilities and methods of small-scale seed saving and breeding through seed exchanges,
to boost small-scale plant production based on agroecological principles,
to raise awareness on the rights and interests of farmers as breeders in order to encourage more individuals to grow their own food and have their own gardens,
to create a network for sharing knowledge through the promotion of seed exchanges
Their primary target groups: small-holders, hobby gardeners, vegetable growers, subsistence farmers and anybody interested in chemical-free cultivation or, simply, seeds.
Registered members: 200</td></tr>
<tr><td>Banya-tanya (Witch farm)
Established in 2005 in Bátor in a form of a foundation.
Aims:
to achieve sustainable development locally by promoting a traditional, community-based rural way of life with respect for nature,
to preserve cultural values where self-sufficiency can be reached through practicing agroecological farming methods and diversification of the production,
environmental education through community events, trainings and online as well</td><td>Union of Organic Farmers in Szer (SZÖSZ)
Established in 2010 near Ópusztaszer by 10 families.
Legal background: Vackor Nature Protection Association in Szeged.
Aims:
to revive the old, traditional peasant lifestyle that was practiced in homesteads in the countryside,
to achieve self-sufficiency using organic farming methods and building a resilient farming community relying on locally adapted, traditional varieties and traditional professions,
environmental education through community events, especially for children</td></tr>
<tr><td>Szatyor (Shopping Bag)
Established in 2012 in Kecskemét in a form of an association.
Aims:
to create a direct connection between farmers and consumers in the city in the form of a shopping community,
to support the livelihood of local farmers who practice sustainable farming methods by purchasing their products while providing chemical-free, safe food for consumers,
to educate the inhabitants about sustainable practices and lifestyle in the city through community or city-wide events</td><td>Ecological Institute for Sustainable Development (EISD)
Established in 1992 in Miskolc in the form of a foundation, inspired by the Rio Conference on sustainable development.
Aims:
to provide scientifically sound environment status assessments,
to develop sustainable methods for natural resource management,
to introduce locally adapted agricultural practices,
to improve the culture of ecological knowledge through environmental education and knowledge sharing
strong environmental advocacy
The institute has been slowly dissolving and will be reorganized in the form of an association (Green Connection).</td></tr>
</table>

a) Framing

The dimension of framing within social innovation embodies basic values and beliefs of a community that hold them together. Framing is reflected in the mission, vision, stories or commitments of a group that helps to understand what social innovation is about (Hexaltine *et*

al. 2016). The framing process within farmer seed networks and local communities therefore can be traced back to the mission statement or what kind of discourses, meanings, and stories they communicate, which substantiate their existence or differentiate them from other communities. Regarding the meanings of seeds, all local hubs associate the seed with "life", considering it a living being; except Magház and Banya-tanya who used the concepts of "food sovereignty", "food source", or "miracle" to define seeds.

As I mentioned in the literature review, the issues surrounding agrobiodiversity and local varieties have only reached Hungary in the 2010s, therefore Magház essentially capitalized on this trend to reintroduce traditional varieties and sustainable small-scale practices to public awareness, challenging the industrialized agricultural methods that started during the socialist regime and regulations introduced also after the change of regime. The representative of Magház explains:

> Magház adapts to generational changes. As our grandparents and parents were not taking care of seeds, they just bought them, therefore Magház brings back this traditional practice giving it a scientific basis. The main redefinition is preserving diversity, which has long disappeared from an average grower's garden.

They specifically frame their message around the importance of home gardening or city gardening using diverse varieties, emphasizing that not only can professional farmers produce food on a large scale, but anyone can achieve it on a small scale relying on sustainable methods. In this way, they introduced the concept of food sovereignty and self-sufficiency into popular discourse, which is reflected in their associations with the seed as well. In this way, Magház shows similarity with the results of the case study conducted by Védegylet (2012), which pointed out the importance of food sovereignty within local communities.

While Magház has its own central mission and framing of its activities, the local communities and hubs linked to the network have their own freedom to redefine their mission and goals, or the concepts around seed or food. Magház acknowledges that different regions in Hungary have different characteristics and needs regarding seeds or food, and anticipates the emergence of a diversity of definitions. Every interviewed local hub has a wide range of activities, from preserving traditional rural lifestyles, to providing ecological education to children, to conserving nature. Therefore, activities related to seeds comprise only a specific segment of their work, which is linked to other activities like sustainable farming.

The Union of Organic Farms of Szer (SZÖSZ) associated the seed with "life", "food sovereignty", and "preservation", which are all reflected in their framing process. They consciously aim to revive the old, traditional peasant lifestyle that was practiced in homestead communities in the countryside. This concept is very similar to the French Réseau Semences Paysannes' concept of "peasantization" (Bocci 2009; Demeulenaere 2014). They similarly frame their activity around the holistic understanding that the peasants, the landscape, and the soil are all connected as a living community. Therefore, sustainable practices and the conservation of landraces and heirloom varieties are a prominent part of preserving the tradition of old peasant lifestyle and of diversifying their production. "Landraces are the embodiments of old, peasant farming for us. They incorporate the life of old generations who preserved or changed them. I often think nostalgically of landraces as ancient monuments," explains the representative of SZÖSZ.

In this way, they challenge the negative, dismissive connotation attached to peasants in popular culture, showing that peasant farming communities can be self-sufficient and culturally rich in opposition to individualized, industrialized monocultures. Moreover, their framing process, focused on preserving traditions and cultural inheritance, echoes the results of Védegylet which pointed out that the concept of traditionalism is a driving force for local communities dedicated to agrobiodiversity.

In the case of Szatyor, "life" and "traditional values" also appeared in association with seeds. However, their framing process is more focused on food self-sufficiency. As a shopping community, they introduced the concept of community and trust-based food provision, showing that a direct connection is possible between local organic farmers and consumers even in the city, circumventing the supermarkets. In this way, they challenge the culture of consumerism, giving an alternative example that conscious consumers can alter the variety usage of the farmers and shape the demand for food from local and traditional varieties.

Szatyor does not only frame their mission, but uniquely frames their seed exchanges naming it as Seedy Days[9] with a logo (Figure 8) and with its own webpage. As Szatyor's representative explains,

> It is not a simple seed exchange: we call it Seedy Day for a reason. Strictly the most important aim of our events is the spread of "seedy thoughts" shaping the

[9] Author's own translation. The original name of the event is "Magvas Nap" which literally means "Seedy Day". In Hungarian, "magvas" means both "related to seeds" and "deep" or "full of content".

perspective of people about seeds, sustainable gardening, the possibility of achieving agrobiodiversity in the city which are all linked to our health. We are sowing seeds in people's minds, not just in our soils.

Figure 8. Logo of Seedy Day

In this sense, they consciously communicate and position seed exchanges as a mixture of professionally informative and socially interactive programs, therefore openly raising it from the level of material exchange to the level of a community event in their online and offline communication as well. It is important to point this out, because other hubs may organize lectures or workshops during seed swaps, but it still remains a simple seed swap in their communication. Branding and story-telling make seed exchanges interesting and attractive for outsiders, which potentially increases the outreach of their local hub and the very notion of a seed exchange.

b) Doing

Doing in social innovation means those practices and performances that are continually created and sustained by the members involved in an initiative, which also can be understood as a form of material commitment (Hexaltine *et al*. 2016). The new ways of doing within farmer seed networks and local communities therefore can manifest in a variety of community-building activities they perform within their group or deploy to grow involving others.

Magház and its local hubs have two major new ways of doing: (1) seed production and multiplication and (2) organizing or attending seed exchanges. Moreover, local hubs depending on their mission have diverse activities.

Seed production and multiplication

In opposition to the individual seed production in the formal seed system, Magház tries to create a common pool of seeds in which all seed savers are collectively willing to put their own seeds in exchange for more seeds. This process is achieved through the on-farm project which was launched in 2019 involving nine farmers. Hence, a considerable amount of seed can be created and shared within the network (approx. 7-800 packages/year). Within three years, the aim is to sell the varieties that were selected and performed well in the on-farm trials, resulting in a financial input for Magház in a very similar way as Arche Noah operates. This new collective way of seed saving has the potential to reshape the ruling concept about industrialized seed production among farmers and to make seed saving attractive for interested amateur gardeners.

Seed exchanges

I will briefly share my observations and experience with one of the seed exchanges (Figure 9) organized by the CBGC in Budapest. I participated with other volunteers of Magház as the second biggest seed exhibitor on this event. Magház brought 160 packages of seeds and only 29 remained at the end, which marked the seed swap pretty successful. Magház received 44 packages of new seeds through the exchange, some of them were labelled, but the majority were not. During the event, the participants received seeds from Magház not just through exchange for other seeds, but for filling out a seed quiz, a questionnaire, or for playing a seed identification game. These activities were not only important to involve participants and attract them to our table, but to educate and make them interested about seeds and seed saving.

Figure 9. Exchange is taking place

The event was semi-official, as it was opened by the Minister of Agriculture István Nagy and the director of CBGC, which was followed by a series of presentations on the advantages of organic farming and the consumption of organic products, on how to build a small organic garden at home and on fruit landraces. I expected to experience a very official atmosphere throughout the event due to the ministerial presence, but I turned out to be wrong. About 130-150 people attended and the atmosphere was very friendly and informal with many anecdotes, and with exchanging experiences on the cultivation and plant health of local varieties. For instance, I met a very young farmer asking for seeds at the table of Magház who turned out to be an amateur breeder. The conversation unfolded quickly and he joined our table as an "exhibitor," bringing his crops and seeds out of his car and putting them next to Magház's seeds. This is the type of networking that makes these seed exchanges unique and could potentially link strangers to the work of Magház.

I also noticed that the seed exchanges I visited can be categorized according to the interest of local people. In Szeged, the participants were more interested in ancient, traditional, Hungarian varieties, while in Pécs, exotic and experimental seeds were favored, in Budapest any kind of variety that can be grown in pots on the balcony was popular, and in Kecskemét, as mentioned, the current theme was cover crops. (But the representatives told me that usually plants that can bear the sandy soil and the dry climate are preferred.)

I also found it interesting that the great majority of participants came to seed exchanges without any seeds as they would expect to get some for free anyway. Usually there are some core members within a local community who enthusiastically save seeds and multiply often, and they are the ones who have become fixed exhibitors. The rest just attend to get seeds. However,

the reason behind this tendency can be related to Magház's assumption that in Hungary the knowledge about seed saving, traditional varieties, and vegetable gardening in general is just becoming established and widespread. Therefore, it is already a success if people arrive at all, let alone bringing their own seeds.

Seed exchanges ultimately challenge the profit-oriented focus of the formal seed sector through the free circulation of seed. On a seed exchange, there are no intellectual property rights, seeds are available for anyone. Magház does not sell seeds for profit, therefore the commercial market is purposefully avoided. If Magház or other local hubs organize an exchange event, seed circulation is solely non-commercial. Seeds are not bought, they are swapped for other seeds. In case somebody does not have seeds for exchange, they are encouraged to fill out a survey or a quiz or participate in a seed recognition game to get a package of seed, depending on the rules and the host.

Moreover, I experienced that not only material exchange, but the experience of a social gathering and of collective learning attracts people to visit seed exchanges. In Figure 10, I collected the ten most common reasons participants visit seed exchanges according to my questionnaire data.

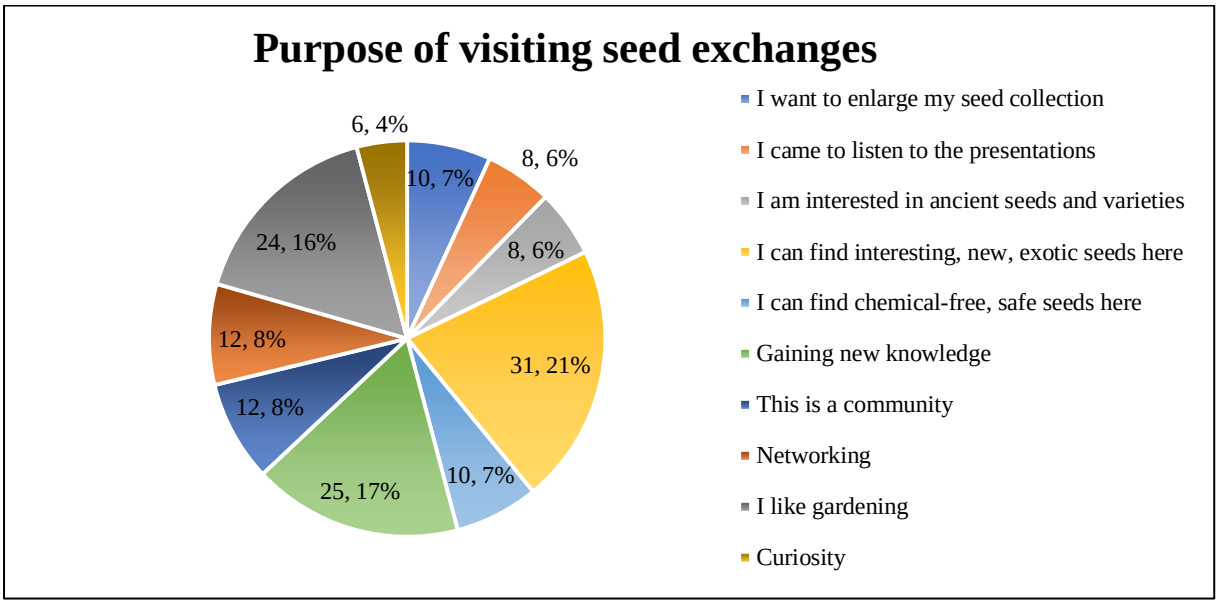

Figure 10. Questionnaire results on the purpose of visiting seed exchanges

Besides the interest in acquiring exotic or ancient seeds for free, gaining knowledge through listening to presentations, networking, community-building and curiosity appeared as important factors determining the purpose of participants in relation to seed exchanges. This confirms the

notion pointed out by Balázs and Aistara (2018) that seed exchanges are not only the places of material exchange but personal experiences, stories about seeds, and know-how on different ways of cultivation flows in the form of social interactions, which can be in the form of informal conversations or a public lecture.

Magház confirms that the underlying concept of seed exchanges is networking and connecting with others, not just practical exchange. Banya-tanya puts it this way:

> The success of a seed exchange hugely depends on the stories we tell about a particular seed, depends on the shine in the eyes of an old man who's been saving his seed for 40 years now. That's why I prefer small gatherings with 4-5 exhibitors when we have the time go around each table and discuss our experiences.

In the case of local hubs, seed exchanges are not always stand-alone events. Workshops, presentations, exhibitions, family programs are necessary to make seed exchanges interesting and worthwhile to attend. SZÖSZ in Ópusztaszer and Szatyor in Kecskemét always include three- to four-hour-long presentation sessions during seed swaps. Every time, Szatyor selects specific themes around which the seed swap and lectures are organized (cover crops, crops of sandy soils). If it is a complex event with a colorful program, people are more prone to attend. In this way, local hubs consciously use seed exchanges to create new types of social relations and personal connection as it is emphasized by Balázs and Aistara (2018).

c) Organizing

Organizing in social innovation denotes the work that unites the members, creating internal – often external with other initiatives – coherence (Hexaltine *et al.* 2016). The process of organizing in farmer seed networks and local communities, therefore, manifests in their legal form, organizational structure, system of responsibilities and task management or forms of operation.

Magház has no legal entity, the network organizes itself on a volunteer basis, which makes the structure difficult to formalize or even to hold the volunteers together in the long run. Magház purposefully has not centralized its activity yet with a "headquarters," as they want to strengthen the network through its local hubs. The communication within the network is horizontally arranged between the two main coordinators and the volunteers who are encouraged to take

initiatives on their own (i.e. to organize or to participate in seed exchange events, to give lectures, or to recruit members).

Within the local hubs, the very same horizontal organizational structure can be observed, as they are all civil initiatives in a form of foundations and associations. In this way, the network heavily relies on the legal background of civil organizations (for managing donations and to apply for state or international funds), which used to create a good financial opportunity for the initiatives. However, in light of the government's negative propaganda against NGOs, their financial opportunities became very limited, locally and countrywide. As a result, the Hungarian network is very different in its organization from any other Western European farmer seed network, because Arche Noah, Red de Semillas or Rete Semi Rurali have legal backgrounds and central offices. With this new way of organizing, the decentralization can achieve better resilience in the organization of local hubs and communities against changing socio-economic conditions or in case the formal seed system stops operating.

Magház and local hubs do not want to forcefully change or challenge dominant structures with this special form of organizing through lobbying the local governments or campaigns, unlike their Western European counterparts. The critical mass to politically reclaim food sovereignty, to go against seed companies or to lobby for farmers' rights has not been achieved yet. First, Magház aims to strengthen itself by connecting with as many local initiatives as possible and gathering enthusiastic seed lovers in order to be capable of influencing a bigger audience and achieving a wider outreach.

Regarding other new ways of organizing in local hubs, Szatyor organizes its activity around organic farmers near Kecskemét, very similarly to Arche Noah. In this way, they do not only boost local production but through their consumer demand, they are able to persuade local farmers to diversify their production with local or landrace varieties challenging the ruling supermarket-induced consumer demand. However, the main difference between Szatyor and Arche Noah is that the latter incorporated the farmers into the whole network, therefore achieving social innovation in a wider sense, not just locally. Supporting local production in the form of local products confirms the results of Védegylet (2012), which pointed out that the concept of rural development is a driving force for local communities dedicated to agrobiodiversity.

Moreover, Szatyor's organization uniquely created a strict standard of conduct: a quality insurance system in order to avoid green-washing farmers. A farmer can only enter into the system if their farm is examined personally by the members of the community – usually in the form of farm visits.

> Nowadays, anyone can have an organic farming certification, this won't stop a farmer to use fertilizers and chemicals. Everyone cheats in this country, organic inspection is corrupt. A farmer can only join our community if I personally saw their farm, their shed, touched their soils and had a good conversation with them. Personal connection and trust are the foundations of Szatyor,

explains their representative. Through this internal governance, they show that a local hub is capable of self-inspection, maintaining quality (of seeds, of food) within the community without relying on any kind of certification from dominant institutes.

d) Knowing

Knowing in social innovation is the way how knowledge is created and circulated within the initiative, which supports their mission, commitments, and activities (Hexaltine *et al.* 2016). The knowing process in farmer seed networks and local communities is usually created through collective learning, evaluating, and improving of competence. The circulation of knowledge is done through different online and offline platforms using digital, print, and interactive materials or personal interaction.

For instance, Magház created and published *The Practicalities of Seed Saving* (Figure 11) with the help of CBGC, which is the most important knowledge material within the network containing the methods of seed saving. Through the creation of this knowledge, Magház and its network is officially acknowledged within and beyond the network as it contributes to widely promote their name, their logo, and their mission. With the booklet, they created and circulated a new, comprehensive material which had never existed before in Hungary, addressing the knowledge gap that exists about seed saving. Probably, online platforms (Facebook, website) are their strongest communication tool for the network and for the local hubs as well, where Magház informs the network about seed exchanges happening in the country. These tools hold the network members together, but simultaneously allow them to spread knowledge to a wider audience as well. Seed exchanges, presentations are given high importance in terms of sharing

knowledge in person, as I explained in the previous section on new ways of doing.

Figure 11. Packaged and labelled seeds for seed exchange by Magház and the Practicalities booklet

But local hubs create their own knowledge as well, related to their specific mission or goal. The sharing of this knowledge is usually done through community-based events and online platforms. EISD organized a six-part lecture series in the elementary schools of Borsod county to educate children about sustainable development, starting from smaller to bigger concepts: the evolution of life, the importance of plants and seeds, food production and sustainable development. Interactive games were used to convey concepts and share knowledge on a specific subject. They created memory games indicating different varieties of plants, they had seed recognition games, or they presented the phases of seed saving using different species. This unique way of knowledge sharing about the diversity of crops and seed saving specifically designed for children innovatively introduces new techniques into environmental education of the children.

There is an interesting dynamic between local hubs and their immediate environment regarding knowledge sharing. These hubs create knowledge in response to intensive, large-scale agriculture and its impact on local farming and gardening practices, as well as to the fading culture of local communities, traditional values, and rich peasant culture. In this way, they started to challenge the dominant thinking of their local institutions and environments. It turned out that these local social structures are very rigid and unwelcoming in many villages. Banya-tanya explains:

> When we launched our village newsletter with agroecological tips, the elderly

> people were incredibly unreceptive to us. How dare we tell them about the ways of gardening, hoeing and digging?! They have been doing it for decades now, they know it better! We are just a bunch of young strangers who come and go…

It seems it is not an easy task to challenge local attitudes, not to mention nation-wide ones. Therefore, they changed strategy and started to share knowledge through practice by cultivating a 4000m² vegetable and herb garden. The garden does not only serve their self-sufficiency but is an example garden for the elderly inhabitants of the village to present a sustainable example of gardening in opposition to heavy fertilizer and chemical usage that dominates the gardening practice of the older generation in villages.

6.3. Social innovation in related individual communities

In Hungary, many independent local communities self-organize seed exchanges without having any connection to Magház, to its local hubs, or any other civil initiative, for that matter. However, within their local environment, seed exchanges have become traditional community events. These individual communities can be considered potential future local hubs for Magház, therefore I find it important to connect their local social innovation activity to the overall mission of Magház. In this section, I will analyze the social innovative potential of a smaller local community, the Ecological Community in Bercel and an individual gardener in Pécs who started their own seed exchanges without any help or knowledge from Magház. Table 6 summarizes the activities of the related individual communities.

Table 6. Description of the activities of the related individual communities

Eco Community	**Permaculture gardener**
Established in 2015 in Bercel by 4 families, 2 couples, and 3 individuals. Legal background: Otthon Európában (Home in Europe) Association. Aims: • environmental reconstruction through renovating ruinous houses into authentic, peasant adobe houses, • to contribute to the preservation of rural traditions and culture, • to follow the principles of sustainable, holistic living, which includes agroecological farming practices and gardening, • sharing knowledge on sustainable lifestyle through community events	Emerged in 2017 in Pécs in a form of an online knowledge-sharing platform about permaculture. Aims: • to promote the principles of permaculture online mainly in Pécs, • to share and circulate knowledge on the practices of permaculture mainly through online platforms, • to organize community events and gatherings in Pécs in relation to permaculture

a) Framing

The Ecological Community in Bercel associated the seed with "life" and "future", which is reflected not only in their mission, but symbolizes their creation as well. With the promise of a new life close to nature and of sustainable future, they moved out from the city to the countryside where they can start over. They were given a very special opportunity by the rich family of Bercel who owned the local castle and some nearby houses. The family gave these houses to the members of the community in the form of courtesy accommodation in return for renovation. Essentially, they could move into and live in the houses for free in return for house renovation and garden cultivation. They call themselves ecological community because they frame their activity in the spirit of sustainable and environmentally conscious ways of living, using agroecological methods and preserving the rural lifestyle. Having been born and lived in the city for a long time, they consciously formed their mission of self-sufficiency as an alternative to the dependent and fast life of the city

"It is so reassuring that I can just wake up and go into my own garden to pick some vegetables. No supermarkets, no overfertilized fruits and vegetables, I control everything," explains the representative of the Eco Community.

In this sense, their framing process around the preservation of rural lifestyle is similar to SZÖSZ and Banya-tanya, but Eco Community does not consciously use "peasantization" to describe their motivations.

Pécs differs from any other place who participated in this research, as the social innovation here is achieved by a single individual and not by a community. The gardener in Pécs used the word "miracle" in relation to seeds which is also very symbolic to his emergence. As a graphic designer living in the city, he encountered the principles of permaculture which suddenly opened a new world for him. Permaculture gave him a complex understanding of ecology and system thinking within nature which resulted a miraculous change in his life. Sustainable gardening and agrobiodiversity conservation framed his activity when he started his online permaculture group in Pécs. In this way, he alone started to introduce the concept of permaculture and food self-sufficiency through seed autonomy, making sustainable gardening methods attractive in the city.

b) Doing and Organizing

The two individual communities also have the same ways of doing as mentioned in case of Magház and its hubs; however, these activities only exist on an individual level, not a collective level like in the case of Magház.

Seed exchanges occurred spontaneously in Bercel, but slowly grew into a whole community event in 2017. Seed exchanges are not only important to boost participants' kitchens and backyard gardens, but they are also the tools to open up to the village. In this way, seed exchanges help them to challenge the ruling social structure within the village, showing that new types of practice can be also part of the village's cultural life and can become community traditions. However, they face very similar discriminative attitudes as Banya-tanya. "They consider us strangers. The local government told me that we are even worse than gypsies, because we are unpredictable with our community-building, 'green' whims," said the representative of Eco Community.

Figure 12. Smaller seed exchange in Pécs

In Pécs (Figure 12), organizing seed exchanges made it possible for the gardener to get acquainted with his online permaculture community with the aim to promote the concept of permaculture through seeds in person as well. In this sense, he did not just reintroduce seed exchanges in Pécs, but he was able to socially (and online as well) mobilize people within a local environment by himself, using seed exchanges as a tool for networking and creating new social relations.

These communities differ greatly from local hubs or Western European networks, as they are just emerging and experimenting with new ways of organizing. Therefore, joining the network of Magház can help them enhance their social innovation potential as well.

d) Knowing

While the introduction of knowledge on permaculture for the gardener in Pécs is more linked to online platforms, the Eco Community strongly relies on communal events for sharing knowledge, ranging from soap boiling, crafting workshops, artisan baking or gardening together. For sharing the knowledge on seed saving, diversification techniques, and permaculture, they launched a permaculture demonstration garden project in 2018 within the local community, called Eleven táj (Living Landscape). This is also very similar to the garden of Banya-tanya which serves a similar purpose in Bátor. These programs are all integral parts of their knowledge-sharing process, which enables them to collectively learn about seed saving through practice and to promote sustainable gardening techniques through their own example, challenging the fertilizer- and chemical-dependent gardening methods of the locals. Plus, their practice supports the results of Védegylet (2012), showing that the concept of landscape stewardship is a driving force for local communities dedicated to agrobiodiversity.

These initiatives are great examples of willingness and enthusiasm, showing that a handful of people are capable of changing their environment in the hope of a more sustainable life – which is often enough to start social innovation within local circumstances. However, the know-how provided by Magház could help them to grow into an organized community or local hub which is not isolated anymore from the outside world. In return, Magház can further connect with different, new initiatives in the country which can provide other, locally specific ways of knowing, doing, organizing and framing, thus mutually benefiting and strengthening themselves and the whole network.

6.4. Discussion

In this chapter I analyzed the social innovative activity of Magház and six local initiatives dedicated to agrobiodiversity through their new ways of doing, organizing, framing and knowing. For instance, Szatyor in Kecskemét uniquely frames its seed exchanges in its communication by emphasizing its interactive, community-focused characteristics, thus

elevating the event from the level of material exchange. Regarding new ways of doing, apart from seed exchanges, Magház achieves seed production through on-farm cooperation with farmers, very similarly to Arche Noah in Austria. In Hungary, this collective seed saving enterprise within the network greatly differs from the dominant way of individualized, industrialized seed production. As a new way of organizing, Magház differs from other Western European centralized networks, as it aims to achieve a decentralized organization by building on and strengthening local hubs in order to enhance the resilience of the network against the formal seed system. As a new way of knowing, Banya-tanya and Eco Community created demonstration gardens for sharing the knowledge of diverse production with landraces within their local environment in order to shape the ruling chemical-dependent, uniform gardening practice of the locals.

Moreover, the social innovation within the Magház network enabled them to cooperate with one of the dominant institutes, CBGC. Their cooperation uniquely laid the foundation for scientifically sound seed saving techniques and promotes the importance of traditional variety and landrace conservation, emphasizing the benefits of food sovereignty in the country. As the Hungarian government shows great support for seed exchanges, Magház together with the gene bank have the potential to launch broader transformative processes in the Ministry regarding agrobiodiversity conservation support, or even policies that could eventually challenge the uniform, industrialized seed production of the formal seed system.

I also demonstrated through the analysis that Magház and its network strongly associate seeds with the concept of life, which influences their protective attitude towards nature. It also shapes their activity as the sustainable practices they follow consider seeds as living beings which are an important part of the environment determining their food. But the concept of food sovereignty and tradition preservation is even stronger for framing their mission and activity by promoting small-scale self-sufficiency relying on diverse, local crops and food.

In sum, the results of this chapter add to the current literature on Magház by establishing the knowledge on the social innovation achieved by the Hungarian farmer seed network and six local communities dedicated to agrobiodiversity conservation in relation to dominant structures, which has not been researched in the country.

Furthermore, referring back to result of the case study conducted by Védegylet (2012) which concluded that traditionalism, food sovereignty, landscape stewardship, climate change

mitigation, rural development and nature protection are the main issues contributing to the interest in conserving agrobiodiversity of local communities, I made the following comparison based on my interview data (Table 7):

Table 7. Comparison of themes in Védegylet's study on local communities and the present research

Védegylet case studies (2012)	Magház + 6 local communities
Traditionalism and innovation	Preserving traditions and cultural values
Food sovereignty	Food self-sufficiency and autonomy
Landscape stewardship	Organic farming, permaculture, sustainable farming, peasant farming
Climate change mitigation	Nature conservation/environment rehabilitation
Rural development and employment	Rural lifestyle/alternative ways of living
Nature protection	Supporting local farmers by buying local products
	Environmental education/promotion of sustainability
	Building a resilient community
	Environmental advocacy (only EISD)

My study confirms that preserving traditions, self-sufficiency, sustainable farming methods, boosting rural economy and nature preservation are indeed the building blocks of the interviewed local communities. However, my research also adds more detailed terms to Védegylet's results, like permaculture or peasant farming for landscape stewardship, conserving traditional rural cultural lifestyle for traditionalism. Moreover, new concepts emerged, like environmental education, conscious promotion of sustainable ways of living, building resiliency, and environmental advocacy, showing that local communities can be interested in agrobiodiversity conservation for a variety of reasons depending on their overall mission.

Finally, the results of this chapter serve as a platform for highlighting the socially innovative activities of local or grassroot initiatives in order to learn from each other's examples and to ground further discussion. Thus, creating a possibility for connecting the common points in order to strengthen the network and grow from a grassroot community to a nationwide organization which draws its power from its decentralized structure.

"The knowledge about food production for the consumer stops right at the supermarket. There is no direct connection with the farmers anymore."

- **representative of Szatyor (Shopping bag) Association**

7. BARRIERS AND OPPORTUNITIES

My last analytical chapter will close the study with a discussion of more complex agricultural, socio-political aspects that were raised by the stakeholders themselves during the interviews as factors helping or hindering the activity of the farmer seed network.

I base my analysis on Fairclough's method of discourse analysis (1992), and frame this chapter around the emerging themes related to barriers and opportunities in the responses of the participants. I identify four major barriers reinforcing dominant structures that can hinder the socially innovative activity of farmer seed network: (1) current situation of the farmers, (2) altered consumer choices, (3) lack of adaptive capacity to the changing climatic conditions, (4) hostile attitude against alternative approaches and practices. Additionally, I identify three opportunities that may empower the network and may help them to further achieve innovative changes which shape discourses around agrobiodiversity: (1) expanding to retail, (2) forming Magház into an organization and developing its lobbying power, and (3) capitalizing on international mobility opportunities and available technical knowledge. The Barriers section is built on the data coded from the interviews, and the Opportunities section was built both on the interview data and on my personal observations.

7.1. Barriers

I identify the following barriers to the socially innovative potential of Magház and to the farmer society as well. These barriers result from discourses within society reinforced by dominant structures that can hinder the network in creating new knowledge and practice, in finding new ways of organizing, or in reframing ruling paradigms on agriculture or farmers.

1. Current situation of the farmers

This issue was approached by the participants from many angles. First of all, the participants reflected on the fact that Hungary has great agroecological and geographical characteristics that would make it perfect for agricultural production. However, the dominant socio-political context makes it less and less possible to make a living from agriculture. For example, the representative of Banya-tanya explained:

> Agricultural work is the lowest of all jobs even here, in the countryside. Everyone is running away from it. People have long forgotten to recognize the farmers who produce their food. There is no honor in growing your own food with your own hands. Even the word "peasant" is used in a pejorative way, a simple farmer is regarded as someone inferior.

This is referring to the general perception that agriculture is physically demanding, dirty, and less valued than any other job even if it is the primary production sector. This is why the innovative work of Magház is important, because they reintroduce gardening and small-scale food self-sufficiency into the public discourse, which brings the reality of farming closer to the audiences and makes it attractive rather than dirty or degrading.

Within this broader context of rural change, other interviewees noted the lack of strong farmers' unions. A representative of Védegylet noted that "some unions still exist, but they do not even answer the phone – it's a pensioner's club." Agrya is the only association that tries to connect the young farmers in the country by allocating financial support (Young Farmers Program) through state funds and achieve modernization on the farms, which really helps the farmers (Agrya 2019). However, their lobbying power is limited and focused on intensive, large-scale production.

This is seen as a contrast to the moment after the change of regime, in 1990, when there was a short period when farmers started to organize themselves into unions, and even had representation in a formal political party. However, after the 2000s, their lobbying power and associations were gradually dismantled. When the auction of state farms and lands took place in 2015-2016, most of the lands were bought by rich, large-scale farmers or entrepreneurs creating a new caste in Hungary, the "green barons" (atlatszo.hu 2017). This only made the situation of small- or medium-scale farmers worse, as they had no functioning unions against the government measures.

In sum, strong farmers' unions which would represent their interests never functioned in Hungary, in opposition to Western Europe, like France. The director of the Seed Association argues that

> When a French farmer notices even a tiniest measure that hinders their work, they start a union and rise against the government or a company. A Hungarian farmer avoids their neighbor farmer when they can…. Collectivization had its toll on our society…

The conditioning of Hungarian farmers during the socialist regime and the unwillingness of farmers to work together – or trust one another – only reinforces dominant structures within the society that hinders social innovation for the network.

Many participants stated that it is more convenient for the farmer to use hybrids or modern varieties than landraces or local varieties. Their production is more predictable and profitable – they come with the package of fertilizers and chemicals – just as in any country mentioned in the formal seed system section [Chapter 2, Section 2.2.1.]. Even the director of CBGC agrees: "Hungarian farmers do not really like to experiment, they are interested in safe, tested varieties. Otherwise, they can easily fail in trying out landraces and lose their livelihood."

She based her statement on the knowledge that the supply of legal, certified traditional or landrace seeds is limited in the country. Even if a farmer wants to experiment or diversify their production, the lack of seeds hinders their enthusiasm. This, of course, is further hindered by restrictive EU seed laws or the UPOV's intellectual property rights. Thus, farmers become more and more dependent on the formal seed system which supports the dominance of the related structures. Not to mention that the dominant discourse around seeds favors the "objectified, profit generator" concept, as opposed to considering seeds as part of the living ecosystem.

Therefore, starting a self-sufficient farm based on sustainable practice and diverse crop production is highly discouraged. Moreover, the concept of farmers' rights is unknown for the vast majority of Hungarian farmers, as it has never been embraced by any farmer association or former union. It is not even the priority of Magház yet, at least, until the knowledge on local, traditional varieties becomes well-established among Hungarian farmers.

2. Changing consumer choices

From the point of view of consumers, the situation of farmers is not an significant issue, as it has no direct effect on them. As explained by a representative of Szatyor, "the knowledge of food production of the consumer stops in the supermarket. There is no direct connection with the farmers anymore."

This statement reflects on the limited vegetable and fruit choices found in the supermarkets, but these choices have a great effect on their consumption attitude. The food offered in stores is far from diverse, uniformity rules the shelves. "There is one type of tomato, potato, pepper… the

species on offer are not diverse at all," explains the representative of Védegylet. Unfortunately, retail companies has requirements toward farmers that are difficult to meet unless the farmer ensures the continuous supply of uniform, intact goods. This greatly disempowers farmers in their bargaining position, which results in the discouragement from production diversification. As a result, consumers' interest shifted toward low prices, convenience, and distrust toward colorful, seemingly exotic choices. "When I was selling my produce in the farmers' market, an old lady commented on my purple and green colored landrace tomatoes that she wouldn't buy them because it looks GMO," tells a farmer from Szentes.

Altering consumer behaviors by changing the products on the shelves of the supermarkets requires the cooperation of farmers and retailers.

3. Lack of adaptive capacity to the changing climatic conditions

The lack of technical knowledge about complex ecosystem management on the farmer level and the complete absence of long-term governmental strategic agricultural planning focused on climate mitigation or agrobiodiversity in general are raising concerns for the participants. A landrace trader explains:

> Very limited professional knowledge is available on landraces or exotic varieties and on their adaptation strategies to our changing climate. What I know now, I learned from English sources, or by myself. Hungarian scholars do not know this, not to mention their practice…

The international discourse on climate change mitigation in agriculture only reached Hungary's scientific community, but not the great majority of decision-makers or farmers. Actively, only green civil organizations and local communities embraced climate change mitigation strategies, like Szatyor in Kecskemét or EISD in Miskolc. However, there is no targeted agricultural strategy on the governmental level, therefore, collectively, farmers' awareness has not been raised and they are not educated on it professionally.

Participants such as Szatyor in Kecskemét, Magház, a farmer in Izsák, and SZÖSZ emphasized that many of their plants cannot bear the more and more hot and extreme climate – especially in sensitive regions like the sandy Kiskunság or the salty Hajdúság, – not only their modern varieties but landraces neither. If farmers do not start adapting to the changing climate by diversifying their production or by replacing their varieties or species, the country may face

serious food security issues. A landrace trader pointed out that clinging so much to traditional, Hungarian varieties or landraces may not be the right approach in light of our changing climate:

> Ancient Hungarian landraces should not be forced on farmers so much – maybe on the breeding sector – because our climate is not suitable for their production anymore. We should be focusing on "new, exotic" landraces from hotter climates that are similar to ours now: sweet potato, yellow nutsedge, orange, lemon, new species of arable crops etc.

Openness toward new species combined with the spread of technical knowledge on climate change mitigation among farmers and decision-makers in the form of education and training would be necessary to address the country's limited adaptive capacity. Moreover, the new practice and knowledge creation within Magház and the local communities enables them to react to changing conditions by adopting new crops.

4. Hostile attitude against alternative approaches and practices

In the previous chapter, I mentioned that, as younger generations challenge older generations, agricultural conditionings, and local dominant structures, they face dismissive, often discriminative attitudes from locals. The representative of Banya-tanya explains:

> My neighbor looked at my garden as if it were a garbage field, when I used mulch year after year. When I was not sweating of days of hoeing because she was until her whole garden was weed-free, she considered me a good-for-nothing lazy.

Young, forward-looking gardeners, such as the Eco Community, who move to the countryside in the hope of a natural lifestyle and community life found quite the opposite, which can be very disappointing for starting a sustainable way of living alone, without any help or experience from older generations.

In relation to this issue, the political discrimination of civil organizations reached the countryside as well, which greatly affects the new practice and knowledge sharing activities of those alternative communities or initiatives who are dedicated to agrobiodiversity. In Hungary, classical civil movements based on a strong middle-class have never been a trend. The middle-class has only existed in the capital, but it has been shrinking for years due to the widening income gap (Tóth 2016). Moreover, the local government's discriminative attitude fueled by political propaganda against civil organizations and their activity greatly hinders the development of local initiatives. "In the countryside, the cooperation of 'civilians' does not

exist, it's absent from the culture, it never existed, only in Budapest. Here, local civil movements are synonyms for troublemakers and financed agitators," Banya-tanya explains.

Therefore, local initiatives are not considered valuable parts of the local society – particularly if they are socially innovative and make country life appealing for younger people and boost sustainable gardening. Rather, they are considered rebels against the current dominant structures and disruptive elements within their local society. The combination of dismissive behavior from locals and exclusion from government funding also put barriers in the way of these socially innovative initiatives.

7.2. Opportunities

As mentioned in the introduction, the results of this section build on the observations of the research participants and the researcher. These observations avoid policy recommendations, which, in the current Hungarian political context and in the absence of Magház's lobbying power, are regarded as unrealistic by the participants. Opportunities are listed from the point of view of farmers, local initiatives, and Magház as a whole. Therefore, only those opportunities are considered here which are currently available and realistic to build on, considering the grassroot status and lack of financial background of the network.

1. Expanding to retail

Many participants mentioned that supermarkets should be approached by organic farmers or consumer groups and make them interested in diversifying their offer by rethinking the existing requirements for supplying farmers. For instance, in Austria Arche Noah cooperates with SPAR supermarket to sell the produce of their organic farmer network, including landraces. Only the Hungarian Research Institute of Organic Agriculture (ÖMKi) tried to sell their organic tomato landrace seedlings in Lidl supermarket this year, which is a great improvement; however, landrace vegetables and fruits are still absent from most shelves. Magház should encourage farmers to develop similar initiatives or pilot programs with Hungarian retailers.

2. Forming Magház into an organization and expanding its lobbying power

Although Magház can still be considered a grassroot initiative, its existence proves that there is a need for cooperation among the actors dedicated to agrobiodiversity and on-farm crop management in Hungary. The enthusiasm of the volunteers is gradually paying off, as Magház now has an official agreement with CBGC, which can partly cover their financial costs. Building on the experiences of the previous chapter and on the observations of the participants, I list some actions which may help Magház to develop a well-connected organizational form, which can enable further social innovation and can shape the work and attitudes of dominant structures:

- Connecting and integrating local seed exchange organizers that work individually into the work of Magház, such as the Eco Community and the permaculture gardener in Pécs, through on-farm projects, networking meetings, and workshops.
- Encouraging local seed exchange hosts to mix seed exchanges with other cultural programs or presentations in order to attract a wider range of audiences. They can also develop new activities in relation to seeds to foster discussions on the different meanings of seeds within and outside of the network. In this way, people could first learn to value and recognize seeds; then they would be more inclined to value gardening, farming and agrobiodiversity.
- The cooperation with the gene bank creates a very unique opportunity for Magház, which can be further expanded to work toward social transformation and furthering the issue of agrobiodiversity within dominant structures like the Ministry of Agriculture.
  For example, making seed exchanges into a country-wide brand by organizing road-shows under the auspices of Magház or in cooperation with CBGC in order to raise awareness among general audiences and policy-makers. A communication campaign can be built on spreading the brand, involving environmental NGOs and local seed exchange organizers, reaching different parts of the country.
- As Magház mentioned before, similarly, a nation-wide lecture series can be launched with the help and knowledge of local hubs and communities to educate a wide range of actors on the scientific and practical aspects of seed saving, agrobiodiversity, or sustainable methods.

- After the abovementioned mobilizing events, fundraising events and a donation system should be organized to support the creation of a legal organization which is able to employ full-time workers.
- A strong presence in Budapest should be maintained without centralizing the network, as the capital is more and more open to city gardening and sustainable food consumption.
- Additionally, Magház started its own on-farm project in 2019 with 10 farmers producing landrace seeds. This practice should be continued by launching nation-wide calls for the voluntary participation of farmers and gardeners in order involve more and more people in the network's activity.

3. Capitalizing on international mobility opportunities and available technical knowledge

This opportunity has not been raised by the participants and may sound irrelevant to the topic of farmer seed network at first, but building on my personal observations and experience I believe it must be mentioned.

Balázs *et al.* (2015), during the farmer seed network case study of the TRANSIT EU-funded project, found that western seed networks find their Central-Eastern European counterparts difficult to involve in international work and their lobbying activity for farmers' rights due to English language difficulties and their past agricultural socialization. These two important observations are also reflected in the lack of theoretical and practical knowledge on international agrobiodiversity trends, sustainable farmer strategies, on on-farm management and diversification of production (or participatory breeding practices) among Hungarian farmers. Language barriers, the old farmers socialization in the communist regime (e.g., hostility toward western knowledge) all affect young farmers' attitudes and potentially inhibits them from expanding their agricultural knowledge.

At the same time, there are a number of opportunities to go abroad to study or to gain hands-on practical experiences at universities and research institutes (e.g., Erasmus+, compulsory practice semester abroad, volunteering abroad on farms). Taking advantage from international mobility would result in better English proficiency and in refreshing the currently dominant farmers' attitudes and practices in Hungary with sustainable practices, knowledge on landrace production, or climate change mitigation. Plus, gaining international relations would raise

farmers' awareness of farmer's rights, and gradually enable them to start learning how to cooperate in order to increase their lobbying power.

Not to mention that many technical books on agrobiodiversity, seed saving, and landraces are only available in English. Organic farmers whom I worked with told me that they learned everything from American and English books, because there were no specific Hungarian books nor education – not to mention that old organic farmers were reluctant to share their knowledge with them.

In sum, I included this issue because international mobility in agriculture for Hungarians is still not exploited. I argue that it should be utilized by Magház in order to consciously transcend past attitudes and to import knowledge and make it available on as many platforms as possible.

These suggestions represent only part of the opinions, and further discussion between Magház and local initiatives is necessary to reach a unified concept and strategy on how to target opportunities and organize future work.

7.3. Discussion

This chapter aimed to underline the specific barriers and opportunities that hinder or help the socially innovative activity of farmers, local initiatives, and thus Magház in the country. I explained how the farmers' unwillingness and past socializations inhibit their cooperation which only reinforces the activity of the formal seed system resulting in farmers' discouragement from diversified production or from recognizing seeds as part of the living ecosystem. I mentioned that the technical and strategic unpreparedness of farmers and decision-makers to the changing climatic conditions obstruct the farmer's adaptive capacity to alter their production systems which disempower them against dominant structures in Hungary. Moreover, the unsupportive and discriminative attitude of the locals (mostly old generation) and local governments toward the alternative, sustainable methods of local communities block their new ways of organization and knowledge sharing within and outside of their reach.

In reaction to these, I discussed the opportunities raised by the research participants themselves, to address the current barriers by challenging dominant structures and shape discourses within society. Hungary's membership in the EU creates huge opportunities for international mobility

(e.g., in higher education), that could empower the farmer society in the country and make it more open, informed about agrobiodiversity, or internationally well-connected, than the past generations. New ways of doing and organizing in the form of cooperations between farmers and retailers can alter trends in consumer behavior and attitudes towards landraces and exotic and diverse food choices. I highlighted specific actions for Magház to exploit opportunities. For instance, Magház can shape the popular discourse around seeds by recognizing them as part of the living ecosystem through spreading and branding the practice of seed exchanges as interactive as informative social gatherings, with the help of local communities in the country.

This chapter aimed to add to the current literature on Magház and local communities in Hungary by addressing the knowledge gap on the helping and hindering factors for future social innovation in the Magház farmer seed network and local initiatives. As this analysis reflects on a more detailed and specific knowledge about these issues raised by the local hubs, initiatives, and farmers, it can potentially serve as a working document for the members and organizers of the network. The content of the chapter is open for further discussion regarding new ways of knowing, framing, doing and organizing as it contains only the opinions of the stakeholders involved in the research. I would suggest exploring the possibilities of cooperation between alternative farmers as new ways of organizing and doing, led by Magház. Furthermore, a discussion should be opened about alternative financial and organizational strategies as new ways of doing, for civil organizations to be able to face the restrictive socio-political context of Hungary. A network-wide discourse should start to create new knowledge on the concept of the seed in order to make it valued for the different meanings that stakeholders associate with it, and to shape the ruling commodity paradigm of the formal seed system.

8. CONCLUSION

The purpose of this thesis was, first, to identify different meanings of agrobiodiversity among the related actors in Hungary. Second, to analyze the social innovative activity of the Magház farmer seed network and related local initiatives through their new ways of doing, organizing, framing and knowing, applying the theoretical framework of transformative social innovation. And third, to identify the main barriers and opportunities that hinder or help the socially innovative potential of the Magház network and local communities.

In the literature review, I presented the importance of farmers for the conservation of agrobiodiversity in relation to *ex situ* and *in situ* management of crops. I discussed how farmer seed networks emerged as a result of the disappearing crop diversity and restrictions on seeds, which is fueled by the industrialized agricultural practices of the formal seed system. I pointed out the gap in researching the different meanings of seeds among farmer seed networks, setting the objectified, resource stock concept of the formal seed system against the concept of a living organism among the actors of agrobiodiversity. I presented the current agricultural and political context of agrobiodiversity in Hungary, emphasizing the under-researched topic of Magház's and the related communities' work. I explained the theoretical framework of transformative social innovation for analyzing the socially innovative potential of communities and initiatives through new ways of knowing, doing, organizing and framing. Then, I highlighted the social innovation potential of farmer seed networks, presenting current cases from Europe, such as Arche Noah in Austria, Réseau Semences Paysannes in France, Rete Semi Rurali in Italy, and Magház in Hungary.

To answer the objectives of my research, I used qualitative research methods by interviewing eight representatives of Magház and related local communities and one civil organization, two representatives of dominant institutes, plus two farmers, a breeder and a landrace trader group. Using participant observation, I visited five seed exchanges where I collected open-ended questionnaires to better understand the characteristics of seed exchanges and the work of the farmer seed network.

As a result, first, I identified a variety of meanings and concepts associated to seeds among research participants, successfully addressing a gap in the scientific discourse, emphasizing that the concepts of a wide range of actors should be considered, not only the discourse of the formal seed system. Among the associations of the seed, "seed is life" and the seed as the "source of

food" appeared most frequently, suggesting that the majority of research participants specifically regard seed as a living organism which is the source of life. I also identified meanings of the seed that had never emerged in scientific and academic discourse before, showing that the concepts forming around seeds are very diverse, ranging from the discourse of tradition preservation to "food sovereignty", or to more spiritual associations like "miracle".

Second, I contributed to the scientific literature on Magház by establishing why and to what degree the activities of Magház and of six local communities can be considered socially innovative in the field of agrobiodiversity conservation and in their relation to dominant structures. Building on the results of the meanings of seeds, I demonstrated through the analysis that Magház and its network strongly associate seeds with the concept of "life", "food sovereignty", and "tradition preservation", which helps to frame their activity by promoting small-scale self-sufficiency relying on diverse, local crops. Moreover, the social innovation within Magház enables them to cooperate with dominant institutes. The cooperation between Magház and Hungary's biggest gene bank have the potential to achieve broader transformative processes in the dominant institutes and to shape the social discourse on agrobiodiversity conservation, which could eventually challenge the industrialized seed production of the formal seed system.

Third, I expanded the current studies on Magház and its network of local communities with more specific knowledge by identifying four barriers which reinforce the status of dominant structures in Hungary, hindering Magház's activity: farmers' current situation, altered consumer choices, lack of adaptive capacity to the changing climatic conditions, and hostile attitudes against alternative approaches and practices. In response, I also outlined three opportunities that may empower the network and may help them to continue their innovative work, which shapes discourses around agrobiodiversity: expanding to retail, forming Magház into an organization and developing its lobbying power, and capitalizing on international mobility opportunities.

Finally, my study can provide a basis for further research for the scientific discourse on creating new knowledge on the concept of the seed, to make seeds valued for the different meanings that stakeholders associate with them in order to shape the ruling "genetic resource" paradigm of the formal seed system. Additionally, since my study was unable to involve every stakeholder related to agrobiodiversity, further research should be conducted to analyze the different socially innovative practices of local communities which can further empower Magház.

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10. APPENDICES

Appendix 1: Oral consent

Oral Consent Information Sheet: Participation in an interview for the thesis called Social Innovation in Magház Farmer Seed Network in Hungary

Contact information:

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Background and Purpose

What does an interview imply?

This interview is part of my research for a Master's thesis provisionally entitled Social Innovation in Magház Farmer Seed Networks in Hungary conducted at the Department of Environmental Sciences and Policy at Central European University, Budapest, Hungary. It aims to identify the main characteristics of the informal seed saving network, local seed communities linked to it, and its relationship to of other main stakeholders beyond the network that influence seed conservation in the country. The interviews conducted as part of the research will help to understand the deeper meanings contributed to seed by different actors, how the network and its members achieve seed conservation through social action, networking and to find the main factors helping and hindering the situation of informal seed saving activities in Hungary.

Information will be collected from representatives of both formal seed market actors and informal seed saving networks through interviews with audio recording, pictures taken of seeds, seedling, plants, and notetaking during observation of public events.

Interviewees and their initiatives are encouraged to communicate any questions they may have regarding the research to the researcher or supervisor.

Voluntary participation

The participation in this study is voluntary. You may decline to be recorded, or ask to stop the recording or the interview at any time.

What will happen to the information that is obtained through the interviews?

The information and pictures collected in the interviews will be used solely for the purpose of the thesis. All information will be stored only with the researcher.

All names of participants will be replaced by pseudonyms before any communication or publication in order to protect the anonymity of the participants, unless the interviewee informs the interviewer that he or she consents to using his or her real identity.

Upon request, the results and the content of the thesis will be made available for the participants.

Agreement between participants and interviewers / Oral Consent for use of name in the research

I have received information about

the research and am willing to participate

I undertake to comply with the agreements described here above

Appendix 2: Interview questions Magház (based on the Dynaversity case study interview questions)

Doing
How is seed produced and shared within the network? In which aim? By whom?
How does seed circulate beyond the network (on a non-commercial or commercial basis)?
How does the initiative enable seeds and associated knowledge to be created and shared?
Do you interact with gene banks ? How is this going?

Organising
How is the network structured, coordinated and governed, be it formally or informally? How are different roles attributed among the participants?
Are there any specific devices, structures or events that allow to reach out beyond the network? Which are they?
How does the organisational structure of the initiative empower participants to reclaim crop diversity?

Knowing
How are knowledge and know-how created and shared within the network? Are any other types of knowledge excluded? How?
How are the knowledge and know-how of the network legitimated beyond the network?
How does this knowledge challenge other forms of knowledge concerning agriculture and food?

Framing
Why and for whom does the initiative operate? Are innovations protected from being taken over against their purpose? How?
Does the initiative carry seed issues to the broader public beyond the network? How?
How are the meanings behind seeds, crops and food redefined by the initiative's activities?

Networking
Which particular people, objects or techniques operate as "bridges" allowing different people and networks to link up and collaborate? For example:
People who translate between different approaches, forms of knowledge, worldviews or languages
Species, plants, topics or objects which arise a shared interest of people who are not used to working together
Techniques / events / technology / software / documents used to communicate and coordinate
Evolutions in the initiatives trajectory or history that allowed for the involvement of new categories of participants

Author's own added interview questions
Meaning
Why are seeds important to the initiative? What do you do with it?
Do you save seeds? Why is it important to you?
What is a variety to you? (also landrace) Why are they important?
Describe your relationship with the formal seed network.
Do you have a relationship with other seed saving civil organizations? If yes, describe the relationship.

Seed Exchanges

When and why did you start to organize seed exchanges? Is it legal to organize them? What are the rules of participation? Who are your main target groups?

What makes for a successful seed exchange event? Can you give an example of particularly successful/ unsuccessful events?

What kind of seeds are exchanged via the events? Are there types that are more preferred over others?

Practical recommendations

What do you think, what are the main factors that help or hinder seed saving locally and country-wide? Any suggestions for improvement?

Appendix 3: Interview questions for network members and related initiatives

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Introductory
Tell me about yourself, how did you get in contact with agriculture?
If a farmer: Do you have land, what size, what do you grow, what practice do you use? Where do you originally get the seeds from? How many varieties and species do you save?
If an organization: When and why was the initiative established? What are the goals? Describe the organizational structure.
Tell me about your regional characteristics. What crops have been historically grown here, and where do farmers have the seeds from? What species or varieties are grown by the farmers? What types of agricultural practices are used?

Meaning
Why are seeds important to the initiative? What do you do with it?
Do you save seeds? Why is it important to you?
What is a variety to you? (also landrace) Why are they important?

Seed exchanges - Doing
When and why did you start to organize seed exchanges? Is it legal to organize them? What are the rules of participation? Who are your main target groups?
What makes for a successful seed exchange event? Can you give an example of particularly successful/ unsuccessful events?
What kind of seeds are exchanged via the events? Are there types that are more preferred over others?
How do you create and circulate seed within the community?

Knowing
Do you create and communicate know-how or knowledge within and beyond the community? If, yes how is it created?
What methods, channels are used to share the knowledge? How do you encourage others beyond the community?
How do you see the role of your initiative in local seed saving activities?
How is your activity acknowledged in the region, in the country?

Networking
Describe your relationship with the formal seed network.
Do you have a relationship with other seed saving civil organizations? If yes, describe the relationship.
Have they ever received seed from the gene bank? What is your relationship with NöDiK?
Describe your relationship with Magház. What kinds of activities do you participate in with them, and what others would you like to see?

Practical recommendations
What do you think, what are the main factors that help or hinder seed saving locally and country-wide? Any suggestions for improvement?

Appendix 4: Interview questions (plant breeder)

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Introductory
Tell me about yourself, how did you get in contact with agriculture?
Do you have land, what size, what do you grow, what practice do you use? Where do you originally get the seeds from? How many varieties and species do you save?
Tell me about your regional characteristics. What crops have been historically grown here?

Breeding
How would you describe your work with growing plants, saving seeds, and breeding, what does it involve?
Why did you start to breed? What is your goal? What method do you use?
Where do you get the seeds from? How do you choose the seed? Are there types that are more preferred over others?
Do you try to keep them separate or let them evolve/ adapt/ cross?
How do you keep track of new varieties and breeding processes?
What do you do with the variety after you bred it? Do you have officially registered varieties?

Meaning
Why are seeds important to you? What do you do with it?
Do you save seeds? Why is it important to you?
What is a variety to you? (also landrace) Why are they important?

Seed exchanges
Do you go to seed exchanges? Why?
What do you look for? What do you bring?

Networking
Describe your relationship with the formal seed network. Do you use commercial varieties as well for crossing?
Do you have a relationship with other seed saving civil organizations ? If yes, describe the relationship.
Have they ever received seed from the gene bank? What is your relationship with NÖDIK?
Describe your relationship with Magház. What kinds of activities do you participate in with them, and what others would you like to see?

Practical recommendations
What do you think, what are the main factors that hinder seed saving and conservation locally and country-wide? Any suggestions for improvement?

Appendix 5: Interview questions (farmers)

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Introductory
Tell me about yourself, how did you get in contact with agriculture?
Do you have land, what size, what do you grow, what practice do you use? Where do you originally get the seeds from? How many varieties and species do you save?
Where do you get the seeds from?
Do you breed? If yes, what are your results?

Tell me about your regional characteristics. What crops have been historically grown here?

Meaning (seed, agrobiodiversity, seed saving, breeding etc.)
Why are seeds important to you? What do you do with it?
Do you save seeds? Why is it important to you?
What is a variety to you? (also landrace) Why are they important?
Please, tell me about your experiences with landraces.

Seed exchanges
Do you go to seed exchanges? Why? If yes, what are your impressions?
Did you ever exchange seeds? What varieties?
What do you look for? What do you bring?

Networking
Describe your relationship with the formal seed network. Do you use commercial varieties as well for crossing?
Do you have a relationship with other seed saving civil organizations ? If yes, describe the relationship.
Have they ever received seed from the gene bank? What is your relationship with NÖDIK?
Describe your relationship with Magház. What kinds of activities do you participate in with them, and what others would you like to see?

Practical recommendations
What do you think, what are the main factors that hinder seed conservation locally and country-wide? Any suggestions for improvement?

Appendix 6: Interview questions (NGO)

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Introductory
Tell me about yourself, how did you get in contact with agriculture?

If an organization: When and why was the organization established? What are the goals? Describe the organizational structure.

Meaning (seed, agrobiodiversity, seed saving, breeding etc.)
Why are seeds important to the initiative? What do you do with it?
Do you save seeds? Why is it important to you?
What is a variety to you? (also landrace) Why are they important?

Seed exchanges - Doing
When and why did you start to organize seed exchanges? Is it legal to organize them? What are the rules of participation? Who are your main target groups?
What makes for a successful seed exchange event? Can you give an example of particularly successful/ unsuccessful events?
What kind of seeds are exchanged via the events? Are there types that are more preferred over others?
How do you create and circulate seed within the community?

Knowing
Do you create and communicate know-how or knowledge within and beyond the community? If, yes how is it created?
What methods, channels are used to share the knowledge? How do you encourage others beyond the community?
How do you see the role of your initiative in local seed saving activities?
How is your activity acknowledged in the country (regionally, locally) ?

Networking
Describe your relationship with the formal seed network.
Do you have a relationship with other seed saving civil organizations ? If yes, describe the relationship.
Have they ever received seed from the gene bank? What is your relationship with NÖDIK?
Describe your relationship with Magház. What kinds of activities do you participate in with them, and what others would you like to see?

Practical recommendations
What do you think, what are the main factors that hinder seed saving locally and country-wide? Any suggestions for improvement?

Appendix 7: Interview questions (HSA)

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Organization and Strategy
When and why was the organization established? What are the goals? Describe the organizational structure.
What are the criteria of membership? What are the responsibilities? How many members do you currently have?
Does the HSA deal with agrobiodiversity issues in Hungary? What is your opinion on the state of the Hungarian seed sector? What are the major issues currently on your agenda?

Meaning
Why are seeds important ?
Do you save seeds? Why is it important to the farmers?
What is a variety to you? (also landrace) Why are they important? Do farmers grow landraces?

Operation
Please, briefly describe the operation of formal seed sector with its major stakeholders. What are the weaknesses and strengths? How the Hungarian seed sector is connected to the European seed sector? What is the most significant species in terms of production and seed multiplication? How do you see the state of breeding with regards to the seed sector in Hungary?

Seed exchanges
What do you think of the civil-based, farmer seed networks? Have you ever heard of them? Do you have any connections to them? If yes, please describe this connection.
Have your ever visited a seed exchanges? If yes, what were your impressions?

Knowing
How is your activity acknowledged in the region, in the country? Describe your relationship with the Hungarian government.

Appendix 8: Interview questions (landrace trader)

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Introductory
Tell me about yourself, how did you get in contact with agriculture?
Do you have land, what size, what do you grow, what practice do you use? Where do you originally get the seeds from? How many varieties and species do you save?
When and why was the group established? What are the goals? Describe the organizational structure.

Portfolio
Please, briefly describe the operation of the group from production to selling. How many and what kind of varieties do you produce/sell? What is the price of the seed (packages)? How do you determine the price of the seed? Who is your target group? What kind of platforms do you use to sell the seeds? Which is the most efficient?
How many seeds do you produce/sell per year/month? Do you monitor consumer satisfaction?
What varieties are the most popular? Why? Are you the only landrace trader group in Hungary? If no, do you have connection with other similar traders?
If relevant: Do you breed?

Meaning
Why are seeds important to the group?
Do you save seeds? Why is it important to you? How do you save seeds?
What is a variety to you? (also landrace) Why are they important? What are your experiences with landraces?

Seed exchanges - Doing
Do you visit seed exchanges? If yes, please, tell me about your impressions.
Do you ever exchange seeds?
Are there types that are more preferred over others?
Is there any difference between the demand in seed exchanges and the online demand?

Knowing
How is your activity acknowledged in the region, in the country?

Networking
Describe your relationship with the formal seed network.
Do you have a relationship with other seed saving civil organizations? If yes, describe the relationship.
Have they ever received seed from the gene bank? What is your relationship with NöDiK?
Describe your relationship with Magház. What kinds of activities do you participate in with them, and what others would you like to see?

Practical recommendations
What do you think, what are the main factors that help or hinder seed saving locally and country-wide? Any suggestions for improvement?

Appendix 9: Interview questions (CBGC)

Name:
Location:
Age:
Occupation:
Contact:
Date of the interview:

Organization and Strategy
When and why was the institute established? What are the goals? Describe the organizational structure. Please describe your relationship with the Ministry. How many samples do you store in the gene bank?
Please describe the process of handing out seed for amateur gardeners? Who are the applicants? How many seed do you hand out in a year?
What is your opinion on the state of agrobiodiversity and plant genetic resources in Hungary?

Meaning
Why are seeds important ? What does the seed mean to you?
Why is seed saving important to the farmers?
What is a variety to you? (also landrace) Why are they important?

Seed exchanges
When and why did you start to organize seed exchanges? Is it legal to organize them? What are the rules of participation? Who are your main target groups?
What makes for a successful seed exchange event? Can you give an example of particularly successful/ unsuccessful events?
What kind of seeds are exchanged via the events? Are there types that are more preferred over others?
Do you visit other seed exchanges in the country?
How do you regard civil organizations that deal with agrobiodiversity? Do you support them? If yes, how?

Knowing
Do you create and communicate know-how or knowledge within and beyond the institute? If, yes how is it created?
What methods, channels are used to share the knowledge?
How is your activity acknowledged in the country (regionally, locally) ?

Strategy
The Strategy on the Conservation of Plant Genetic Resources for Food and Agriculture 2013-2020 emphasises the importance of ex situ and in situ conservation in the country. (on-farm management by farmers, community gene banks, etc.) How have the related goals of the Strategy been implemented so far? What steps do you consider successful?

Networking
Describe your relationship with the formal seed network. Do you hand out samples to breeding houses?
Do you have a relationship with seed saving civil organizations ? If yes, describe the relationship. Describe your relationship with Magház. What kinds of activities do you participate in with them?

Practical recommendations
What do you think, what are the main factors that help or hinder seed saving locally and country-wide? Any suggestions for improvement?

Appendix 10: Seed Exchange Questionnaire

1. You attend on this exchange as

Seed saver (brought seeds) Visitor (did not bring seeds)

2. Where did you come from?

3. How many and what type/variety of seeds did you bring to the event?

4. Why do you participate in seed exchange events? What makes it interesting for you?

5. Are a member of a particular conservation/seed-saver community or network? Why did you join?

6. What does the seed mean to you? How would you describe your connection to the seed?
7. What was your first personal experience with seeds?

8. Name 5 seeds that you exchanged here today

9. Can you mention 3 reasons why it is worth going to a seed exchange event?

10. With what kind of expectations did you arrive here? What did this event give you?

Appendix 11: The complete list of the meanings of seed emerged from questionnaire data

Meanings of seed	Occurrence
Life	**50**
Food source	**31**
Self-sufficiency	**5**
Plant	4
Future	**5**
Survival	3
Organic production	1
Evolution	2
Beauty	1
Beginning	**9**
Circulation	3
Propagating material	2
N/A	**5**
Curiosity	1
Cradle	1
Garden	2
Healthy plants	1
Possibility	1
Wonder	2
Joy	1
Health	4
Hungarian	1
Strengh	1
Treasure	2
Diversity	1
Development	4
Abundance	1
Ancestor	1
Livelihood	**5**
GM Free	1

Determination	1
Complexity	1
Human right	1
Fruit, crop, harvest	1
Renewal	2
Unity	1
Biodiversity	1
Joyful garden	1
Rebirth	1
Transmission	1
Flower to the bees	1
Green	1
Ornament	1
Hobby	1