Local varieties in the kitchen garden

Awakening the interest - Examples from Katrinetorp Landeri, Malmö - Sweden

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Abstract

Our food system is facing several severe challenges. Climate change and population growth are just a few of the issues putting immense pressure on the agricultural food system. Yet, agriculture is a major contributor to environmental degradation. To ensure global food security, agriculture must not only produce sufficient food but do so sustainably, within the planetary boundaries. The concept of food system resilience is increasingly used to understand how the food system can become productive, and adaptive while mitigating the different threats. Diversification has been used as a risk minimizer throughout history and is emphasized in a range of global and national environmental goals. Increasing the genetic diversity in agriculture by cultivating local varieties and safeguarding the embedded traditional ecological knowledge (TEK), can be seen as a part of the solution. Still, genetic erosion and erosion of traditions are happening at an ever-faster rate. In Sweden, knowledge about these varieties and how they can improve food system resilience is still lacking amongst the general public. Hence this thesis focuses on how knowledge about and interest in local varieties can be fostered so that they can become a natural part of the food system. Furthermore, these varieties can be seen as a way to create an even greater connection to nature and foster care for the environment. Therefore, this thesis focuses on examining what potential tools can be used.

A case study of a Swedish agrarian museum, Katrinetorp Landeri, was made to gain an understanding of how these questions can be addressed on a local level. It was carried out through semi-structured interviews and observations at Katrinetorp and by drawing lessons from a reference place that already works with these issues, the local heritage society in Bjäre härad. The study resulted in three suggested tools directed to address deeper leverage points to encourage deeper, emotional connection and lead to behavioral change; *storytelling*, *nature-based education,* and *co-creation*. The result showed that visitors-gardens and museums can help increase knowledge about local varieties and potentially reach people with no previous interest or knowledge. However, for these varieties to re-enter the food system several other steps need to be addressed, for example, the lack of seed producers in Sweden that are willing to produce these varieties. The suggested vision can be seen as a small step in trying to place genetic diversity and local varieties on the agenda.

Keywords: Genetic diversity, local varieties, cultural heritage, TEK, Katrinetorp Landeri, visitors-gardens, museum, connectedness

Foreword

I started the Agroecology Master's program after taking practical courses in small-scale farming and forest gardening which awakened my interest in sustainable food production. I hoped to gain a better understanding of the farming system and how we can create a food system that is both just and environmentally sound.

A fundamental concept of the program is systems thinking, which is also one of the reasons I chose this master's program. During my bachelor's in Human Ecology, I acquired knowledge of systems thinking and its benefits in addressing complex problems. By studying problems as parts of whole systems, new elements can be found that previously were hidden. However, during my studies in Human Ecology, I sometimes felt trapped in a sense of hopelessness by constantly criticizing the system without ever being handed any solutions. I applied for Agroecology because I wanted to explore potential solutions to all the overwhelming challenges we face. I do feel like my time at the Agroecology program has given me tools on how to use systems thinking to focus on solutions, without losing the critical lens. This has given me a greater sense of hopefulness, even if I still at times feel an overwhelming sense of despair thinking about all the challenges ahead.

One of the parts I appreciated most about the program was the diversity of backgrounds among the students. Coming from a social science background I sometimes felt I lacked sufficient insight in the natural science field. However, the program gave plenty of chances for group work and discussions that offered opportunities to learn from each other which helped me gain a better understanding of natural science whilst being able to share, challenge, and deepen my previously acquired knowledge.

Through several case studies and farm visits, we got chances to experience the complexity of farming systems in real-life situations and develop abilities to assess the economic, environmental, and social sustainability of different systems. One great takeaway from that experience is the importance of involving the practitioners in the process of forming solutions. What might seem like a good solution in theory can have devastating consequences in practice. By including the people closest to the studies issue, new insights might arise, and more long-term sustainable solutions can be formed. During interviews with different stakeholders, I got to practice and sharpen my communication skills and gain tools on how to perform participatory-based research.

Agroecology's emphasis on the importance of collaboration between multiple stakeholders and valuing different types of knowledge as equally important for sustainability is something I carry with me. During my time in the Agroecology program, I have gained an even greater admiration and respect for all those people practicing farming and the immense knowledge they hold. The humbling experience of having an 'urban farming' company also taught me that some things can only be taught through experience and that safeguarding a continued practice of traditional farming is therefore incredibly important.

This thesis is an attempt to combine what I have learned so far while delving deeper into a subject I have become particularly interested in - namely the rich diversity of local varieties and traditional ecological knowledge.

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Introduction

Our food system is facing a myriad of severe challenges and the question ‘how can we secure future food supply’ is an increasingly urgent matter. Multiple internal and external drivers of change continuously increase the systems' vulnerability to shocks (Tendall et al., 2015). Climate change, biodiversity loss, energy crisis, water scarcity, pandemics, economic or geopolitical shocks, urbanization, dietary shift, and land degradation are just a few of the problems adding pressure to the global food system (e.g. Clark & Tilman 2017; Poore & Nemecek 2018; Mirzabaev et al., 2023). It is predicted that we will see a greater variability in climate including shifts in temperatures and precipitation patterns, as well as changes in pest occurrences and plant pathogens which will influence our ability to produce food (Lin, 2011; Yang, Ren & Zhan, 2023a). While being vital for human well-being, agriculture also acts as a key driver of environmental degradation. The challenges are therefore not only to produce sufficient food in a changing world, but to do so without destabilizing the Earth system (Rockström et al., 2023). Researchers (eg. Rockström et al., 2009; Tendall et al., 2015) argue that in order to handle the complex and uncertain changes our food system needs to be resilient. A resilient food system can be defined as a system that is able to maintain economic, ecological, and social balance even under the effects of dramatic changes and stresses (Reddy, 2015). One key element to building resilient systems is ensuring a rich diversity.

Agricultural biodiversity, or agrobiodiversity, can be seen as the foundation of resilient and sustainable agriculture as it can act as a buffer to negative effects caused by environmental stressors like climate change (Raggi et al., 2022). However, the loss of agrobiodiversity is happening at an exceptionally high rate as agriculture becomes more and more globally uniform (FAO, 2019). Not only are we relying on a smaller set of staple crops but the genetic diversity (the range of genetic characteristics in a crop) within these crops is rapidly declining. Mercer and Perales (2010) argue that crop genetic resources are indispensable for future food security. Yet, Europe is facing a dramatic loss of crop diversity as modern industrial agriculture is increasingly substituting more traditionally used, or older local varieties with modern, high-yielding ones (Raggi et al., 2022). Local varieties play an important part in a resilient food system (Mercer & Perales, 2010; Gliessman, 2015; Raggi et al., 2022). Besides consisting of genetic material that can be valuable for future plant breeding (Mathew & Mathew, 2023) studies suggest they are better at adapting to sudden environmental stressors, can produce even under unfavorable conditions, and demand less input (Moudry et al., 2011; Gerhardt et al. 2019). In addition, local varieties have a high cultural value as these varieties are embedded in local culture and traditional ecological knowledge (TEK), knowledge that is important in the transition to sustainability (Gliessman, 2015; Vijayan et al., 2022). While ex situ conservation of local varieties is widely recognized in several global and national policies, researchers urge for in situ conservation (Mercer & Perales, 2010; Raggi et al., 2022) and re-introduction of local varieties in the food system (Börjeson, 2015; Lara et al., 2023). Preserving local crop diversity and cultural heritage through continued cultivation is for example mentioned in the Swedish environmental objective *A Varied Agricultural Landscape*. Still, the progress is far too slow and as time goes, we risk losing both the people carrying the traditional ecological knowledge and the genetic material itself. The question is how can the importance of local varieties be lifted on a local level?

Aim of the study

The overarching goal of this study is to find ways to improve food system resilience, address the Swedish environmental objective A Varied Agricultural Landscape, and help increase genetic diversity by re-introducing local varieties in the cultivation system. While the challenges are multiple, this thesis will focus on increasing awareness of and interest in local varieties of kitchen vegetables amongst the general public as it can help lift the question and encourage more people to either produce these varieties themselves or support others who do. The aim is, therefore, to look into how a visitor's garden, such as Katrinetorp Landeri in Malmö, can further include genetic diversity in their work and become a platform for local varieties and traditional ecological knowledge (TEK), helping people connect to food, place, and landscape.

I will focus on the following questions:

- How can local varieties help people re-connect to food, place, and people - to improve food system resilience?

- How can a public garden, like Katrinetorp, help spread awareness of the importance of genetic diversity and increase the use of local varieties?

Theoretical Framework and Conceptual Tools

This thesis is based on three bodies of literature; to understand the challenges we face *system thinking and food system resilience* are used, *connectedness to nature, and leverage points* are used to assess the potential changes within the food system and where to direct our attention. The concept of *Traditional ecological knowledge* (TEK) is used to grasp the importance of cultural aspects of the food system and understand what place local varieties have in a transition to a resilient food system. Since this thesis is written under the program of Agroecology, this section will start with a brief description of the concept.

Definition of Agroecology

Agroecology is a broad field with no single definition. It was first coined in the late nineteenth century and has since evolved, and been redefined, by the broad spectrum of actors in the agriculture socio-ecosystem (Saj et. al., 2017). Agroecology is often posed as an alternative to industrial agriculture - generally defined as a holistic approach to understanding the food system (Gliessman, 2015). By promoting the use of ecological principles and giving nature a leading role in the design of the system, the aim is to create an ecological, economic, and socially sustainable food system (Tittonell, 2014). Agroecology also recognizes the important role of local practices and knowledge in the development of a sustainable food system, and the idea of co-creating knowledge (Tittonell, 2014; Gliessman, 2015). The overall goal can be defined as creating a stable food system that is resilient to different challenges such as environmental perturbations and economic fluctuations.

Agroecology has since the mid-80s become a central concept in social movements as resistance to agribusiness industries, and a strong advocate of food sovereignty (Saj et. al., 2017). Along with a growing concern for climate change in the 90s agroecology has had a large focus on adaptive agriculture that can sufficiently provide food in a changing climate, and more recently also included mitigation on the agenda (Saj et. al., 2017).

Stephen R. Gliessman defines agroecology as “the use of ecology [...] to design and manage sustainable food systems” (2020: 547). The author describes it as a transdisciplinary, participatory, action-oriented field that simultaneously integrates social and environmental components. According to Gliessman, it offers solutions to several current global agricultural issues that we face today - such as meeting the needs of a growing population, conserving natural resources, and promoting sustainable lives and livelihoods for farmers and people dependent on the food system. It is the ecology of the food system as a whole (2020).

Agroecology has also been recognized and applied in global development strategies by for example the Food and Agriculture Organization of the United Nations (FAO). Who, since 2014, have been advocating agroecology as a way to transform the food system (Jeanneret et al., 2021). FAO follows the definition by Francis et al., (2003) which defines agroecology as “the integrative study of the ecology of the entire food system, encompassing ecological, economic, and social dimensions”.

The term is used not only in scientific research circumstances but in practice and social movements across the world (Gliessman, 2015; Shiva, 2022; La Via Campesina, 2011). The

definition is therefore slightly different depending on its purpose. Vandana Shiva argues that it is the methods and practices developed by agroecology that will "feed the world" (Shiva, 2016, p:13). Shiva argues that agroecology is a knowledge paradigm, that contrary to modern industrial agriculture, values the several strands of knowledge from traditional and organic farming practices and new science. Agroecology is a "time-tested" knowledge that recognizes the earth as living. It is "the scientific paradigm that covers all ancient, sustainable, and traditional farming systems that were based on ecological principles". It is the combination of knowledge passed down from generation to generation in tribal and indigenous communities and knowledge from a new science. The social movement and international "peasant and indigenous voice", La Via Campesina argues that agroecology not only should focus on how we farm but also on the relationship between people (La Via Campesina, 2011).

The definition used in this thesis will be the one used in the program of agroecology at SLU - which is in line with FAOs. In short; "the integrative study of entire farm and food systems, embracing environmental, economic and social dimensions". With an emphasis on a holistic, system thinking approach it aims at recognizing the need for interdisciplinary work and strengthening the knowledge exchange between stakeholders and researchers (SLU, 2023).

Systems Thinking and Food System Resilience

An important pillar of agroecology is the perspective of system thinking (Gliessman, 2015). When it comes to addressing complex situations such as the global environmental challenges we face today, the perspective of system thinking can be useful. The term was coined in 1987 and has since been redefined in numerous ways, and according to Arnold and Wade (2015: 670), it is somewhat hard to define since it is a "system of thinking about systems". However, in an attempt to clarify, systems thinking can be described as a perspective or a set of skills and the goal is to gain a better and deeper understanding of complex issues and their root causes to predict the outcome and find solutions on how to handle them. It is perceived that these complex issues cannot be solved by simply one actor or understood from just one perspective. System theory or thinking is based on the assumption that the interrelated components of a system need to be addressed as a whole - in a holistic manner (Arnold & Wade, 2015). The idea of emergent properties of a system means that components of a system can act differently when separated from its context - Its parts cannot be fully understood in isolation. Leading to the famous conclusion that "the whole is greater than the sum of its parts" (e.g. Gliessman, 2015).

To fully grasp the complexity and understand the interconnectedness of food systems we need to examine it as a whole. By considering the whole process of the food system (from resource extraction, production, and consumption to decomposing) we can better develop sustainable solutions. If we fail to recognize social aspects (values, beliefs, and attitudes) in suggested solutions we decrease the success and risk creating more damage than progress (Tendall et al., 2015).

Food system resilience

Tendall et al. (2015) define food systems as 'social-ecological systems' - they are formed by biophysical as well as social factors. They include all activities such as food production, packaging, distribution, retail, and consumption. All components are part of a complex system,

often with competing priorities. Just like any other system, the parts cannot be treated in isolation. Instead, to solve issues in these complex interactions there is a need for a holistic approach considering all parts of the system (ibid).

The concept of resilience is increasingly used to address issues putting pressure on the food system and its ability to provide food security (Tendall et al., 2015). Resilience can be defined as the capacity of a system to withstand shocks and pressures and still maintain its structure and function. A resilient system has a buffering capacity allowing the system to adapt to changes, learn from past mistakes, and recover (Shipanski et al., 2016). However, Tendall et al. (2018) point to the importance of understanding that resilience thinking represents a paradigm, not a testable theory.

By applying resilience thinking to agriculture, it has the potential to reduce the vulnerabilities of the food system. Shipanski et al., (2016: 601) define food system resilience as the "capacity of people to produce and access nutritious and culturally acceptable food over time and space in the face of disturbance and change". Tendall et al. (2018) see resilience as complementary to sustainability as resilience can be seen as a system's capacity to face disturbances over time, while sustainability is a system's capacity to be preserved in the long run. According to the authors, food system resilience can be understood as the four functions of food security (availability, access, utilization, and stability). However, food system resilience also needs to go beyond conventional risk management and deal with unforeseen disturbances as specific disturbances might interact and have cumulative impacts. Tendall et al. (2018) divides food system resilience into four components; - Robustness (capacity to withstand disturbance before any food security is lost), - Redundancy (capacity to absorb the perturbing effects or to what extent the elements of the system are replaceable), - Flexibility (the rapidity of a system to recover any lost food security) and - Resourcefulness or adaptability (how much of the lost food security is recovered). Food system resilience is not to be seen as a stable state of a system, but a constantly developing capacity with a constant need to include learning and preventive action to help minimize food insecurity.

Resilience can be enhanced by ensuring system attributes such as diversity, redundancy, buffering capacity, transformability, transparency, learning capacity, and capital (Tendall et al., 2018). One of the key strategies for increasing resilience suggested by Shipamski et al. (2016) is to support regionally organized food systems and ensure access to food that is both healthy and culturally relevant. Tendall et al. (2018) argue that any attempt to build resilience in food systems needs to include several different stakeholders, and their knowledge, in a participatory and collaborative process.

Connectedness and Leverage Points

Agriculture is seen as one of the major factors driving the biosphere to its tipping point. To fully address the challenges we face, we must transform the food system leading it toward sustainability. The underlying reason for our unsustainable living has often been explained by people's increasing disconnection from nature (e.g., Pyle, 1993; Folke et al., 2011; Dorninger et al. 2017). An increasing amount of research calls for a re-connection to nature (e.g., Nisbet et al., 2009; Swaisgood & Sheppard, 2011), or our biosphere (Folke et al., 2011; Andersson et al., 2014) to handle the current global environmental crisis (Ives et al., 2018). The presumed

disassociation is what Folke et al. (2011) call cognitive disconnection. The idea is that the further we are from 'nature' the less we tend to respect it. Uhlmann and colleagues (2018:1) state that "to be 'connected' is to care", and to handle the environmental challenges we face in an effective way we need to be emotionally connected to nature. As Balmford A., Cowling puts it;

> "[E]ven if all the other building blocks of effective conservation are in place, we will not succeed unless the general public cares, and they are unlikely to care enough if they no longer experience nature directly" (2006, p: 694).

The goal of reconnection is to change the dominant perception of humans being separated from (outside and above) nature. It is perceived that it is precisely this inability to see humans as part of, and inevitably dependent on, nature that allows for environmental destruction. By reconnecting people to nature, we can help mend an emotional bond that will encourage people to practice environmentally responsible behavior supporting resilient social-ecological systems (Zylstra et al., 2014).

Science has shown that feelings of connectedness to nature can foster feelings of care and responsibility for natural environments and animals (Uhlmann et al., 2018). Studies have shown a correlation between nature's physical experience and the willingness to protect nature (Zaradic et al., 2009; Gosling and Williams, 2010). Early incorporation of outdoor activity and nature-based education amongst children can help create environmentally driven citizens (Ewert et al., 2005).

Besides its ability to bring about change and help transform the food system, a re-connection has also proved to be important for our health and sense of identity and community. Being exposed to green environments has the ability to promote mental and physical health, such as reducing stress (Ulhmann et al., 2018). The healing effect of nature makes it useful as a rehab strategy for patients who struggle with mental health conditions such as exhaustion and depression (Pálsdóttir et al., 2014). Participating in community gardening can help enhance nutrition and physical activity, increase knowledge about the food system and sustainability, and improve public health while strengthening a sense of community and belonging (Turner, 2011).

Folke et al. (2011) coined the idea of 'reconnecting to the biosphere' arguing that a historical separation between humans and nature has caused a cognitive disconnection where people's perceptions of their actions do not match the actual effects on the biosphere. Due to the complexity of the global resource system, the impact of resource extraction is often hidden from the consumer (Andersson et al. 2014, Ives et al. 2018). The explanations for the disconnection are plenty, but some of the most common ones are; industrialization (e.g. Folke et al., 2011; Steel, 2012), urbanization (e.g. Cumming et al., 2014), lack of green experiences (e.g. Bertram & Rehdanz, 2014), loss of traditional agricultural practices (Vijayan et al., 2022), and changes in consumer and producer relationships (e.g. Mehrabi et al., 2022).

Levels of connectedness

Connectedness can exist on several levels - mentally or physically. While some research focuses on the direct physical closeness of green environments (e.g. Collado et al., 2013), others might focus on local consumption, or the producer-consumer relationship, where

knowledge about the source of food, or other resources, can increase the connection to nature (e.g. Mehrabi et al. 2022). Christopher D. Ives and colleagues suggest that connectedness be divided into five different dimensions; material (resource extraction and use); experiential (recreational activities in green environments); cognitive (knowledge, beliefs, and attitudes); emotional attachments and affective responses; and philosophical perspectives on human-nature relationships (Ives et al. 2018).

Ives et al. (2018) point out that these five levels are interrelated and affect each other, meaning that a connection on one level can help the connection on another. According to their study, building stronger relationships on several of these dimensions can help society shift to a more sustainable one, and 'reconnection strategies' can help change human behavior as well as systematic structures (Ives et al., 2018). However, some strategies might be more effective than others.

Leverage points

In an attempt to understand the potential of strategies, Ives et al. (2018) suggest they should be placed on a scale of different 'leverage points'. These leverage points are placed within a complex system where interventions can be directed in the hope of change. The leverage points range from shallow to deep depending on their ability to influence the system. The challenges we face are dependent on large changes in the overall system. Shallow leverage points, address 'outer' connections (such as experiential and material connections) and are limited in their ability to generate major changes in the system. However, they can act as supporting initiatives for deeper interventions. Deeper leverage points address 'inner' connections (such as cognitive, emotional, and philosophical connections) and are more effective in transforming the system. According to Ives et al. (2018), sustainability solutions are based on 'value and belief systems'. Therefore, interventions based on emotional and philosophical reconnection have the potential to address even the deeper 'leverage points' - it has the capacity to influence people's goals and therefore actions.

During the last decade there has been an increasing amount of literature body on the field of urban development discussing the consequences of an increased distance between urban dwellers and nature, especially under the subject of food and food security (e.g. Pothukuchi & Kaufman, 1999; Mikkelsen, 2011; Nasr & Komisar, 2011; Steel, 2011; Isendahl & Barthel, 2018; Uhlmann et al., 2018). The author of Sitopia (2021), Carolyn Steel, suggests we look for food as a tool to handle our complex and global problems. According to Steel, food shapes every aspect of our lives - our landscapes, economy, daily routines, and identities. Acknowledging the importance of food and seeing it as our most vital common resource is what Steel calls 'food-based values'. When we use food as a lens it holds the power to transform.

Uhlmann and colleagues argue that the separation between people and nature may impact their relationship with and knowledge of food. The know-how of food production is decreasing as urban dwellers are less involved in food production - causing a "global generational amnesia" (2018:2). The know-how of food production is often passed down from generation to generation and requires a presence in the field. When new generations move to urban areas and leave agriculture behind, the line of knowledge transference might be broken. Pretty and colleagues (2009) argue that as people spend less time in nature with community elders and

family members there is a risk of cultural erosion. The knowledge is not only concerning how to grow food but also knowledge about the local climate, local varieties, and food culture are important for sustainable food systems.

Traditional ecological knowledge

Indigenous knowledge, often referred to as traditional ecological knowledge, TEK, is crucial for a sustainable transformation of food systems (Vijayan et al., 2022). TEK is often described as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes, Colding & Folke, 2000: 1252).

TEK has gained research interest, partly due to the link between the knowledge and the conservation of biodiversity (Berkes, Colding & Folke 2000). According to Vijayan et al. (2022), 80 percent of the world's biodiversity is conserved by indigenous people. As such, TEK can be seen as vital for the sustainability of food systems as it underpins agrobiodiversity (Pretty et al., 2009). Access to TEK is often linked to the resilience of traditional community food systems, and the adaptability to change (Swiderska et al., 2011). Local varieties and TEK are interlinked and, along with the reduced genetic diversity, there is a decrease in what Barthel et al. (2013) call "traditional place-specific practice and knowledge of food production". Swiderska et al. (2011) suggest TEK and traditional local varieties, both wild and domesticated, are also dependent on each other. As much as many traditional practices depend on the presence of diverse biological resources (such as older local varieties), Swiderska et al. (2011) argue that the re-introduction of older varieties is often accompanied by traditional knowledge and practices. Vijayan et al. (2022) argue that the "relationships between people and their environments can only be conserved in situ" (2022: 2). However, seeds of locally adapted crop varieties can act as a supportive method ex situ - by transferring traditional knowledge between regions and generations (Vijayan et al. 2022).

When it comes to research on TEK, most attention is paid to indigenous people, especially in Latin America, as holders of vital environmental knowledge. However, Hernández-Morcillo et al. (2014) notes that other rural people such as farmers and fishers participate in the conservation of TEK, even in developed countries, even though research on TEK in these areas is scarce. Most research on TEK in Europe has been conducted in remote areas focusing on 'emblematic communities' (e.g., Sami an indigenous group of nomadic herders in Scandinavia), presumably due to industrialization arriving later in these areas, preserving a more traditional way of life. According to Hernández-Morcillo et al. (2014), this does not imply that other, more central parts of Europe lack TEK, and important traditional knowledge might exist. However, Hernández-Morcillo and colleagues (2014) note that the knowledge might not be considered 'traditional' as the knowledge isn't passed down from generation to generation and might better be defined as 'lay knowledge'.

Even if there is a growing acknowledgment of the importance of TEK, when it comes to conventional agricultural practices TEK is still often perceived as an outdated and ineffective way of producing food (Swiderska et al., 2011; Vijayan et al., 2022). Berkes and colleagues do highlight that TEK, just as any culture, is not static - it is indeed ever-evolving along with

the local context. However, acknowledging the importance of TEK is not a claim that all traditional cultures have been environmentally sustainable (Berkes, Colding & Folke, 2000). Cannarella and Piccioni (2011) argue that strategies that fail to properly acknowledge the cultural environment in which they are placed are more likely to be unsuccessful. Creating a link between TEK and innovations for change might help increase the effectiveness of the strategies.

Methodology and Methods

This thesis can be divided into two sections - a literature study and a case study. The literature study forms the background of this work and places the concept of local varieties in a bigger perspective to understand their function in a resilient food system. The case study aims to concretize the attempts to increase the knowledge and use of local varieties on a municipal level.

This thesis followed inductive reasoning by being flexible throughout the study and letting the observations determine the direction. According to Nicholas Walliman (2011), inductive reasoning begins with observations to form general conclusions. The gathered data is used to build concepts, hypotheses, or theories (Merriam, 1998), as opposed to deductive reasoning which uses general statements, or hypotheses, that are then tested through research (Walliman, 2011). As an initial step in my research, I conducted interviews with three experts on the subject of cultural heritage varieties to gain a better understanding of the underlying issues and potential directions for research. The three experts were purposely selected due to their vast knowledge of the subject and ability to suggest research ‘gaps’. The first interview was with Helena Persson who works as a coordinator for The Programme for Diversity of Cultivated Plants (POM) at SLU in Alnarp. POM was contacted since the program is a national tool for developing sustainable ways to conserve and utilize the plant riches of Sweden. The second interview was with Agneta Börjeson, an agronomist working as a consultant at POM and SLU in Alnarp, Sweden with a special focus on seed-propagated kitchen plants and crops. She has written reports for the Swedish Board of Agriculture on the current status of cultural heritage varieties in Sweden and what is needed for this genetic diversity to enter the market. She holds courses in small-scale seed production and also produces some seeds of local varieties that are sold by for example the Swedish seed company Impecta. The last interview was with Agneta Magnusson who has written several books on Swedish living green heritage and local varieties - their past and present use. Magnusson is active in the association Sesam. The association Sesam is a non-profit association that works to preserve the diversity of kitchen gardens- and field- crops. Their members help conserve varieties by growing and sharing seeds. Coming from more of a grassroots movement she was thought to have a slightly different perspective that could potentially broaden the understanding of issues related to local varieties in Sweden. However, the lack of awareness amongst a large part of the population was mentioned as an issue during all three interviews. Since little to no prior research was found on this particular direction in Sweden, I decided it could be an interesting subject for my thesis.

Literature study

A large part of the thesis body is the background describing the context in which local varieties function. Based on the concept of systems thinking the goal of this part is to create an understanding of genetic diversity and local varieties' role in a resilient food system, as well as the causes of the loss of this genetic diversity. The purpose is to create a more holistic overview to be able to communicate the importance of genetic diversity. This body is based on secondary sources of evidence, such as academic literature and government official reports with a greater emphasis on Europe and Sweden.

Case Study

To examine and illustrate how to address the loss of local varieties on a local level a case study of Katrinetorp Landeri in Malmö, Sweden was conducted. Katrinetorp Landeri is a historical museum with a large park and kitchen garden open to the public. They also have a goal of showcasing how life in 19th century Sweden could look like. Katrinetorp is used as a case for a deeper understanding of how a museum can address the issue of lacking awareness of older varieties of kitchen crops amongst the public. The particular location was chosen after recommendations from Helena Persson (Oral, 2023). Katrinetorp was deemed interesting as it is a living historic environment, centrally placed in Malmö with a great potential to reach a large and diverse group of people.

Warren and Bell (2022) describe case study research as a research strategy or design focusing on the understanding of one, or several, cases with clear boundaries - such as a person, a community, or an organization. A case study aims to provide an in-depth, holistic view of the research problem by conducting a thorough description and analysis of the specific complex phenomenon or social unit (Merriam, 1998). According to Robert K. Yin (2014), the application of a qualitative case study is especially beneficial if the research seeks to answer 'how' and 'why' questions in a contemporary context, making it highly relevant to my research.

Methods

A key characteristic of case study research is the use of a range of methods and perspectives to generate data and analysis of the selected research question (Warren & Bell, 2022). To get a rich picture of the selected case study I used qualitative data collection methods. Qualitative methods are mainly used when it comes to the understanding of people's feelings, emotions, or perceptions (Walliman, 2011), which is the case of this thesis. The concept of method triangulation, commonly used in social science, refers to the use of several, different methods to better understand the studied phenomenon (Turner et al., 2017). It is often used as a means to create a broader understanding of the phenomenon and to produce more valid results as "the strengths of one method can offset the limitations of another method" (Turner et al., 2017: p; 1). This thesis uses a combination of data collected from a reference place, interview, observation, and document study. The following sections will describe how they were used.

Semi-structured interview

The interview at Katrinetorp aimed to establish a deeper understanding of the garden, how they use local varieties today, and pinpoint different potential opportunities and challenges. According to Daymond and Holloway (2011), interviews are seen as a vital source of information while doing qualitative research as it helps to create a deep understanding of the subject. The interviews in this study were conducted according to the principles of semi-structured interviews, explorative conversational interviews following a structure but being flexible to gain a better understanding of the perspective of the interviewees (Daymond & Holloway, 2011). Before the interview, an *interview guide* was developed and designed after the principles described by Adams (2015) which meant an outline of planned topics containing a combination of both closed- and open-ended questions, often followed with *how's* and *why's*, and being able to refocus the questions during the interview (interview guides attached in Appendix II).
One interview was conducted with Ahmet Becarevic**,** the gardener at Katrinetorp, chosen since he is responsible for the design of the kitchen garden and the selection of crops. A 90-minute-long interview was held at Katrinetorp to gain a deeper understanding of the structure of

Katrinetorp's kitchen garden and the museums current work with local varieties. Verbal consent was given before the interview by providing a briefing on the purpose of the interview and the aim of the study. The interview was documented by notes, as the recording was not deemed suited in the situation (due to the hard wind at Katrinetorp). The notes were later transcribed to retrieve relevant information.

According to Palinkas et al. (2015), sampling methods are intended to maximize efficiency and validity. Purposeful sampling, which was used in this study, is often used in qualitative research as a technique to identify and select 'information-rich cases' for efficient research (Coyne, 1997). This means selecting individuals and groups especially knowledgeable or experienced within the studied phenomenon. (Palinkas et al., 2015). While random or probabilistic sampling (commonly used in qualitative research) is used to minimize the potential for bias in selection and ensure generalizability, purposeful sampling aims at depth of understanding, and the samples are not intended to provide general statements. Instead, Palinkas et al. (2015) argue that when using purposeful sampling it is important that the reason behind the samples is stated.

Observations

Observations 'in the field' are commonly used in qualitative research and help the researcher become familiar with the studied subject by recording what they see and hear (Daymond & Holloway, 2011). They are used to create a 'detached view' of the nature of a phenomenon (Walliman, 2011). In this thesis two observations were conducted at Katrinetorp; one on 7 March 2023 and a second one on 17 September 2023. The first one at the beginning of the study was to get an idea about how the garden was structured and as a tool to explore potential directions of the study, as commonly used in the inductive approach (Walliman, 2011). The second observation was during the harvest festival at Katrinetorp. This observation aimed to see how Katrinetorp presented itself, how the kitchen garden was 'communicated', if, or how, knowledge was transferred to the visitors, and how visitors interacted with the garden and the different parts of the museum. The first observation lasted one hour, while the second one lasted three hours. The observations allowed me to develop a better understanding of how visitors used the space and how Katrinetorp invited visitors to indulge in the activities. Observations were documented by field notes and photos. As it was impossible to obtain consent from each visitor, particular care was taken to avoid photos where people would be recognizable.

Document study

Data collected from documents such as books, maps, archive material, newspapers, Instagram, Facebook, and official web pages were used to strengthen and deepen the understanding of Katrinetorp their history as well as how they communicate to the public.

Reference place

In order to form suggested improvements at Katrinetorp a brief study of a place already focusing on local varieties was performed. The aim of this 'reference place' was to explore tools for increasing awareness amongst the public and to draw lessons from their experiences. The local heritage society in Båstad (Bjäre-härad hembygdsförening) was mentioned by Agneta Börjeson (oral, 2023) and was selected as a reference place because of their current work with spreading awareness and knowledge about local varieties. Since the amount of

locally adapted varieties available varies depending on region, selecting a reference place from the same region seemed more relevant.

Data about Bjäre-härad local heritage society was gathered through one semi-structured interview held over Zoom, with both the project leader, Ingrid Thuresson, and the gardener Julia Öhman. Like at Katrinetorp, verbal consent was given beforehand, and the interview was documented by notes that were later transcribed. Additional information was gathered through a document study (Instagram, Facebook, official web page).

Methodological discussion

This thesis focuses on local varieties of kitchen vegetable crops. The reasoning for the exclusion of other crops is primarily because I believe it would be most suitable in the context of Katrinetorp and visitors-gardens or museums alike. Secondly, a lot of research on local varieties is focused on cereal crops, while kitchen vegetables are often left in the background.

The number of interviews and observations conducted can be considered to be quite few. Only one interview was conducted with the gardener responsible for the kitchen garden at Katrinetorp. This was mainly due to the fact that they did not have time to contribute with more time. Interviews with other people working at Katrinetorp could have been interesting and given a perhaps richer picture. For example, it would have been interesting to interview the owner of the restaurant at Katrinetorp to understand their point of view, and if they would consider any greater focus on older varieties of vegetables and food culture. However, due to the timespan of this study, such interviews were not possible. Yet it could be an interesting path for further studies. The reference case of Bjäre-härad could have been enriched by observations on site. It would have been interesting to see how they present the information to visitors in the actual garden and how knowledge is transferred. However, due to limited access, I was only able to have contact with Bjäre-härad online. Still, thanks to Ingrid Thuresson and Julia Öhman's enthusiasm for my thesis I was able to retrieve plenty of useful information from our online interview.

While I had hoped to find information about past cultivation and kitchen garden design at Katrinetorp this appeared to be much harder to find than I originally planned, and no older maps or lists of what was grown were found. Perhaps with more time spent in archives, more details can be found, which can be interesting if to implement the suggested vision at Katrinetorp. During my study, I was only able to find information on what was grown in the fields since that was recorded in local newspapers' 'for sales' pages and in books about the past owners of Katrinetorp. Information could have been used from other, nearby larger estates that have kept such details but that was not possible due to the time limit of this thesis. Such information could have enriched the study and helped place the local varieties in an actual context. However, in this thesis, the case of Katrinetorp Landeri only acts as an example of how such varieties can be lifted and communicated. The overall goal is to increase the use of local varieties in cultivation and highlight these varieties' importance for future food system resilience.

Background to the context of local varieties

This background section focuses on the context of local varieties to help understand why they are important for food system resilience, how these varieties have been cultivated in Sweden, the causes behind their loss, and how these varieties are perceived in global to national policies.

Local varieties for food system resilience

Agrobiodiversity

Central to the science of agroecology are the so-called agroecosystems (Altieri & Nicholls, 2005; Tittonell, 2014; Gliessman, 2015; Shiva, 2016). Agricultural biodiversity, or agrobiodiversity, is a part of biodiversity and can be seen as the building stones of the farming system. It exists as a result of "the interaction between plant, animal, and microbe genetic resources with the environment, management systems, and cultivation practices of diverse cultural settings" (Raggi et al. 2022). Agrobiodiversity includes all crops and livestock, wild relatives, and interacting species - such as soil microorganisms, pests, and pollinators (Hammer, 2003). FAO defines agrobiodiversity as "the variety and variability of animals, plants, and micro-organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry, and fisheries. It comprises the diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceutical". (FAO, 1999). Raggi et al. (2022) argue that agrobiodiversity is a vital part of resilient agroecosystems and helps to buffer negative effects caused by climate change. Threats to agrobiodiversity are, per se, a threat to food security and food sovereignty (Almeida et al., 2023). Hence, Frison et al. argue that agrobiodiversity needs to be seen as a central element of sustainable agriculture (2011).

Genetic diversity

Genetic diversity makes the foundation of our food system, it is vital for resilient agriculture (e.g. Hufford et al., 2019; Khoury et al., 2022) and can be described as the range of genetic characteristics in a crop (Barot et al. 2017). According to the study by Barot et al. (2017) plant genetic diversity plays a vital role in ecosystem functioning and has, for example, a positive effect on the presence and richness of other organisms such as predators, herbivores, and soil organisms. Further, it can influence plant productivity and help the agroecosystem adapt to disturbances (ibid.). Relying on a small number of crops and varieties makes the food system extremely vulnerable to climatic changes, pests, and weeds. The use of a large diversity within a crop helps us to spread the risk, relying on several varieties with different attributes creates a more resilient system (Pilling, 2015). The genetic material could also be crucially important for future crop development (Priyadarshan, 2022).

However, an increasing amount of literature is articulating concern over the decrease in genetic diversity globally (e.g. FAO, 2020; Raggi et al., 2022). Already in 1990 Fowler and Mooney claimed that the loss of genetic diversity is "perhaps the biggest single environmental catastrophe in human history" (1990, p: ix). The loss of genetic diversity, also called genetic erosion, can be defined as the loss of genetic diversity in a specific place and time, both the loss of specific genes and specific combinations of genes (Khoury et al., 2022). Modern

agriculture is increasingly focusing on fewer crops and varieties, leading to an increasingly homogeneous food system (Frison et al., 2011). With only nine crops standing for two-thirds of the world's crop-based food production, the food system is increasingly vulnerable (IPBES, 2019). Not only are we relying on fewer crops, but researchers also warn that modern food production is increasingly genetically uniform (Frison et al., 2011). According to Priyadarshan (2022), the genetic diversity within the nine staple crops is declining and there is a risk for genetic erosion within several of our staple crops which can lead to severe crop failure (Priyadarshan, 2022). Increased use of pure lines and hybrids from small germplasm pools in modern agriculture results in the loss of “excellent gene repositories” - unique traits and variability that can be crucial for future plant breeding (Mathew & Mathew, 2023).

Local varieties

Almeida et al. argue that local varieties are a key element of agrobiodiversity (2023). There are several existing terms used synonymously for local varieties. Some of the most commonly used in research and policies are cultural heritage-, heirloom- (e.g. Dwivedi et al., 2019), landrace- (e.g. Mathew & Mathew, 2023), traditional-, indigenous- (e.g. FAO, 2020), or ancient (e.g. Migliorini et al., 2017) varieties. There is no clear definition for them which makes it difficult to specify what they constitute.

What FAO calls farmers varieties or landraces have undergone repeated farmer selection which has led to unique characteristics. Some of the characteristics FAO mentions as traits of landrace or traditional varieties are; -Recognizable, distinct crop variety, -Dynamic population character, -Lack of formal crop improvement, -Genetically heterogeneous, -Locally adapted, -Associated with local cultural, historic, or religious values, -Associated with traditional farming systems. However, they mention that a variety does not have to conform to all of these traits, rather the list can work as a guide to what is included and not (FAO, 2020).

Mathew and Mathew define landrace and indigenous breeds as animals or plant species that have developed at a specific location through natural or (and) artificial selection processes over an extended period of time. By adapting to the changing environment and mixing with other genotypes they are constantly evolving. They represent a highly resilient gene pool with unique features that are suitable for the specific context and conditions- such as climate, soil quality, pests, and farming management (2023).

The study by Raggi et al. (2022 and referenced therein ECPGR, 2017) includes an approach that puts further attention to the materials in in situ conservation - in addition to ‘true’ landrace also introduced landrace, cross-composite populations, and varietal mixtures are included in the term. However, all varieties share the characteristics of within-population genetic diversity.

Similar to the definition used in Raggi et al. (2022) Leino, Nygårds, and Börjeson (2023) use the term 'local varieties' (*lokalsorter).* These varieties have been cultivated in the same place for a long period of time, and which seeds have been collected by the farmer each year. According to Laino et al. (2023), the origin of the varieties varies, and many are presumably once bought on the seed market. In the term local varieties, the authors also include 'true' landrace varieties. This broader definition is what will be used in this thesis.

Figure 1 - Pictures of three Swedish local varieties of *Pisum sativum var. arvense.* From the left; grey pea 'Maglaby', grey pea 'Puggor från Ballingslöv-Glimåkra', sugar pea 'Lokförare Bergfälts jätteärt'. The authors pictures, and seeds from NordGen.

According to agroecological principles, traditional agriculture is important for a resilient food system (Altieri et al., 2012; Tittonell, 2014). Traditional ways of farming have historically shown it is possible to farm in a long-term sustainable way and embedded in these traditions is the knowledge that has been accumulated through generations of coexistence with surrounding nature (Altieri & Nicholls, 2005; Altieri et al., 2012; Gliessman, 2015). A vital key to the continuation of traditional agriculture is access to traditional or local varieties.

Research suggests that local varieties have a greater capacity to handle sudden changes in climate (Van de Wouw et al., 2010; Gordon et al., 2017; Berry et al., 2018; Singh, 2018). Since older varieties often consist of a large diversity within the variety it enables a larger flexibility to adapt to different environmental conditions and stresses (Wolff, 2004; Migliorini et al., 2017; Dwivedi et al., 2019). A study by Simona Ciancaleoni and Valeria Negri (2020) showed that heterogeneous varieties, such as cultural heritage varieties, of broccoli were able to evolve across time and locations, whilst still preserving the original diversity and productivity level. The study concludes that varieties with great genetic diversity are more suitable than hybrids when it comes to adapting to a rapid change in climate and growing conditions.

While local varieties might fail to catch up to the same level of yield as modern breeds, their flexibility allows for productivity to be continued even under less optimal conditions and with less input (Wolff, 2004; Altieri et al., 2015). In a report after the drought in Sweden in 2018, when cereal production was reduced by half, older varieties were shown to perform better than modern varieties (Gerhard et al., 2019). In other words, they can both adapt to short-term shocks and long-term changes - a capacity that is vital for food system resilience.

In addition, the physical characteristics of older varieties, such as deeper roots and higher plants, can be beneficial when it comes to water management and weed tolerance (Mouldry et al., 2011). A study by Migliorini et al. (2017) comparing old and landrace cereal varieties

with modern breeds showed that the older landrace varieties were beneficial when unfavorable weather conditions had delayed the autumn sowing. Because of their height, older varieties were able to compete with the natural flora. During the same year, the modern varieties were less resilient and did not reach sufficient quality for harvest. In another study, older varieties of wheat, such as emmer and einkorn have been shown to be resistant to brown rust and mildew (Mouldry et al., 2011). Considering brown rust is one of the most serious diseases threatening wheat production in developed countries, resistance genes are vital for future production (ibid). The genetic material of older varieties is therefore important for future breeding and development of new varieties (Villa et al., 2005; Altieri et al., 2015). However, some research mentions that some heirloom varieties are more susceptible to pathogens, especially soilborne diseases (Dwivedi et al., 2019).

When modern breeding focused on high yields, qualities such as nutrient content and taste were often overlooked. Some older varieties have been shown to have higher nutrient values (Migliorini et al., 2017; Zamaratskaia et al., 2021) and have taste important in traditional recipes. However, the study by Dwivedi et al. (2019) gives a more nuanced picture, arguing that not all heritage varieties equal higher nutrient levels and some modern varieties reach the same levels. Dwivedi et al. still argue that there is "little doubt that heirloom cultivars contain reservoirs of useful traits, including those that might be able to contribute to improved human nutrition" (2019, p:5). Ultimately, it is not about downplaying the importance of modern breeding but acknowledging the importance of diversity and safeguarding materials that are, or might become advantageous for food production. Local varieties can be useful as a complement to newer varieties by reducing the vulnerability of the system in total and enhancing the system where it is at risk.

Ex situ versus in situ conservation

According to Hammer et al. (2003), one of the main goals of agrobiodiversity research is (re)introducing a larger amount of diversity from gene banks, botanical gardens, or other sources of diversity into the current agroecosystems. Further, they argue that sustainable use of native and cultivated resources is needed to enlarge the diversity of agriculture and meet the needs for food, fiber, and fodder. The increased sense of emergency associated with the loss of agrobiodiversity amongst researchers has increased the work of ex situ conservation globally. Ex situ conservation is a type of 'static conservation' of plant genetic resources outside their natural environment, such as seed samples in gene banks. While this work is important, some researchers argue that ex situ conservation is not sufficient in itself (e.g. Raggi et al., 2022; Mathew & Mathew, 2023). Raggi et al. (2022) argue that placing germplasm in gene banks freezes the variety's evolutionary and adaptive abilities.

In addition to the benefits heterogeneous varieties have in supporting ecosystem functions, resilience, and productivity (Raggi et al., 2022), their continued presence on farms acts as a crucial complement to ex situ conservation methods (Mercer & Perales, 2010). In situ conservation, for example on farms, allows for continued exposure to changing environments. To maximize the level of conserved diversity, In situ conservation complements ex situ methods by enabling the preservation of the biological as well as social processes of crop evolution (Brush, 1995; Mercer & Perales, 2010; Raggi et al., 2022; Mathew & Mathew, 2023).

In situ conservation not only allows for the continued gradual evolution of the varieties and adaptation to the local conditions, but also the management skills and knowledge embedded in the use of the varieties - knowledge that might be important for the development of a sustainable agroecosystem. Barthel et al. (2013) argue that the conservation of TEK is as important as the plant material itself. "[I]f a key goal is to safeguard global food security, it is not only the biological components of ecosystems that must be curated. Due to the varying historical and geographical conditions under which species have been (and are currently) cultivated, it is also important to safeguard the knowledge of management practices that relate to these conditions" (p:1142). By only focusing on ex situ methods, this knowledge is at risk. Mathew and Mathew (2023) argue that identification, characterization, assessment, documentation, and conservation are all mutually important aspects of preservation. To sufficiently safeguard genetic diversity, we need to know what we are preserving. In situ conservation on farmland or in public gardens would help to identify the genetic resources conserved in the gene banks.

Kitchen vegetable cultivation in Sweden

According to Agneta Börjeson, knowledge about the early production of kitchen vegetables in Sweden is scarce. However, Börjeson mentioned that archeological findings have shown that kitchen vegetable cultivation existed even before the monastery - which is often presented as the first to cultivate many kitchen vegetables in Sweden. Still, Börjeson argues that the cultivation was probably not as common in Sweden as in other parts of Europe (2015).

Different kinds of cabbage, leafy greens, and onion - mainly kale and white cabbage, ramson, and other types of wild leek and later leek, potato onion, and red onion were grown at medieval farms. Amongst the nobility and clergy during 1500 and 1600 the kitchen vegetable cultivation was larger in the countryside. Documentations show that some of the crops commonly grown were beets, carrots, parsnip, cauliflower, kohlrabi, cucumber, melon, and lettuce. Wrinkled peas and sugar snap peas were introduced during this period and new crops like Jerusalem artichoke, garden beans, and potatoes were introduced from America (Börjeson, 2015).

The range of kitchen crops increased in the period from 1700 to 1750. Writings from Carl von Linnés gives an idea of what was available in different parts of Sweden at the time. Turnips and rutabaga (swedish turnip) were an important part of the 1700 diet. White, red, and yellow carrots, root parsley, Jerusalem artichoke, parsnip, and black salsify were also grown. Less common were celery, black radish, and radishes. Whilst potatoes and kohlrabi are mentioned they were still fairly unusual in the 18th century. Different types of cabbage, white cabbage, savoy cabbage, and green kale existed, and after mid-1700 broccoli entered the Swedish kitchen gardens (Hansson & Hansson, 2002).

During the 18th century, the majority of the Swedish population still lived in the countryside. While the gardens amongst the wealthy were grandiose, the common people often only had small plots for kitchen crop cultivation, growing only what was needed for subsistence. The cultivation was mainly placed on the commonly owned and small plantations close to the buildings. The amount of crops available at this time was similar to today's. Even if the wealthier farmers, and estates typically had a wide range of crops in their kitchen gardens, the crops amongst the common people were still quite scarce (Hansson & Hansson, 2002). When the agricultural land reforms split up farms it allowed for more land to be cultivated in proximity

to the main buildings - which marked a great shift in kitchen vegetable cultivation among the peasants (Andréasson, 2007; Börjeson, 2015).

However, Pia Nilsson (2015) argues that studies on historical kitchen crop cultivations amongst the peasants are insufficient and perhaps the cultivations amongst the less wealthy peasants, or landless peasants, weren't as rare as we've come to believe today. In an article, she argues that kitchen vegetables were probably rotated and grown on different fields, meadows, and pastures, and not only in proximity to the houses, which is a common perception. It seems that kitchen gardens became more permanently placed around 1700.

In 1811 The Royal Swedish Agricultural Academy was founded (today The Royal Swedish Academy of Agriculture and Forestry, KSLA) and was one of the institutions that propagated an increase in the production of kitchen vegetables (KSLA, 2010). Before the introduction of agricultural education, most gardeners got their titles by working as apprentices at different large farms, estates, or manors. After the mid-1800s education in gardening became more common in Sweden and one example is the agricultural school, *Malmöhus läns Trädgårdsmästarskola,* that started in 1876 in Alnarp, close to Malmö. The government wanted to increase the knowledge among farmers and the concept of school gardens became more common (Hansson & Hansson, 2002). In a local newspaper in Ystad 1896, you can read the report from the Balkåkra school meeting concerning gardening as a subject in school. They write that cultivation as a subject is important for awakening the love for gardening and contributing with physical work, stimulating interest in gardening amongst boys and girls, especially the latter, so that it would become possible for every home, even the poorest, to have a kitchen garden (Ystadsposten, 1896). Books about kitchen vegetable cultivation for smaller gardens also became more common - which influenced what was grown even amongst the peasants (Hansson & Hansson, 2002).

During the mid-1800s the Victorian English garden design started influencing the Nordic gardens, and it became more common to include greenhouses, hotbeds, and gardener residents - allowing the cultivation of crops naturally less suitable for the climate. Even crops like cucumber and tomatoes became more common, even if their biggest breakthrough was during 1900 (Hansson & Hansson, 2002).

During 1800 the wealthiest urban dwellers often had land outside the city center for the production of food. In Stockholm, they were called *Malmgårdar* and in Gothenburg, Malmö, and Helsingborg they were called *Landeri*. As the urban areas grew, many of these estates vanished - Katrinetorp is an exception. The number of home gardens amongst farmers and urban dwellers reached its highest amount during the first half of 1900 (Börjeson, 2015).

In a book directed to small farms or home gardens, Gustaf Lind wrote in 1914 that in every garden there should be a cultivation of kitchen vegetables. Cultivations for household consumption should, according to Gustaf Lind, be mixed with a little bit of everything and the kitchen vegetables can, with benefits, be grown between fruit trees. However, commercial cultivation should only focus on one, a maximum of three crops, on a separate piece of land if it is to be profitable. The small gardener is recommended to purchase plants of different crops (e.g. tomatoes, cucumbers head cabbage) at the local garden center (*handelsträdgård)* for a cheap price (Lind, 1914, P: 63-65).

At the end of the 19th century the ideal kitchen vegetable cultivation, even amongst the common people, took up most space in the garden. The classic design was four quarters divided by two larger paths. The quarters contained potatoes, parsnips, turnips, onions, dill, spinach, parsley, peas, and beans. Around the quarters were flowers, like tagetes and marigolds (Hansson & Hansson, 2002).

Gunnar Berge (1939), a teacher at the gardener school in Alnarp, writes that the kitchen vegetable cultivation in the Swedish home gardens in the 1930s was far too modest and that people have yet to appreciate the value of kitchen vegetables. He argues for increased production and consumption of nutritious crops. He describes that the housewives who normally are the ones managing the kitchen gardens lack time to take care of any larger cultivation, promoting the need for more rational cultivation.

Between 1800 and 1960 market gardens were common sources of vegetables for the urban dwellers. As transportation became cheaper, international imports grew and the garden center lost its importance. With the introduction of more advanced sewage systems, the manure available in the city decreased and the production of intense kitchen vegetable crops moved to locations where it was cheap and easy to produce (Börjeson, 2015).

During the second half of the 19th century, kitchen vegetable and fruit cultivation decreased in Sweden as industrialization meant cheaper import of crops. Industrialization also meant a rationalization of agriculture which resulted in fewer people being needed in agriculture and further inducing the process of urbanization. In Malmö, the urban population doubled between 1850 and 1870. The poor living conditions in the cities led to a series of working-class riots. ‘Own-home activity’ and allotments became a solution to give the working-class access to land and to be able to grow some food (Hansson & Hansson, 2002, p:167).

A list of kitchen vegetables grown in Sweden during the different centuries (Table 6), retrieved from Hansson and Hansson (2002) is found in the appendix.

Source of seeds

According to Agneta Börjeson, some kitchen vegetables have probably never reached a large amount of seed production in Sweden, and import has always been an important source of seeds. Saving and sharing of seeds between farmers and home growers is not well documented. Börjeson argues that traditionally cultivated crops probably mainly came from seeds saved at the farm. Seeds of peas, beans, and to some extent, cabbage seem to have been commonly saved at the farm or in the gardens. However, Börjeson argues that information about the source of seeds in Sweden is scarce and there is a need for a more thorough study on the subject (2015).

According to Marie and Björn Hansson (2002) it is practically impossible to know the different varieties that were grown during the 18th century. Selling of seeds existed in the 18th century, the seed catalog by Johan Ahlich from 1720 is a famous example - but most of the varieties lacked names, and were solely presented with a description of their characteristics. During the 19th century plant breeding had a revolution in Sweden and resulted in a systematic commercialized sale of seeds.

Interest in modern plant breeding sparked in Sweden at the end of the 19th century. Walfrid Weibull, a sea captain, and farmer, started a plant breeding company in Landskrona (Skåne) in 1870 and would focus on seed production on tuber crops. In 1886 the Swedish Seed Association was formed by farmers and landlords (Solberg & Breian, 2015). Allmänna Svenska Utsädes Aktiebolag, a marketing company, was founded during the same time (1890). They would later merge and become Svalöf AB. More companies would follow but Weibull and Svalöf are often regarded as leading in the Swedish industry. Studies at Svalöf would become globally renowned for conducting path-breaking work (Morfi, 2020). Svalöf AB and Weibulls AB later merged in 1992 and are today a part of Lantmännen (Solberg & Breian, 2015).

As mentioned, during the 1800s the crops available were practically the same as in 1700. However, the range of varieties grew as seed companies and plant breeders became more common. The seed catalogs could offer farmers around 20-30 different varieties of white cabbage - many with French, Italian, or English names (Hansson & Hansson, 2002).

In books and newspapers, people were urged to increase seed production in Sweden arguing that places where kitchen vegetables give high-yield seed production are highly possible. In an article from 1863 (Karlshamn allehanda, 1863) the 'Journal for Gardeners' (*Tidning för trädgårdsodlaren)* argues that a large amount of money each year goes to import seeds - much of which would be possible to produce within Sweden. They argue that local seeds are far superior to imported ones when it comes to appearance, hardiness, and taste. *H.B. Swensson* explains that while some kitchen vegetable crops are not suitable for seed production in Sweden, locally produced seeds are often better suited for the local climate. At the request of customers, they had started to produce more kitchen vegetable seeds but explained in the advertisement that the cost to produce seeds in Sweden is more expensive and hence the price for local seeds is higher (Jönköpingsbladet, 1872).

In a 'handbook for gardeners' (*Handbok för trädgårdsodlare)* from 1947 by Nils Sonesson there is a chapter about how to save seeds from different kitchen vegetables. Sonesson writes that during the past few years, it has been made clear that seed production of kitchen vegetables is possible in Sweden. However, he notes that it is only in Southern parts of the country where this activity might be profitable on a larger scale and that mainly seeds from kitchen vegetables have increased (1947, P: 87). According to Börjeson, it is mainly in times of crises that the importance of national seed production has been brought up (2015).

Loss of local varieties

Some of the causes of the reduction in locally adapted varieties often mentioned are; changes in agricultural practices (Van de Wouw et al., 2010; FAO, 2020; Raggi et al., 2022), changes in consumer habits (FAO, 2020), seed legislations, certifications subsidies that promote uniform, high-yielding varieties (Wolff, 2004; Bocci, 2011; FAO, 2020), food standards that limit the possibility for local varieties to enter the market, and urbanization leading to a loss of traditional knowledge and generational use of local varieties (FAO, 2020).

Industrial agriculture

Franziska Wolff argues that one of the prime drivers of genetic erosion is the expansion of industrial monoculture agriculture (2004). Today's intensive and high-input agriculture has substituted landrace and local varieties for modern high-yielding crops (Raggi et al., 2022). Due to inputs such as fertilizers, pesticides, and fossil fuels that can alter growing conditions, crops no longer need to be as adapted to the local climate (Wolff, 2004). A focus mainly on maximized production has favored uniform crops or genetic homogeneity, allowing more efficient and standardized crop production management. Large variations in for example height, size, and maturity could risk reducing the efficiency of large-scale industrial agriculture (Wolff, 2004; Gliessman, 2015).

Humans have selected and saved characteristics of crops since the beginning of agriculture. However, according to Wolff (2004), industrial cultivation and processing requirements determine modern breeding objectives today. Resulting in a reduced interest in heterogeneous, local varieties. The development of plant breeding creates many important possibilities as resistant crops are created. One technique that has vastly changed agriculture is F1-hybrids as it allows for a crossing of distinctly different parental types. F1 stands for Filial 1, the first filial generation after a cross-mating. This development has led to the creation of many resistant varieties but also more uniform crops - well suited for a mechanized agriculture system (Gliessman, 2015). A downside is that they often require perfect conditions to produce and are often associated with increased use of external inputs (Gliessman, 2015). Another aspect often pointed out in the context of food sovereignty is the possibility for farmers to save seeds. Even if the seeds from F1-hybrids are fertile they can result in vastly different offspring since they cannot produce the exact same combination of genomes - leaving farmers dependent on companies to supply seeds. In industrial agriculture, this is often not viewed as a problem since seed production and farming practices are separated (Solberg & Breian, 2015). However, in traditional or small-scale production systems seed saving is often a vital part of the farming system (Altieri & Nicholls, 2005; Altieri et al., 2012; Gliessman, 2015).

Seed regulations in Europe and Sweden

Some of the current seed regulations also influence the availability of local varieties on the market. The main regulation regarding seeds in Sweden is based on the seed legislation (*utsädeslagstiftning*) that was enforced in the 1960's. However, some minor modifications to the legislation have been made since Sweden entered the European Union in 1995 (Börjeson, 2021). The purpose of the legislation is to ensure that the seeds on the market are safe for use. They should meet the expected standards regarding quality, productivity, and germination so that they do not cause any economic loss for the growers and that there is no accidental spreading of diseases or invasive species due to contaminated seeds. The legislation is also in place to ensure the production of a sufficient amount of produce (quantity and quality wise) to meet the needs from a national and regional food supply point of view (Börjeson, 2021; Jordbruksverket, 2023a).

For a variety to be allowed to be sold or distributed it needs to be in the variety catalog, either on the Swedish national list or the EU's common list. With some exceptions regarding less-used crops (Jordbruksverket, 2023a). The catalog focuses on the main crops used in agriculture and therefore some crops like buckwheat and dill can be used without having to be listed (Börjeson, 2011). The catalog is divided into agricultural plants (cereals, grains, oil crops,

etc.) and vegetable plants (cabbage, root vegetables, etc.), and the laws differ slightly depending on which list they belong to. Other rules apply to potatoes (Jordbruksverket, 2023a).

For a new variety to be able to enter the list they have to go through some tests. One of them is DUS - meaning the variety is Distinct, Uniform, as well as Stable. This means the variety must be "clearly distinguishable by one or more important characteristics" and differ from the varieties already on the list. It also needs to be stable in its "essential characteristics" and "sufficiently uniform in its relevant characteristics" (UPOV, 2002; Bocci, 2011). The varieties need to be DUS-tested for at least two years, which costs an average of 14200 SEK per year. In addition to this is the cost for application (1000 SEK) adding the variety on the list (3000 SEK) and a yearly fee (2000 SEK) (Qvarnemark, n.d.; Jordbruksverket, 2023a). (Agricultural crops need additional VUC-test, read e.g. Bocci, 2011).

The direct effect of the DUS-criteria is that the genetics that build up our modern agriculture are increasingly uniform. Not only do we rely on fewer varieties, but we have reduced the genetic diversity within the varieties (Wolff, 2004; Van de Wouw et al., 2010). According to Wolff, this has mainly to do with Intellectual Property Regimes (IPR) like Plant Variety Protection (PVP) and patents. To be able to claim Plant Breeder's Right the variety must be able to be distinguished from other varieties, excluding older local varieties because of their genetic diversity (Wolff, 2004; Bocci, 2011). The PVP also indirectly impacts agrobiodiversity, not only because it limits the freedom to use and save the seeds but also because it promotes varieties that have large market potential. Making plant breeders increasingly more focused on the major crops used in conventional industrial agriculture (Wolff, 2004).

Older, local, and more uncommon varieties can, as mentioned, rarely meet the standards defined by the DUS-test. To prevent these varieties from being excluded from the market, and going against the Convention for Biodiversity, some exceptions in the seed legislation were made. The EU conducted two directives (2008/62/EG and 2009/145/EG) that allowed so-called *conservation*- and *amateur*- varieties to enter the variety lists with. The criteria needed (such as uniformity) and the cost associated with adding these varieties to the lists are lower. The idea behind these additional categories was that it would be easier to use and sell these varieties, although under certain circumstances and with some limitations (Börjeson, 2011; Jordbruksverket, 2023a).

A conservation variety is a local variety, or a variety that has been grown in the region for a long time and therefore is adapted to the local conditions. For it to qualify as a conservation variety there must be documents supporting the fact that it has been grown in the area before 1950, and it should be 'worth saving' from a genetic perspective. The variety should also be meant to be produced commercially (Jordbruksverket, 2023a). However, a conservation variety on the national list is only allowed to be grown in its country of origin. Additionally, there are some limitations concerning the scale of production, conservation varieties can only be grown on a limited amount of hectares depending on which species they belong to (Bocci, 2011; Jordbruksverket, 2023a).

An amateur variety is a kitchen crop variety that lacks 'actual value' for commercial cultivation but has been developed for production associated with certain technical and environmental circumstances. Because of the lower control of these varieties, they are limited to only being

sold in small packages. They still need to be on a list in order to be sold, but in contrast to a conservation variety it can be sold outside of the country of origin. The cost for registering a conservation- or amateur-variety is 800 SEK and there is no annual fee (Jordbruksverket, 2023a). From 2020, some crops also need a plant passport in the EU to ensure the safe trade of seeds (unless they are sold with direct contact with the consumer). For older varieties, this is needed for legume crops, onion crops, and tomatoes, which leads to an additional cost for the seed companies (Börjeson, 2021).

However, despite the extensions of the regulations regarding conservation- and amateur varieties, there are still just a few varieties on the EU list. The market for older varieties is often too small to bear the costs of doing the tests still needed - leading to an exclusion of these varieties from the list (Börjeson, 2021). In some cases where a variety does not have a documented history before the 1950s, and therefore does not qualify for being a conservation variety, they are placed on the amateur list. This makes it almost impossible for the variety to be produced commercially. The same problem arises if the breeder cannot pay the price for the regular list, with its yearly fee (Börjeson, 2011).

The seed market

Another factor affecting the accessibility of locally adapted varieties is the fact that just a few companies control the seed market globally. To get seeds a farmer can either save seeds on farm or purchase seeds derived from public plant breeding or from the private sector. Historically farm-saved seeds have been the main source, but today the private sector dominates the global market (OECD, 2018). According to Svein Øivind Solberg and Line Breian (2015) the breeding of vegetables has almost ceased in Sweden. This has led to an even increasing dependence on larger companies who are controlling the market, focusing on the most profitable crops and high-yielding hybrids.

The tendency has been for larger companies to buy up smaller seed companies and then reduce their crop varieties to focus more on fewer major crops. Which results in an ever-decreasing amount of varieties available on the market (Shiva, 2016; Bratspies, 2017). The former “Big-six” ag-biotech companies have, during just a short period of time, merged into three mega companies. The global market is now dominated by four major ag-biotech companies Dow/DuPont, ChemChina/Syngenta, Monsanto/Bayer, and BASF, giving them increasing control over food production. Even before the merges the ‘big six’ stood for 63% of the global seed market and had major control over private-sector research on seeds and pesticides (Bratspies, 2017). The control of seeds in the hands of just a few companies could be seen as a tremendous threat to global food production and can easily increase insecurity for farmers (Solberg & Breian, 2015)

Some smaller seed companies do exist in Sweden, but many depend largely on imported seeds and few produce seeds themself. However, some channels for local varieties do exist in Sweden, for example, NordGen, Sesam, Runåberg, Lindbloms, and Nordfrö but they only sell or distribute a small amount of seeds. To get a sufficient amount of seeds for production much more would be needed (Börjeson, 2021). Runåberg produces 20% of their seeds themselves and sell some older varieties but also mainly in smaller quantities (Börjeson, 2019). For a small-scale family farmer or home-garden farmer producing for self-substance, finding local varieties might not be a problem. For them Sesam, Nordfrö, Runåberg and in

some cases NordGen could be enough. But for commercial production, even on a smaller scale, it is much harder. From NordGen a farmer can get a small amount of seeds, about 50g per bag (Börjeson, 2018) but the responsibility to make these varieties available on the market in larger quantities is mainly left to the seed producers (Jordbruksverket, 2023a). The market directs which varieties reach success and Börjeson (2021) argues there is a need for improved marketing strategies in order to increase production of local varieties.

Lack of seed producers

In a report by Agneta Börjeson (2021) the interest in local varieties is slowly increasing. However, the supply of seeds on the market does not cover the demand and only a few varieties have a sufficient amount of seeds available. The process of producing a sufficient amount of seeds is time-consuming. NordGen in Alnarp can provide seeds, but only 25 seeds for legumes and around 100 seeds for vegetable crops. Producing legume seeds for one hectare will take around 4-5 growing seasons. Kitchen vegetables for hobby-growers will take around two years, and longer for larger commercial farming.

Börjeson (2021) argues it is possible to create profit in the seed production of vegetable crops, counted on each separated variety. One successful example is Nordisk Råvara (funded by Vinnova) who managed to make the grey peas ‘Rättviksärt’ and ‘Stäme’ available for consumers. However, Börjeson mentions that it will probably not be sufficient for a full-time income for the seed producers. Resulting in most of the seed production being left to enthusiasts who produce them. The administrative work needed because of the seed laws and the work in relation to the amount of seeds, act as restraints for seed production today. To increase the amount of seed producers in the country there is a need for increased knowledge in seed saving practices, technical innovations and easily handled administrative work. According to Börjeson, there is also a need for better documentation on the characteristics and qualities of the varieties so commercial farmers are willing to use them. This means the varieties need to be tested in the cultivation system.

Local varieties that differ from more common varieties are suited for a ‘niche market’ and if the added value is articulated it can lead to a higher price on the market - both for the harvested products and seeds. All varieties in the gene bank are probably not suitable for larger cultivation, and Börjeson (2021) argues that the largest diversity of varieties will probably be more suitable for hobby growers.

The amount of Swedish local varieties available in the gene bank differs depending on the crop. The report *Från genbanksmängd till utsädesvolym* by Börjeson (2021) gives an overview of the different crops and how many local varieties are or can become, conservation- or amature-varieties if seed producers are increased. According to Börjeson, most of the kitchen crop varieties that are to be considered in up-scaling seed production are ‘kitchen legumes’. While some local varieties are already available on the market for hobby-growers (e.g. 9 sugar peas, 5 broad beans, and 4 wrinkled peas) many more varieties in the gene bank can become interesting for both hobby- and commercial-growers. There are, for example, around 20-25 broad bean varieties, 30-40 wrinkled peas varieties, and 20-25 bean varieties that can be suitable for seed production. When it comes to leafy greens there are around 7 varieties of Acid sorrel in the gene bank that can be of interest, mainly for hobby-growers. Today there are no local varieties of root vegetables (e.g. carrots, parsnips, beets, salsify) on the market

today, and few varieties of interest in the gene bank. No older Swedish fruit vegetables (chili, paprika, eggplant, pumpkin, and squash) exist in the gene bank, even if they have a long history of cultivation in the country. When it comes to tomatoes only around five varieties of Swedish varieties, or varieties with specific importance to Sweden exist in the gene bank. The same goes for melons (2) and cucumbers (5). Today only one older Swedish variety of cucumber is available on the market. In the category of Brassicaceae crops, there is one white cabbage variety available on the market and three varieties in the gene bank that can be interesting both for hobby- and commercial- growers. However, Börjeson notes that there are few local seed producers of cabbage. There are five varieties of cauliflower with potential in the gene bank. One local variety of turnips is available on the market today and between 10-15 varieties in the gene bank can become of interest, but seed production is only hobby-based (2021).

Local varieties in policies - global to national

Conservation in global and EU policies

The potential danger of losing crop genetic diversity and local or traditional varieties is not only recognized in research but in several international policies and agreements. The need for conserving and sustainable use of Plant Genetic Resources for Food and Agriculture (PGRFA) is referred to as crucial in for example the Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) (FAO, 2009). Sweden, like the rest of the EU member countries, has agreed to follow ITPGRFA (Raggi et al., 2022).

The EU strategy 'Farm to Fork', forms the heart of the 'Green Deal' (European Commission, 2020) and was developed to make "food systems fair, healthy and environmentally friendly". The strategy recognizes the importance of older, and more heterogeneous varieties and states that the Commission will aim at ensuring easier market access for traditional and locally adapted varieties and promote their use by "take[ing] measures to facilitate the registration of seed varieties, including for organic farming" (European Commission, 2020 p:10).

However, despite the call for the conservation of crop genetic diversity and landrace being highly visible in a global and European policy context, Raggi et al. (2022) argue that the current legislative foundation for in situ landrace is insufficient. According to ITPGRFA, there is a need for an inventory of in situ-maintained landraces. The study of Raggi et al. (2022) is the first step toward such an inventory in Europe.

Swedish environmental objective - *A varied agricultural landscape*

Aims to tackle current and future environmental issues and secure a healthy, functional environment for generations to come the Swedish government has developed *the environmental objectives system*. It includes sixteen objectives that are meant as guidelines for sustainable environmental development and target the different aspects of environmental issues. One objective specifically targeting the loss of genetic diversity and local varieties is *A Varied Agricultural Landscape*. The goal of the objective is to strengthen and preserve biological diversity and cultural heritage whilst ensuring that the genetic resources embedded in locally cultivated crops are protected. The goal presses on the importance of continued farming practices, arguing that preserving Swedish crop plants and livestock breeds with unique characteristics is crucial for future food supply, and has value in the sense of being a part of our cultural heritage (Naturvårdsverket, n.d).

Genetic Diversity Conservation in Sweden

The Program for Diversity of Cultivated Plants, POM, is Sweden's national program for plant genetic resources. It is a program led by the Swedish Board of Agriculture and the practical actions are held at the Swedish University of Agricultural Sciences in Alnarp. It is a national effort to preserve and use cultivated plants and their genetic resources (such as landraces and crop wild relatives) sustainably, in the long term. In 2000 the Swedish Parliament decided that POM would work as a tool to implement FAO's Global Plan of Action for Plant Genetic Resources. The program is also an action target under the environmental quality objective of *A varied agricultural landscape*.

This thesis concerns local varieties of kitchen vegetables, and while most of the major vegetable crops grown in Sweden are not native to the region (e.g. FAO, 1995) their long use in the country has led to varieties highly adapted to the local conditions and with important cultural values.

For a long time, it was commonly thought that Sweden had lost almost all of its older traditional varieties (e.g. FAO, 1995). However, during a national seed-collecting call led by POM between 2002 and 2005, many varieties that were thought to be lost could be collected. Farmers and home gardeners have kept these varieties alive due to their unique characteristics, such as taste, or because of their local history and cultural heritage. The varieties found during this project are now conserved at NordGen (POM, 2019). The Nordic Genetic Resource Center, NordGen, is an organization that was developed as a cooperation between the Nordic countries and their primary task is to “contribute to securing the broad diversity of genetic resources linked to food and agriculture”. NordGen was established in 2008 and is mainly financed by the Nordic Council of Ministers (NordGen, n.d.).

Grönt Kulturarv

In 2013 the brand Grönt Kulturarv (Green Cultural Heritage) was developed to enable the commercialization of cultivable plant material collected through POM. There are about 150 varieties on the market sold as *Grönt Kulturarv*, and new varieties are launched every year. They are fruits, berries, ornamental- and kitchen plants that have been cultivated in Sweden before 1940, 1950, or 1960 (depending on plant species) and have a well-documented history. It can also be varieties produced in Sweden or spontaneously generated material that is deemed to be worth growing. The varieties are grown by for example commercial gardens and can be found at well-stocked garden stores (POM, 2023).

When it comes to plant-genetic resources in *A Varied Agricultural Landscape* the target values are that all conservation-worthy varieties documented by the POM must be in cultivation or preserved in gene banks. Further, they should be available for future use and the number of conservation-worthy varieties on the variety list, and varieties available on the market, must increase. In the report by The Swedish Board of Agriculture from 2023 these targets are deemed to have been reached (Jordbruksverket, 2023b). However, this does not mean that no additional work is needed. (especially since most varieties are conserved ex situ).

One of POM’s overarching goals is to make its work, goals and means known also outside the circle of the already initiated. A central message is to make cultivated diversity available to more people. The purpose is to increase knowledge, influence attitudes, and create action around cultivated diversity (POM, 2023). In addition to initiatives such as Grönt Kulturarv, POM has published several books on the subject and the interest seems to increase (Björnson, 2023). However, in the program plan for 2021-2025, the communication work is set to be improved (Weibull, 2019).

In a report on the work at POM by Jens Weibull (2019) for The Swedish Board of Agriculture the author points to the importance of involving the museum-sector. Several Swedish museums act as clone archives for fruits, roses, and other perennials. Some examples are Fredriksdal's open-air museum, the Julita agricultural museum, and Linnés Hammarby. In addition to preserving plants, they act as important ‘showcases’ for cultivated diversity and

help spread interest amongst the public. Many museums have restaurants on the site and have the ability to connect cultivation, food, and the diversity of flavors contained in cultured plants (Weibull, 2019).

Museums, particularly agrarian museums, have the potential to connect past, present, and future food production and increase the knowledge about agriculture's local dependence. In a report concerning the development of Nordiska Museet's gardens by Anders Wästfelt (2021), the author argues for an increased need to connect present food production and land use with history. That the museums should aim for an increased understanding of the correlation between current food production and past land use, their limitations and possibilities, and conditions. To bridge current social issues with knowledge from the past. Further Wästfelt argues that Museums have an important value when working as 'peep-holes' to traditional agriculture and the use of landrace varieties (Wästfelt, 2021).

Swedish food strategy

In 2017 the Swedish government adopted the first national food strategy with a time-span until 2030. It works as a framework to improve the food system as a whole and reduce the country's vulnerability by increasing self-sufficiency. The overall goal of the national strategy is to increase food production and secure a competitive food chain in the country. At the same time, it should achieve national environmental objectives, generate growth and employment, and contribute to sustainable development within the country. The strategy consists of three strategic areas: Rules and regulations; Consumers and markets; and Knowledge and innovation. The objective of the first area aims at applying suitable measures such as appropriate taxes and regulatory simplifications to achieve a competitive and sustainable food chain with increased production. Consumers and markets aim at ensuring consumers have a high confidence in food and to be able to make informed choices when it comes to local and organic produced foods. The goal of the third strategic area, Knowledge and innovation, is to contribute to increased productivity and innovation in the food chain, and sustainable production and consumption of food by supporting the knowledge and innovation system (Swedish government, 2017).

While the food strategy has a large focus on economic growth and compatibility with a global market, the Swedish government (Prop. 2016/17:104) also argues that the agricultural landscape consists of important environmental and cultural values. Values that are vital for tourism, outdoor life, and life qualities for people living in and visiting rural areas. Education in food and nutrition amongst children needs to increase as it can lead to more secure and quality-aware consumers with better dietary habits. The food strategy mentions there is a need for increased interest in food culture, origin, and history as well as the meals' social importance. culinary tourism and food culture should be promoted in order to increase interest and consumption of Swedish food as taste, quality, and cultural heritage can become competitive advantages. They also mention that there is a need for the conservation of genetic resources for future food security - local varieties are mainly seen as important in the aspect of future plant breeding (ibid).

Regional food strategy

In addition to the national food strategy, all counties in Sweden have either a food strategy or/and an action plan depending on the local context. Skåne, where this case study takes

place, has developed a regional food strategy called ‘smart food’ (Länsstyrelsen Skåne, 2017) which is a framework for further development in the region aiming at creating growth, occupation, and sustainable development in all stages of the food sector. The strategy has defined four stances on how the vision is going to be enforced; In Skåne, (1) the food should be highly valued, (2) Skåne should lead the way for a sustainable food system, (3) In Skåne, shall the knowledge about food be promoted, (4) In Skåne it should be easy to feel a sense of pride over the food. Whilst genetic diversity or local varieties are not explicitly mentioned in the strategy, the importance of food culture, history, and sustainable farming practices are seen as vital. In the fourth stance, the goal is for the region to be an open and inclusive foodscape. They argue that in order to be welcoming, the inhabitants of Skåne feel safe and have a sense of pride over their background, and the place they live and operate in. According to the strategy, stories about for example the people, practices, and agricultural landscape play an important part in the sense of pride over local food and beverages. Traditions and history are seen as important, but so are the diverse influences that constantly develop and redefine what food from Skåne is. “The food of Skåne is a reflection of its diversity - from traditional Swedish food (*husmanskost*) and artisan food to falafel and star restaurants' tasting menus with locally produced ingredients“ (Authors translation, 2017: 13). The strategy also stresses the potential of using food and meals as tools for increasing nutritional and environmental knowledge amongst children. In addition, greater cooperation between different stakeholders in the food system is seen as a way to create a resilient, innovative, and adaptive system. The strategy argues for a greater number of platforms where different actors in the food system can meet (both digital and physical) to share knowledge (2017).

Potential obstacles for intangible heritage in Swedish

There is a growing interest in so-called culinary tourism and the use of food and beverage to promote destinations is a commonly used market strategy in many countries. Yet, Håkan Jönsson argues that Sweden has a history of opposing heritage and traditions in favor of a mentality of openness. In an article about gastronationalism in Sweden Jönsson argues that Sweden is attempting to “deheritagize the culinary profile of the nation” (2020: 223). A phenomenon the author traces back to the time of rationing during 1914-1955 and the early years of restaurants. Jönnson gives the example of UNESCO’s intangible cultural heritage and that Sweden in 2020 hadn’t nominated any intangible heritage (today there is one Swedish intangible heritage on the list -boat making). The reason behind this was to avoid ‘value hierarchies’ - to point out one heritage or tradition as more important than another. Jönsson associates this avoidance with the fear of “allowing forces that want to exploit certain notions of nationality to gain ground on the political scene” (2020: 232). Promoting national heritage is seen as in opposition to the dominating ideology of multiculturalism. The fear of xenophobia leads to a culture lacking cultural heritage (Jönsson, 2020). It is seen as a threat to the multicultural society. Jönsson mentions that one of the main characteristics of Swedish middle-class identity from the second part of the 20th century was the embracing of modernity and progress. Instead of guarding traditions, the Swedish mentality was about being open-minded - developing what some call a “culture of cultural denial” (2020: 233). Sweden's reluctance to serialization is giving traditions and heritage a limited space in the national food strategy. This ultimately has consequences in the work of defining and protecting intangible culinary cultural heritage, argues Jönsson. The author argues that this has led to deheritagization being an important part of Swedish gastronationalism.

As a result, there might be some limitations to the success of adding value to older locally adapted crop varieties (and their heritage) by the use of *terroir* (‘the taste of the place’) in Sweden, as opposed to for example Italy and France where it is commonly used and embraced. However, as mentioned, both the national and regional food strategy states that promoting Swedish and local food culture and heritage is part of the goal.

Case study - Katrinetorp Landeri

The Estate Katrinetorp is situated on the outskirts of Malmö, in Bunkeflo socken, and is owned by the city of Malmö. It is one of Sweden's most well-conserved empiric style facilities and consists of several buildings with an exhibition, a shop, and a restaurant surrounded by a garden and an English park. It is a center for recreation and as a visitor, you can participate in guided tours, stroll in the garden and park, view art exhibitions, and get a glimpse of how a 19th-century manor could look like or just eat at the restaurant. Each year Katrinetorp Landeri hosts several events and exhibitions like antique markets, conferences, harvest festivals, Christmas markets, and more.

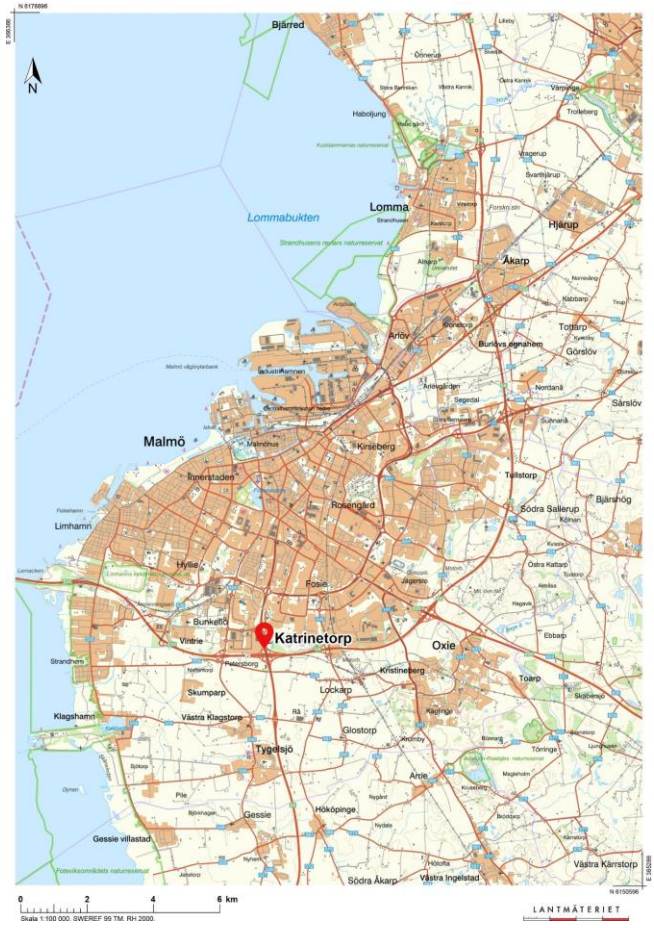
The estate was formed in 1800 and is a so-called *landeri* - a country estate owned or leased by citizens, often wealthy merchants, and was primarily used as a summer resort and for hosting larger events and balls. Since its existence, it has been shaped and formed by its many owners. The estate became the property of the city of Malmö in 1937 but was rented out until 1992. After deciding to keep and facilitate the estate the city of Malmö has restored the manor to be open for the public to enjoy a living historical environment. In 2022 Katrinetorp won the Swedish Cultural Heritage award from the association Svenskt kulturarv.

Figure 2 - Map of the different parts of Katrinetorp, the kitchen garden (F) is located in front of the main building (A) (Malmö stad, 2023).

The kitchen garden contains four quarters and a centrally placed fountain. The park is inspired by the English landscaping style and consists of trees, a water stream, and a walking path. In the east building is the restaurant that offers dishes partly made of harvests from the kitchen garden. The stable hosts a gift shop and a larger exhibition hall. The West magazine hosts an antique shop.

Around 100 000 people visit Katrinetorp each year and the famous Christmas market can attract up to 15 000 visitors in just one day. The visitors are mixed. During and after COVID-19 there has been an increase in the number of families with children that come to explore the garden (Becarevic, oral. 2023). The harvest festival in September attracted lots of people of different ages. People participated by strolling in the gardens and there were long queues to the stalls selling locally produced vegetables and artisan food (Observation, 2023).

However, since the focus of this thesis is kitchen vegetable crops, the main part of my observations and interviews have been directed to the kitchen garden and the restaurant. The English Park and other parts of the estate will not be discussed in depth.



The location

Katrinetorp is situated on the south plains of Skåne, *Söderslätt,* an area famously known for its fertile soils and long association with agricultural practices (Länsstyrelsen Skåne, 2017). Katrinetorp is located on the border between the city and peri-urban landscape, with the industrial landscape of Svågertorp on one side and the green space of Lindängelund on the other. You can easily access the manor by bus, car, or a twenty-minute bike ride from the city center. Being located in proximity to the city center of Malmö allows the museum to reach out to a large visitor base. During the harvest market 2023 Katrinetorp arranged a bus going from the city center to Katrinetorp, free of charge, making it even more accessible (observation, 2023).

Figure 3 - Maps over Katrinetorp and the surrounding area. Source: © Lantmäteriet.

Lindängelund

On the land previously owned by Katrinetorp is one of Malmös largest recreational areas - *Lindängelunds rekreationsområde*. Sydväst arkitektur och landskap AB, who are the architects behind the redesign of the area, writes that one of the goals is to create vast, nature-like environments that give the visitors a sense of entering a different world (Sydväst, 2021). The over 100-hectare area is still under development and the vision is to turn the area into a large park including a lake, meadows, cultivated terraces with a potential botanic garden and greenhouses (Sydväst, 2021; Malmö stad, 2023b).

The first step in the realization of the recreational area was the *Millennium Woods* (*Millenieskogen*) which was inaugurated in 2014. The 11-hectare area consists of a constructed 'forest' with several oval 'rooms' surrounded by hedges and brick walls, intended for meditation and relaxation. Trees like Chinese sequoia and redwood trees act as wind protection in the otherwise open area (Malmö stad, 2023b). The planning of the forest is based on environmental psychology research to provide the human needs for recreation, activity, socializing, experience, and recovery. Creating a place for people to experience nature with plants from all over the world (Sydväst, 2013). Even if the area is still fairly unknown by the city residents, the accessibility and potential for several attractions and activities in the nearby area gives Katrinetorp more opportunities to reach a large and diverse visitor base, which could positively affect the success of spreading awareness of local varieties.

Figure 4 - Map from Malmö city homepage (2023b). The red line indicates the area for which the detailed plan for the Lindängelund recreation area is being situated.

Figure 5 - Old picture of Katrinetorp, source: Malmö Stad, 2023a.

Katrinetorp is a typical example of the many estates that were built by the wealthiest merchants around the outskirts of Malmö during the turn of the century 1700-1800 (Andréasson, 2007). This period also meant great changes in the structure of the landscape and villages due to the land reforms[1]. Before the land reforms, Vintrie village consisted of around 17 cadastral homesteads (*hemman*). From 1783 landowners could get their land collected into a larger piece of land separated from the villages and it was common for wealthy landowners to request their land to be shifted to sell for profit. Hack Stiernblad at Torup had inherited two small estates in Vintrie after his mother, which were later passed down to his grandchildren Lave Beckfriis and his sister Maria at Bosjökloster in 1780. In 1799 they requested to get their land partitioned (*skiftat*). The shift was finished in 1800 resulting in a piece of land in the east part of the village on the border to Lockarp and land on the coast of Öresund (Andréasson, 2007). Beckfriis lived in Stockholm and was probably not very interested in keeping the land in Malmö hence it was out for sale the same year (Kewenter, 2010).

[1] The land reforms, or the enclosure movement, were three reforms (*storskiftet, enskiftet,* and *laga skiftet)* that aimed to simplify land ownership and rationalize agriculture by allowing farmers to own fewer but more connected pieces of land. Enskiftet was more thoroughly enforced in Skåne County and resulted in the split of traditional villages into more separate entities (Möller, 1990; Myrdal & Morell, 2011).

1800 - 1809 Samuel Johan Björkman and Anna Catharina Bager

In 1800 the land was bought by Samuel Johan Björkman from Hyby. He named the estate Catharinetorp after his wife Anna Catharina Bager. Björkman was a great example of the rise of a new class. He was a so-called 'self-made man', whilst his wife Anna Catharina Bager came from one of Malmös' wealthiest merchandiser families (Kewenter, 2010).

When Björkman took over he quickly started building several buildings on the land; two barns (*fäbodlänga* and *logelänga*), one stable, a windmill, a house for the owner, and a house with rooms for people working at the estate. The estate had a rich water supply with several wells in the gardens, as well as a stream and pond but the land was open and exposed to wind (Kewenter, 2010). Amongst the first things Björkman did in the garden was to plant trees along the road and lines of pollarded willows (*pilevallar)* along the fields (Bager, 1991). Lines of pollarded willows are a typical element of the landscape of Skåne. During 1700 most of the forest on the south plains of Skåne had been cut down resulting in a lack of timber and problems associated with wind erosion. Planting of pollarded willows, often white willow *Salix alba*, increased after the land reforms and became an important timber reserve, source of fodder for husbandry, and acted as fences and wind protection (Länsstyrelsen skåne, n.d., Kewenter, 2010).

The family Björkman themself lived in the city center of Malmö and used the estate at Katrinetorp as a country resort, for relaxation, and as a status marker. Samuel Björkman also leased Petersborg from his father-in-law and in 1806 he bought more land in Vintrie, probably available due to *enskiftet*. Even if Katrinetorp was a resort for Björkman the estate was also used for production, both for the owners and the people working at the estate. Some of the crops grown at this time were grain, oats, vetch, peas, rye, and wheat (Bager, 1991).

The estate was mainly managed with the help of a hired workforce. During the first year, there was a gardener named Nils Lybeck, a maid Hanna, and a farm-hand S. W. Lybeck. Nils Lybeck is only mentioned during the first two years and presumably started the development of the garden, as well as the planting of trees along the roads to the estate (Andréasson, 2007).

From 1804 the management of the estate increased and so did the amount of people living on the estate. According to Anna Andréasson (2007), the people listed on the estate are seven 'married farm-hands' (probably *statare*[2]) with families (7 men, 7 women, and nine children). In 1806 a new gardener was mentioned, Hinric Nyman. According to Andréasson (2007), four more farm-hands were hired during 1806. Ewa Kewenter (2010, p;36) counts 17 people hired that year, 10 of them with families - suggesting more profound work in the garden was made during this time.

Hinric Nyman is often seen as the first gardener at Katrinetorp (Bager, 1991; Malmö stad, 2023). Andréasson (2007) argues that this is probably because Nils Lybeck was just briefly mentioned in the scarce sources available from the time, and that perhaps it was during

[2] *Statare,* or contract workers, were married farmers who were employed on a yearly basis getting paid mostly in kind - for example, housing and food. Whilst their contract meant a certain amount of food each year, even during worse years, they lived under poor conditions and on the border of malnutrition. In a contract worker family, even the wife would work at the estate, often doing chores like milking the cows (Bengtsson & Svensson, 2020).

Nyman's time that the foundational changes in the garden were made. Nyman worked at Katrinetorp during two periods, the first time around 1806 and then returned 1813-1814 (Andréasson, 2007).

In 1809, at the age of 40, Samuel Björkman died leaving 32-year-old Anna Catharina and four children behind. Anna managed the estate for a time and presumably intended to keep it. However, due to financial obstacles, she had to put the estate on auction in 1810 (Nytt och gammalt, 1810) and the new owner was her younger brother Erland Gabriel Bager (Bager, 1991).

1810 - 1832 Erland Gabriel Bager and Anna Maria Nilsson

Erland Gabriel Bager was interested in agriculture, was an agronomist, and already owned several larger estates in Skåne (Andréasson, 2007). Besides Katrinetorp the Bager family also took over the lease of the nearby estate Petersborg. When Erland and his wife, and cousin, Anna Maria Nilsson moved to Katrinetorp in 1810 they became the first owners to live at the estate (Kewenter, 2010).

The life at Katrinetorp was luxurious compared to the everyday life of the common people in 1817 Malmö. Notes from the time show that Katrinetorp hosted several parties. Every New Year's Eve Bager housed a masquerade ball at Katrinetorp. In 1819 90 guests were invited - and served several beverages and a full breakfast the next morning. According to Bager (1991), the food was prepared by one of the wives of a contract worker (*statarhustru*).

One of the earliest maps available of Katrinetorp is the ‘skånska rekognosceringskartan’, a map created during the Napoleonic War. Still, it was very detailed, and you can get a glimpse of the garden design (Andréasson, 2007).

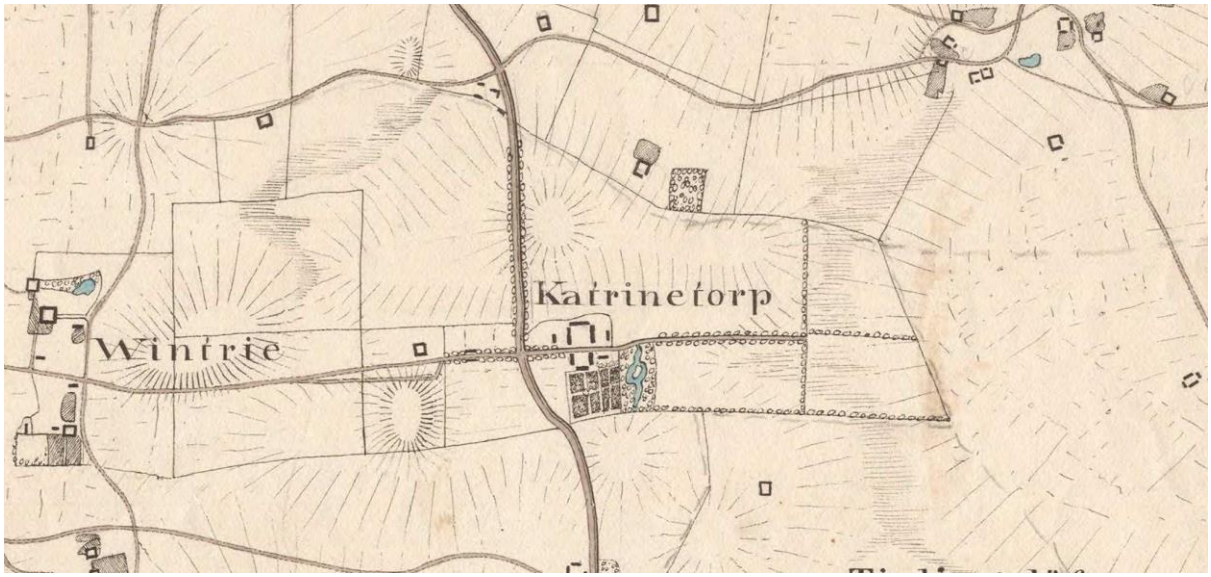


Figure 6 - Map over area around Katrinetorp, Skånes rekognosceringskarta 1812-20, source: Riksarkivet, n.d.

On the map from around 1815, you can see the rows of trees (marked as rings around the roads and fields), the English park with a pond and island, and a kitchen garden with eight quarters (which according to Andréasson, 2007, probably is due to a minor error in scale).

The first gardener mentioned after Bager took over was Samuel Wagnblad, who only stayed a short period of time, and more information about him is lacking. As mentioned previously, Nyman returned and worked at Katrinetorp between 1813-14 (Bager, 1991). During the same period around 31 people worked at Katrinetorp and several of them had families living there (Kewenter, 2010). According to Andréasson (2007), it is around this time that the surroundings of the main building get its finite design and more work on details and decorations of the garden can be made.

Between 1815 and 1816 Bager built several houses for contract worker families (*stattorpare)* some hundred meters from the estate. Statare had a low status in society and often their (poorly built) housing was placed far from the main building. According to Kewenter (2010), there were 60 people hired at Katrinetorp in 1816 and many of them had families living at the estate as well. In 1817 Erland bought several estates during the economic crisis in Malmö and had little time to take care of them all (Bager, 1992). Even though Bager owned Katrinetorp until 1832, the family moved to their recently renovated estate in Snapparp in 1822. Bager visited all his estates by traveling back and forth, but the daily labor between the years 1822-1832 was mainly done by the different managers (*inspektorer*[3]) living at Katrinetorp, the first being Carl W. Neuman who lived at Katrinetorp with his wife and four children (Bager, 1991; Kewenter, 2010). In 1826 all buildings except the main building were destroyed in a fire. Reconstruction began but the estate was sold before it was finished.

[3] An *inspektor* was a manager or trustee working at a larger agricultural estate. After the owner, they had the highest position and were responsible for the supervision and management of the estate (SAOB, 1933).

In 1823 Bager put Katrinetorp out on auction in a national newspaper (Post- Och Inrikes Tidningar, 1823) with a description of the estate. He writes that Katrinetorp is situated on the most fertile soils of Skåne, with a view over the sea and the land of Denmark. The land consisted of over 200 hectares, half of it used for pasture and the other half, three-fourths were used as fields with clay soil and one-fourth as a meadow with humus soil. Bager writes that the estate has two gardens, one 2-hectare large garden with over 300 fruit trees and one two-and-a-half-hectare large garden in English style with a canal dividing the garden. They produced cereals and potatoes in the fields. At the estate, they had room for farm-hands and a manager. The daily labor at the estate was done by 12 contract worker families living in houses isolated from the main building. The same announcement can be seen in a local newspaper in 1828 (Malmö Allehanda, 1828). However, the estate remained in Erland Bager's possession until 1832.

1832 - 1867 Thomas Fricks

The new owner was Thomas Frick, one of Malmös most successful merchants (*handelsman*) and shipowner (*skeppsredare*). Besides Katrinetorp, he owned several other estates, for example one in Västergötland and one in Fru Alstad (Kewenter, 2010). Frick was married to Anna Christina Mandorff from a wealthy merchant family who was also a cousin to Frick. The family lived in a residence (*handelsgård*) in the city center of Malmö but spent their summers at Katrinetorp. Like Bager they hosted several large festivities at the estate (Bager, 1991) and the garden is thought to have been frequently used (Andréasson, 2007).

Katrinetorp suffered, like many other farms in Sweden at the time, from droughts, and in letters by Fricks 1860 expressing his concern for the harvest being preserved (Bager, 1991). However, during years of good harvest, some of the surplus from the harvest was sold. In different local newspapers from the time, there are several advertisements of crops for sale from Katrinetorp. Mostly rye, wheat, potatoes, onions, beans, peas, and apples (e.g. Malmö tidningen, 1843; Snällposten, 1863). The gardener Erik Eriksson posted in a local newspaper that Katrinetorp also sold seeds to fodder peas and beetroots, turnips, and white carrots with a green top (Snällposten, 1856).

The daily management of the estate was assigned to the manager, Thomas Bond, and later Jöns Gustaf Qvittberg. Fricks also kept a permanent gardener who took care of the garden and park, whilst living in a gardener’s residence in the north corner of the English park. Between the years 1833 and 1873, four different gardeners stayed around 10 years each (Jacob Sörensen, Carl Johan Krull, Erik Eriksson, and Anders August Björkholts).

1867 - 1901 David Gilius Fricks

Thomas Frick died in 1867 and left Katrinetorp to his only child David Gilius Frick. When David took over Katrinetorp he was 44 years old and worked as a farmer at Alstadsgården in Fru Alstad. After the death of his father, David moved to his father’s residence in the city center of Malmö. After some time, he sold his father's merchants-yard to spend his time with investments and management of his estates. He remained unmarried his whole life and was often described as a strange, but generous man - giving many of the children at Katrinetorp financial support for their studies (Bager, 1991: 56) and also allowance during sickness and funerals (Andréasson, 2007; Kewenter, 2010). Despite the generous working conditions, the turnover amongst staff on the estate was large.

Several people lived at the estate during this time: an inspektor, a gardener, several contract workers, farm-hands, maids, a foreman, a housekeeper, a smith, a mamselle, and a miller (Bager, 1991). David Frick kept many of the same staff as his father. Lorents Edrthard Malmros for example stayed at Katrinetorp from 1845 until his death in 1890. In 1873 he got a new gardener named Johan Peter Lundberg from Kristianstad. Before Katrinetorp he had worked at different estates in Denmark and Malmö (Andréasson, 2007). Lundberg stayed at Katrinetorp for one year and then moved to Petersborg where he worked for two years. In 1874 Olof Rosengren from Klågerup took over the job as gardener at Katrinetorp. The year after he married the mamsell at the estate, Anna Persson. Rosengren is presumed to have stayed at Katrinetorp until 1895-1900 (Andréasson, 2007).

Fricks was very interested in gardening and was a member in several local garden associations (e.g. *Skånes Trädgårdsförening* and *Malmö Förskönings och Planteringsförening)* (Andréasson, 2007). Documented cultivated crops during this time were for example wheat, rye, barley, peas, potatoes, and fodder beets. The main income came from the sale of barley and rye and seeds were bought in (Bager, 1991).

Table 1 - Changes in husbandry at Katrinetorp (Bager, 1991 p:61).

	Oxen	Cattle	Horses	Pigs	Sheep	Chicken	Ducks	Beehives
1809	55	20	20	7	86	Existed	?	28
1867	16	43	15	24	21	68	44	8
1901	-	47	15	8	-	Existed	?	5

1901-1937

The following years after the death of Frick, Katrinetorp had several different owners. The first one was Christian Fredrik August Larsen (1840–1907) and his wife Emilie Maar, both from Denmark. Prior to Katrinetorp they lived at Hyllie No 25 (Andréasson, 2007). They hired Larsen Conrad Liliecrona from Karlskoga as manager. In 1905 he married the owner's daughter Emmy (Bager, 1991 s. 62).

When Christian Larsen died in 1907 his son, Kai Larsen took over Katrinetorp. Kai Larsen had six children. The farm was not very successful, and the estate was sold in 1922 to Aron Fritiof Hall. Hall also struggled to create a profitable agriculture at the estate and Katrinetorp was once again sold only four years later. The new owner Alfred Andersson gave up after four years of struggle. In 1930 the estate was put out for auction and sold to Jöns Olsson. According to Andréasson (2007), Olsson seemed to have both the resources and knowledge to successfully manage the farm during the hard years of the 1930s. Unfortunately, he died of a sudden peritonitis in 1937. Since Olsson was unmarried the estate was offered at auction the same year, but no new owner was found. Andréasson (2007) mentioned that the hard times and the many owners' struggle to make the estate profitable probably affected the willingness of a new owner to take on the risk. Katrinetorp was therefore bought by the city of Malmö (Bager 1991 s. 63).

1937 - Malmö municipality

In 1937 Katrinetorp was bought by Malmö municipality and leased out until 1992. Suggestions to break up the land and sell it were stopped by the municipal board in 1993. After deciding to keep and restore the estate there was an archeological excavation to determine the size and placement of the garden and greenhouse, which at this time was completely wiped out. The reestablishment of the garden was started in 1998 and in 2000 the manor was leased out for café and hosting of events.

When the municipality board of Malmö decided to transform Katrinetorp into a living cultural heritage platform, the kitchen garden was practically demolished. A lot of work has been done to reconstruct and form the garden into its current state. The garden and the English park are now one of the main attractions amongst visitors at Katrinetorp. People can stroll in the garden and there are several benches to sit and enjoy the view.

Table 2 - Table of the owners, managers, and gardeners at Katrinetorp, retrieved from Anna Andréasson (2007).

	Owner	Manager (*Inspektor*)	Gardener
1800	**1800-1809** Samuel Johan Björkman and Anna Catharina Bager		**1802-1803** - Nils Lybeck
			1806 Hinric Nyman (1781-1820)
1810	**1810-1832** Erland Gabriel Bager and Anna Maria Nilsson. Lived at the estate 1813-1822.		**1813** Samuel Wagnblad (1781-)
			1813-1814 Hinric Nyman
1820		**1824-1828** Carl W. Neuman (1777-)	
		1828-1830 Jacob -?-ström (1802-)	
1830		**1830-1836** Thomas Bond (1794-)	
	1832-1867 Thomas Frick and Anna Christina Mandorf.		**1833-1836** Jacob Sörensson (1807-)
		1836-1845 Jöns Gustaf Qvittberg (1808)	**1836-1845** Carl Johan Krull (1814-1877)
1840		**1845-1890** Lorenz Eberhart Malmros (1819-1890)	
1850			**1851-1860** Erik Eriksson (1823)
1860			**1860-1873** Anders August Björkholtz (1832-)
	1867-1901 David Gilius Frick		
1870			**1873** Johan Peter Lundberg (1833) **1874-1900** Olof Rosengren (1852-)
1880			
1890		**1890-1901** Anton Fredrik Malmros	
1900	**1902-1907** Fredrik August Larsen **1907-1922** Kai Larsen **1922-1926** Aron Fritiof Hall **1926-1930** Alfred Andersson **1930-1937** Jöns Olsson **1937-1992** Malmö municipality (leased out to the family Ingvarsson). **1997 -** Restauration started.		

The kitchen garden

Figure 7 - Main building at Katrinetorp, seen from the kitchen garden. Source: Malmö stad (n.d.)

The current kitchen garden is the size of half (½) a hectare of land. The goal of the garden is to be visually pleasing as well as historically correct, giving the visitors an idea of how life during 1800-hundreds in Sweden could look like. The garden is open for the public to enjoy and the museum holds guided tours on specific occasions.

The kitchen garden today is located in front of the main building, surrounded by hedges. The garden was reconstructed after thorough research by the garden archaeologist Anna Andrésson at Alnarp (Kewenter, 2010). The kitchen garden is using a combination of beauty and usefulness of vegetables, flowers, and herbs. The garden is divided into 16 compartments with different themes (Table 3 is a list of plants grown in the garden).

The garden is filled with a diversity of crops and flowers - most of them edible. There are both perennial and annual crops, such as rhubarbs, artichokes, pumpkins, cabbage, peas, and herbs. The garden is colorful and, despite the strict design of a potager, almost on the “wild side”. At the entrance of the kitchen garden, signs show the current design (Figure 10) and a list of crops grown in each compartment (Table 3). While in the garden, most of the crops have signs showing the specific variety grown.

The vegetables are grown using organic principles, meaning that the garden does not use any herbicides or pesticides and tries to do as little harm as possible to the soil and surrounding environment, according to the gardener (Becarevic, oral. 2023). The people managing the garden are the gardener and two people doing work training. During the summer Katrinetorp gets help from around 10 trainees from different schools focusing on gardening (university or professional training level). The gardener mentions that the small workforce gives a small capacity to expand, even if the interest is there. He also mentions the need for a larger budget or financing from elsewhere (Becarevic, oral. 2023).

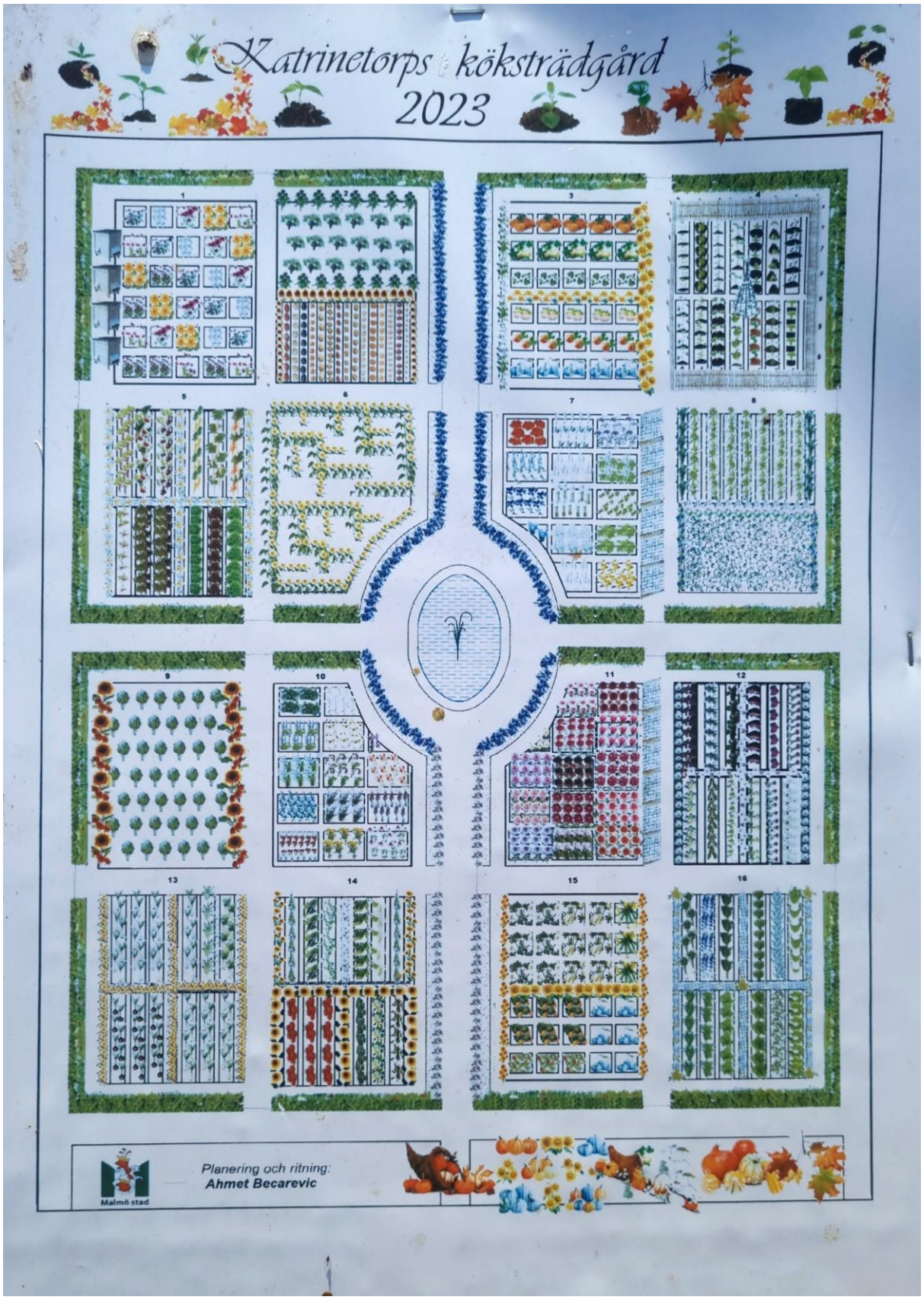


Figure 8 - Kitchen garden design 2023, showing the different compartments in the garden. Source: picture taken during observation, 2023.

Figure 9 - Pictures of the kitchen garden at Katrinetorp taken during the observation in September 2023. The garden includes a diversity of flowers and kitchen vegetable crops and combines both strict forms in and between the compartments, and more fluid and 'wild' forms within the compartments.

Table 3 - List of the compartments in the kitchen garden.

Compartment	Name of compartment	Plants
1	Beehive and pollinators	Beehive and flowers (e.g. facelia and tagetes)
2	Rhubarb	Cardoons (*Cynara cardunculus*), Rhubarb (*Rheum rhabarbarum),* Sunflower (*Helianthus annuus*), Potato (*Solanum tuberosum*)
3	Pumpkin	Edible pumpkin (*Cucurbita maxima*), Decorational pumpkin (*Cucurbita pepo*), Sunflower (*Helianthus annuus)* Jerusalem Artichoke (Helianthus *tuberosus*)
4	POM	Blackberry (*Rubus fruticosus*), "POM-plants" (see next table)
5	Kitchen-crops	Carrot (*Daucus carota*), Red beet (*Beta vulgaris*), Yellow beet (*Beta vulgaris*), Lettuce (*Lactuca sativa*), Celery (*Apium graveolens*)
6	Jerusalem Artichoke	Jerusalem Artichoke (Helianthus *tuberosus*)
7	Perennial compartment	
8	Corn and flax	Malabar spinach (Basella Alba), Morning glory (Ipomoea tricolor), Flowering flax (Linum grandiflorum), Cathedral Bells (Cobaea scandens), Sweet corn (Zea mays)
9	Artichoke	Artichoke (cynara scolymus), Sunflower (Helianthus annuus)
10	Flower compartment	
11	Dahlia compartment	
12	Cabbage compartment	Lacinato kale (Brassica oleracea), Kale (Brassica oleracea), Purple kale (Brassica oleracea), Pointed cabbage (Brassica oleracea), Kohlrabi (Brassica oleracea), Savoy cabbage (Brassica oleracea)
13	Onion compartment	Yellow onion (Allium cepa), Red onion (Allium cepa), Shallot (Allium cepa), Tagetes (Tagetes tenuifolia), Garlic (Allium sativum)
14	Bean, tomato & paprika compartment	Cucumber (Cucumis sativus), Paprika (Capsicum annuum), Tomato (Solanum lycopersicum) , Sunflower (Helianthus annuus) Bean (Phaseolus vulgaris), Wax bean (Phaseolus vulgaris), Broad bean (Vicia faba)
15	Squash compartment	Summer squash (Cucurbita pepo), Winter squash (Cucurbita pepo)
16	Herb compartment	Different herbs - e.g. Sweet Cicely, Lemon plant, Lovage, Wormwood.

POM- plants - older varieties in the garden

Figure 10 - Picture of the signs in front of compartment 4, in this thesis, called the “POM garden”, photo taken during the observation in September 2023.

Most of the older varieties grown in the garden are located in *compartment 4,* in the top right corner of the kitchen garden (see Figure 10). The compartment consists of so-called ‘POM plants’ - old varieties of vegetables, herbs, and flowers from 1800-1900 hundreds. The garden is marked with three signs describing the brand *Grönt kulturarv*, a list of crops grown, and a map of the placement of the plants. No context information on the importance of genetic diversity is mentioned on the signs.

The varieties in the garden are mostly crop varieties from Europe, for example, an east-European pointed red cabbage, (*Brassica oleracea*) ‘Kalibos’ (1800), Italian Lacinato kale (*Brassica oleracea*) ‘Nero Di Toscana’ (1800), and one of the world’s most grown eggplants (*Solanum melongena*) ‘Black Beauty’ (1902). However, there are a few local varieties of kitchen vegetables (marked in gray in table 4 below) - artichoke (*Cynara cardunculus*) - ‘Herrgårds’ (1900) an artichoke found at a farm in Ingelsträde outside of Höganäs in Skåne, and a wrinkled pea (*Pisum sativum*) - ‘Mors stora’ (1900) from Broby in Skåne. However, no information about the variety's history, origin, or use is shown in the garden (Observation, 2023).

Some crops found in the garden are not on the plant list but are marked out on the map. For example, two additional Swedish local varieties; a snap bean (*Phaseolus vulgaris*) ‘Ståhult’ and a cooking bean (*Phaseolus vulgaris*) ‘Båstad’. They also grow the Spanish cultural heritage broad bean (*Vicia faba*) ‘Superaguadulce’. On the map, it says ‘Ståhult’ which according to SLU is the variety ‘Ståstrop’ (NGB-number: 17812) that was sold under the wrong name ‘Ståhult’ for a period. A bean originated from Ståstorp outside of Trelleborg, Skåne (Nygårds & Leino, 2013). ‘Båstad’ originates from a farm outside of Båstad, Skåne, and was especially grown for its use in Christmas food (POM, n.d.).

During the interview with the gardener at Katrinetorp, it was brought up that they had previously tried to grow some cultural heritage varieties in general, but they demanded too much work compared to newer varieties. The gardener explained that due to climate change, the older varieties are no longer suited for our climate and now they mainly grow newer hybrid varieties (Becarevic, oral. 2023).

According to the gardener they have tried older potatoes (like blue kongo), but with little success. They did not produce as much as newer hybrids and others got badly infected by potato late blight fungus (Phytophthora infestans). He also noted that many of the vegetables in the cabbage family, like cauliflower, were hard to grow due to pests - except for green kale and herbs. However, according to the gardener they want to use more older varieties, but in order for it to work they need to be suitable in an organic system, without the need for pesticides and herbicides (Becarevic, oral. 2023).

The kitchen garden at Katrinetorp is first and foremost a *visitor's garden*. They do use organically allowed pesticides, such as sulfur and Turex but they are not sufficient in handling all pests according to Becarevic (oral, 2023). Since one of the main purposes of the kitchen garden at Katrinetorp is to be visually pleasing, the presence of pests or crop diseases might demolish this ideal or romanticized picture of a garden. It is therefore important for the garden to have varieties that are well-suited to the local climate.

Figure 11 - Pictures of compartment 4 and the 'POM-plants' from the observation in September 2023. The compartment is located in the corner furthest away from the main building. Most varieties have a sign with their name, most plants are overgrown, weeds in and between the beds, and cabbage are affected by pests.

Table 4 - Table over the plants in the POM garden. Information was taken from the signs in the garden, with some correction of errors. The plants that were not on the list but are present in the garden are also added to the table. One of the columns 'available' shows where the varieties are purchasable.

Crop	Variety	Time period	Available on the market
Chard (*Beta vulgaris*)	Groene Gewone	Cultural heritage 1869	Lindblom, Impecta, Weibull
Eggplant (*Solanum melongena*)	Black Beauty	Cultural heritage 1902	Impecta
White cabbage (*Brassica oleracea*)	Brunswijker	Cultural heritage 1847	Impecta, Lindbloms
Lettuce (*Lactuca sativa*)	Little Gem	Cultural heritage 1870	Impecta, Runåbergs
Lettuce (*Lactuca sativa*)	Red Salad Bowl	Cultural heritage mid-1800 according to Runåbergs	Runåbergs, Plantagen
Mexican Sour Gherkin (*Melothria scabra*)	-	Cultural heritage 1866 (Newly introduced in Sweden by impecta)	Impecta, Nelson Garden
Lemon cucumber (*Cucumis sativus*)	Lemon	Cultural heritage 1894 (Newly introduced in Sweden)	Impecta, Lord Nelson
Cherry tomato (*Solanum lycopersicum*)	Gardener's Delight	German cultural heritage according to Runåbergs	Runåbergs, Impecta Nordfrö
Plum tomato (*Solanum lycopersicum*)	Principe Borghese	Common Italian cultural heritage according to Runåbergs	Runåbergs, Impecta
Beefsteak tomato (*Solanum lycopersicum*) **(Not on the map)**	Brandywine	Cultural heritage 1885	Runåbergs, Impecta Nordfrö
Plum tomato (*Solanum lycopersicum*) **(Not on the map)**	Cuor di bue	Cultural heritage 1925	Impecta
Plum tomato (*Solanum lycopersicum*)	San Marzano	Common Italian Cultural heritage 1950	Impecta, Runåbergs
Cherry tomato (*Solanum lycopersicum*)	Black sweet cherry	Russian cultural heritage according to Runåbergs	Impecta, Runåbergs Nordfrö
Lacinato kale (*Brassica oleracea*)	Nero Di Toscana	Cultural heritage 1800	Impecta, Runåbergs
Pointed cabbage (*Brassica oleracea*)	Kalibos	Cultural heritage 1800	Impecta, Runåbergs, Nelson Garden, Lindbloms fröer
Kohlrabi (*Brassica oleracea*)	Noriko	Cultivated since mid -1800	Impecta, Runåbergs, Lindbloms fröer
Kohlrabi (*Brassica oleracea*)	Azur Star	Cultivated since mid -1800	Impecta, Runåbergs, Nelson Garden, Lindbloms fröer
Golden Cosmos (*Cosmos sulphureus*)	Sunset	Heirloom variety according to Runåbergs	Runåbergs
Daylily (*Hemerocallis*)	Esbjörn	Cultural heritage 1700, Grönt kulturarv ®	
Curly mint (*Mentha spicata*)	Crispa	Cultivated since mid-1900	
Pea (*Pisum sativum*)	**Mors stora**	Cultural heritage 1900, Grönt kulturarv ®	Nordfrö
Romaine Lettuce (*Lactuca sativa*)	Rouge d'Hiver	Cultural heritage 1800	Runåbergs, Weibull
Lettuce (*Lactuca sativa*)	Buttercrunch	Cultivated since 1800	Runåbergs
Sugar snap-pea (*Pisum sativum*)	Corne de bélier	Cultural heritage 1860	Impecta
Broccoli (*Brassica oleracea*)	Ramoso Calabrese	Cultural heritage 1880	Impecta, Lindbloms
Costmary (*Balsamita vulgaris*)	-	Historical plant	

Cutleaf blackberry (*Rubus laciniatus*)	Thornless Evergreen	Cultivated since 1900	
Blackberry (*Rubus fruticosus*)	Black Satin	Cultivated since 1900	
Showy stonecrop (*Hylotelephium spectabile*)	Granlunda	1939, Grönt kulturarv ®	Granngården, Blomsterlandet
Artichoke (*Cynara cardunculus*)	**Herrgårds**	Cultivated since 1900, Grönt kulturarv ®	Difficult/often sold out
Zinnia (*Zinnia elegans*)	Purple Prince	Cultural heritage 1700	Impecta
Zinnia (*Zinnia elegans*)	Isabellina	Cultural heritage 1955	Impecta
Sweet pea (*Lathyrus odoratus*)	Franciscus Cupani	Sicilian cultural heritage 1699	Impecta
Cottage Pink (*Dianthus plumarius*) L.	Marieberg	1927, Grönt kulturarv ®	Wexthuset
Shasta Daisy (*Leucanthemum x superbum*)	Bröllopsgåvan	1923, Grönt kulturarv ®	
Garden Phlox (*Phlox paniculata*)	Svea i Haga	1940, Grönt kulturarv ®	
Garden Phlox (*Phlox paniculata*)	Ingeborg från Nybro	1930, Grönt kulturarv ®	
Scotch lovage (*Ligusticum scothicum*)	-	Herb	
Moroccan mint (*Mentha spicata 'Moroccan'*)	-	Herb	
Romaine Lettuce (*Lactuca sativa*)	Forellenschluss	Cultural heritage 1793	Impecta, Nordfrö
Daylily (*Hemerocallis*)	Frösvidal	1930, Grönt kulturarv ®	
Squash (*Cucurbita pepo*)	Black Beauty	Cultural heritage 1931	Impecta, Lindbloms, Runåbergs
Broad bean (*Vicia Faba*)	Superaguadulce	Cultural heritage 1885	Impecta
Flageolet Bean (*Phaseolus vulgaris*)	**Båstad**	Grönt kulturarv ®	Impecta, NordGen (currently sold out)
Garden Angelica (*Angelica archangelica*)	-	Old medicinal plant	Impecta
Bean (*Phaseolus vulgaris*)	**Ståstorp** (Ståhult)	Grönt kulturarv ®	Nordfrö

Restaurant

In one of the buildings (marked ‘B’ in Figure 2) at Katrinetorp is a restaurant called *Gourmetgården* that took over the business in 2019. On their menu, they serve mainly Swedish, locally produced food, and to an extent, they use what is produced in the kitchen garden at Katrinetorp (Gourmetgarden n.d.). However, the restaurant is not owned by the municipality, and during an interview, the gardener mentioned it should be seen more as a separate part of the museum, even if they do cooperate to an extent concerning what is grown (Becarevic, oral. 2023).

At the time of observation, there were no signs or clear information about the source of products or any information about the variety of crops in the different dishes. The gardener mentioned during our interview that there is a need for the chefs to know how to use the older varieties and to be able to articulate how old varieties can become relevant today (Becarevic, oral. 2023).

In the next section, I will further discuss suggestions on how Katrinetorp can improve the work with local varieties, based on lessons from the reference case.

Suggested vision

The goal of the new suggested vision is for Katrinetorp to help increase knowledge about and interest in genetic diversity and particular local varieties. The question is how can they reach out? In an attempt to find potential solutions, a study of a local heritage society in Båstad was made since they are currently working on spreading knowledge of and interest in local cultural heritage varieties and TEK. In addition, they share many similarities with Katrinetorp when it comes to the layout and purpose of the place, except being a local heritage society instead of being owned and funded by the municipality like Katrinetorp. This chapter will give a short presentation of the 'reference place' followed by a selection of suggested tools and how they can be used.

Reference place - Bjäre härads hembygdsförening

The local heritage society Bjäre Härads hembygdsförening is located in Båstad, Skåne, and was founded in 1929 by Ludvig Nobel, nephew of the famous Alfred Nobel. Today the society owns 20 000m2 of land and consists of 9 buildings with high cultural heritage value. The society has a diverse collection of heritage items that have been given by local residents. At Bjäre Härad there is also a café called 'Sockerärtan' (the sugarpea) open for visitors during the summer and during events and bookings (Bjäre härad hembygdsförening, n.d.).

According to the project leader at Bjäre-härads hembygdsförening, the place had been 'sleeping' for 10-12 years when the project leader started there in 2019 - affecting the number of visitors since people did not know it was an active place. The project leader had asked some visitors why they came to the park to which they replied - because of the coffee (Thuresson & Öhman, oral. 2023).

Financed by LEADER in 2022 the society started a project to create a cultural center for historical food-culture crops, focusing on crops from the 19th century and forward. The idea behind the project is to increase the knowledge concerning cultivation and artisan food-making in a small-scale setting, whilst at the same time increasing the attractiveness of the place and being a source of income for the society. The project is set to continue until 2024 with the goal of becoming a permanent part of the operation (Bjäre härad hembygdsförening, 2023).

The idea for the project was formed during a seminar at Food Evolution (an organization that aimed at gathering food and beverage industry in the region). When different local heritage societies were asked if they were interested in doing something with cultural heritage varieties - no one was interested. The project leader at Bjäre-härad was persuaded by a local farmer (Stefan Olsson) to say yes. With help from Thomas Bardenstam at Figo Gruppen (who works with applications to national and EU funds), they wrote an application for a LEADER project which was granted for the years 2022-2024 (Thuresson & Öhman, oral. 2023).

The varieties cultivated at Bjäre were suggested by Agneta Börjeson who works as a consultant at POM (see the list of varieties in table 5). Through NordGen, the association was handed around 20.000 seeds from around 20 varieties, most of which are only available in the National gene bank. The varieties are deemed important due to their particular taste, hardiness to the local climate, and can create new business for local production and consumption. The idea is to cultivate the crops and save seeds to be used in the park.

However, during the interview, it was mentioned that for the board of agriculture, the educational part was lifted as the most important since the park won't be able to produce a massive amount of seeds or crops - the main goal is therefore to inspire (Thuresson & Öhman, oral. 2023).

The project has created allotments for pupils (from preschool to high school) for educational purposes - to increase knowledge concerning cultivation, nutrition, local consumption, and food preparation. The project aims to include chefs and artisan food makers who use or are interested in using, cultural heritage varieties in their profession and help create a culinary experience at the center. With the goal of increasing national food system resilience, the project invites different actors (municipalities, county boards, and agencies working with preparedness) (Bjäre härad hembygdsförening, 2023; Thuresson & Öhman, oral. 2023).

Several lectures and seminars on the subject are used to increase the tourist attractiveness of the local heritage society and they have plans to sell cultural heritage seeds and artisan food at the café. The project's foundation is to lift the cultural heritage in the area and place the tools and buildings available at the park in a context to raise their value (Thuresson & Öhman, oral. 2023).

Most of the visitors are older people, mainly people who already have an interest in the subject. The project leader argues that “things are happening” even if the progress is slow. The project leader mentions an example when visitors with a summerhouse asked if the local heritage society could help determine what was grown in their garden, or on their land before, and if they had any information about the historical background - a question that was new for the project leader (Thuresson & Öhman, oral. 2023). Both the project leader and the gardener mention a lack of especially younger visitors interested in local varieties. The gardener said the participants in the educational part - focusing on peas and beans - have shown a small interest. However, interest was shown especially when the varieties were connected to a *place* that they had visited. Some of the students had brought crops home but didn't know what to do with them. During the interview, the lack of knowledge among people about what to do with the vegetables was mentioned several times. They argued there is a need for knowledge about every step of the process, not only farming practices but gastronomic knowledge - such as recipes and how to store the harvest. This is needed both amongst regular visitors and chefs (Thuresson & Öhman, oral. 2023).

One of the major hindrances to the project is *how* to communicate the knowledge, especially to those who are not already interested. How to create an inviting platform, and attract relevant stakeholders was also brought up. The remote location of the park, with limited access by public transport, was seen as a negative aspect and hindered. The project has a high demand for resources and therefore dependent on volunteers - which is hard to find. It was mentioned that the whole family of the gardener helped out with the cultivation. Creating economic stability when the project is no longer financed by LEADER was brought up as an important issue. The current economic situation in Sweden, with high inflation has created difficulties since people have less money. The gardener mentioned that they have noticed a change, that people focus more on cheap things and food (Thuresson & Öhman, oral. 2023).

The gardener mentions that the project has grown larger during the year and that they might need to sit down and discuss a shared vision. There are many “loose parts”, people coming

from different directions, which might be seen as a good thing, but may result in no coherent vision (Thuresson & Öhman, oral. 2023).

Table 5 - List over varieties at Bjäre härad, that were suggested by Agneta Börjeson. All with a historical connection to the surrounding landscape.

Crop	Variety	Origin / Time period	Available on the market
Flageolet Bean (*Phaseolus vulgaris*)	'Båstad'	Traditional cultivar/landrace from Båstad (Skåne) was donated to Sesam 1990 from a member in Båstad who got it from a farmer outside of Båstad that had grown it for at least two generations and was used for making e.g. Christmas food.	NordGen, Impecta (out of stock)
shelling bean (*Phaseolus vulgaris*)	'Ingas vita'	Traditional cultivar/landrace from Arild (Skåne). The donor received the beans from Inga (born 1916) who received her beans during World War II from older siblings in Arild, southern Sweden. The white beans had been grown in the family for as long as they could remember, since the 19th century. It is one of the few white beans saved in Sweden (Leino, Nygårds & Börjeson, 2023).	-
Bean (*Phaseolus vulgaris*)	'Månsagården'	Traditional cultivar/landrace from Trolle-Ljungby (Skåne). A bean that has been cultivated at 'Månsagården' in Kristianstad municipality (Leino, Nygårds & Börjeson, 2023).	Nordfrö (out of stock)
Brown bean (*Phaseolus vulgaris*)	'Ornakärr'	Traditional cultivar/landrace from Höganäs (Skåne). Unusually large, light brown beans were donated by Margareta Philipsson Svensson in Helsingborg who got it from a relative, Otto Jöns, who cultivated this brown bean already in 1890's in Ornakärr outside of Höganäs (Leino, Nygårds & Börjeson, 2023).	NordGen
Bean (*Phaseolus vulgaris*)	'Persson'	Traditional cultivar/landrace from Österlen (Skåne) named after John Persson, born in 1880 in the southeast of Skåne.The bean had been passed down from generations on his father's side. Perssons wife Ida used the beans as brown beans served with pork (Nygårds & Leino, 2013).	-
Brown bean (*Phaseolus vulgaris*)	'Ebbes mor'	Traditional cultivar/landrace from Vinslöv (Skåne). Donated by one of the founders of NordGen, the botanist Ebbe Kjellqvist. Presumably named after his mother, Gunborg Kjellqvist from Vinslöv in Skåne 1898 (Leino, Nygårds & Börjeson, 2023).	NordGen
Bean (*Phaseolus vulgaris*)	'Cullenberg'	Traditional cultivar/landrace originally cultivated in Söderåkra in Skåne and is a so-called "emigration-bean" that was brought to the USA when relatives to the donors emigrated to Massachusetts in 1890 (Leino, Nygårds & Börjeson, 2023).	NordGen (out of stock)
French bean (*Phaseolus vulgaris*)	'Christas gröna'	Traditional cultivar/landrace from Skåne. Christa came to Sweden after World War II and the bean had been cultivated in her mother's family for as long as the mother could remember. The bean was given to Carina and John-Erik Linde in 1989. The bean is well suited for the climate in Skåne, grows even during bad weather conditions, and has a long-time span for harvest (Leino, Nygårds & Börjeson, 2023).	-
French bean (*Phaseolus vulgaris*)	"Särdal"	Traditional cultivar/landrace from Bengtsgården in Särdal (Halland) cultivated by Sofi Jönsson during the end of the 19th century. The bean was passed on to newer generations and in still cultivated within the family (Nygårds & Leino, 2013).	Fröbanken (out of stock), NordGen
Wax Bean (*Phaseolus vulgaris*)	"Asarum"	Traditional cultivar/landrace from Asarum (Blekinge) grown by Fredrik Fredriksson since at least 1950 and is continued cultivated within the family.	NordGen

Bean (*Phaseolus vulgaris*)	’Ståstorp’	Traditional cultivar/landrace bean from Trelleborg (Skåne). Marta Nilsson brought these beans with her when she married in 1936. They were later passed down to her son (Nygårds & Leino, 2013).	Nordfrö, Fröbanken
Sugar snap pea (*Pisum sativum)*	’Elin’	Traditional cultivar/landrace Giant sugar snap pea from Malmö (Skåne).It was donated by Elsa Telander who had grown the pea on Solbergsgatan in Malmö. It was given to her by her neighbor Elin, who had grown the pea all her life (Leino, Nygårds & Börjeson, 2023). .	-
Sugar snap pea (*Pisum sativum*)	‘Martha’	Sugar snap pea from Halmstad (Halland). Grown by John and Martha during the 1930s and passed down to their daughters (Nygårds & Leino, 2013).	Impecta (out of stock), Fröbanken
Sugar snap pea (*Pisum sativum*)	‘Mattarp’	Traditional cultivar/landrace sugar snap pea from Strömsnäsbruk (Kronoberg). The late blooming pea was donated by Helena Nelson in Strömsnäsbruk and was given to her by her aunt Anna who lived in Mattarp (Leino, Nygårds & Börjeson, 2023).	-
Wrinkled Pea (*Pisum sativum*)	‘Emma B’	Traditional cultivar/landrace pea from Slättåkra (Halland). Grown by Arthur and Asta Forsberg in Ry, Halland. The pea is named after Emma Bengtsson who gave the pea to her daughter-in-law, who then gave it to her sister-in-law Hildur Berg, Asta's mother (Leino, Nygårds & Börjeson, 2023).	-
Wrinkled Pea (*Pisum sativum*)	‘Finas fina’	Traditional cultivar/landrace pea from Kvibille (Halland). Named after Josefina Johansson who lived in Kvibille at the beginning of the 18th century. It has continued to grow due to its ability to produce in all kinds of weather (Leino, Nygårds & Börjeson, 2023).	-
Wrinkled Pea (*Pisum sativum*)	‘Mors stora’	Traditional cultivar/landrace pea from Skåne. Karin Andersson's grandmother received this pea while working for Member of Parliament, Pehr Jonsson, in Broby (Skåne) in 1910. The aunt of Karin continued cultivation in Värmland and it was partly grown for sale (Nygårds & Leino, 2013).	Wexthuset, Impecta (out of stock), Nordfrö, Fröbanken
Pea (*Pisum sativum*)	‘Marieholm’	A yellow pea grown by Kurt Jönsson in Tofta, Skåne (Leino, Nygårds & Börjeson, 2023).	-
Grey pea (*Pisum sativum*)	‘Puggor från Ballingslöv’	Traditional cultivar/landrace grey pea that was inherited in the family Stjärnqvist in Ballingslöv and Glimåkra (Skåne) and has been cultivated since at least 1950, but probably has a longer history of cultivation in the area. It was saved by the family due to its special taste and has by the family been eaten as a wrinkled pea served with butter (Nygårds & Leino, 2013).	NordGen, Nordfrö, Fröbanken
Grey pea (*Pisum sativum*)	‘Maglaby’	Traditional cultivar/landrace grey pea from Skåne. Grown on fields by Sven Svensson at Sasragården in Maglaby, Skåne. It is a very diverse variety with everything from black to blue spotted, green seeds (see Figure 1) (Leino, Nygårds & Börjeson, 2023).	-
Grey pea (*Pisum sativum*)	‘Strömsnäsbruk’	Traditional cultivar/landrace grey pea from Strömsnäsbruk (Kronoberg). Donated by Helena Nelson in Skararp, south of Småland. According to Helena’s mother, grey peas used to be commonly consumed in northwest Skåne. It was cooked in ham broth and eaten mashed (Leino, Nygårds & Börjeson, 2023).	-
Grey pea (*Pisum sativum*)	‘Stäme’	Traditional cultivar/landrace grey pea from Stäme outside of Laholm (Skåne) was grown mainly for fodder.	Nordisk råvara
Acid sorrel (*Rumex rugosus*)	‘Dagny’	Named after the donor Dagny Nelson from Ängelholm in Skåne. According to Dagny, the acid sorrel was grown in all the gardens during her childhood. They were consumed fresh or wilted (Leino, Nygårds & Börjeson, 2023).	-

Orach (*Atriplex hortensis*)	'Britas trädgårdsmålla'	Traditional cultivar/landrace from Veberöd, Skåne (Leino, Nygårds & Börjeson, 2023).	-
Orach (*Atriplex hortensis*)	'Mormors spenat'	Traditional cultivar/landrace from Halmstad (Halland). Grown amongst other kitchen vegetables in Martha's garden in Halmstad from the 1930s (Leino, Nygårds & Börjeson, 2023).	-
Orach (*Atriplex hortensis*)	'Nisses målla'	Traditional cultivar/landrace from Önnestad (Skåne). Named after 'Nisse' Nils-Olof Nilsson (Leino, Nygårds & Börjeson, 2023).	-
Orach (*Atriplex hortensis*)	'Stig'	Traditional cultivar/landrace from Tofta (Skåne). Named after Stig Blixt, an internationally renowned plant breeder who did research at Weibulls amongst other things. This orach was collected by Stig and donated to NordGen (Leino, Nygårds & Börjeson, 2023).	-
Orach (*Atriplex hortensis*)	'Ängelholm'	Traditional cultivar/landrace from Edenberga (Halland). Donated by Irene Petersson in Ängelholm. It came from Peterssons mother's family home in Edenberga, Halland. It was then brought to Baåkra in Skåne where it was an unknown plant among the people in the area (Leino, Nygårds & Börjeson, 2023).	-
Broad bean (*Vicia faba*)	'Ekholmen'	Traditional cultivar/landrace of broad beans. Donated by Inger Caster and had been grown in her family for 50 years. Her father used to grow the broad beans with potatoes. It was eaten as a porridge, boiled with potatoes and pork (Leino, Nygårds & Börjeson, 2023).	Nordgen (out of stock)
Broad bean (*Vicia faba*)	'Kurt Jönsson'	Traditional cultivar/landrace from Tofta (Skåne). Kurt Jönsson Was born in Tofta outside Landskrona, Skåne, in 1926. He lived his whole life on the same farm.They managed the farm the same way during the whole of 1900 with the use of Ardennes horses. He also had several other landrace animals. The origin of the broad bean is unknown, but Kurt was known for saving his own seeds (Leino, Nygårds & Börjeson, 2023).	-

How to change

With lessons drawn from the study of Bjäre-härad, three main themes were found to be vital for how interest and knowledge would be increased: communication, education, and co-creation. This section will discuss how and why these tools can be used.

Storytelling as a communication tool

How Katrinetorp communicates the importance of local varieties is vital for the success of increasing interest. Moreno (2020) suggests we not only need a vision for what kind of future we are striving for, but for the vision to be translated into action we need to address the deeper leverage points and create emotional connections (Ives et al. 2018). During the interview with Bjäre-härad, they mentioned that one of their main struggles is how to communicate, especially with those not already interested (Thuresson & Öhman, oral. 2023). One communication tool used by POM is the concept of *storytelling* - a concept increasingly acknowledged in the context of communicating strategies.

What is storytelling?

Stories have been a way for humans to connect and interact for centuries. It is often seen as the characteristic differentiating humans from other species (Joubert & Metcalfe, 2019). The act of telling stories has been used throughout history to pass on wisdom, knowledge, and culture to future generations as well as a tool to strengthen communities (Joubert & Metcalfe, 2019).

The research of storytelling as an effective form of science communication is gaining interest and there are multiple studies on the subject (e.g. Dahlstrom, 2014; Joubert & Metcalfe, 2019; Moreno, 2020). It is commonly seen as an effective way to help 'non-experts' make sense of information (Bloomfield & Manktelow, 2021). According to Dahlstrom (2014), the use of narratives in communicating science has potential since it offers increased comprehension, interest, and engagement. However, some scientists argue against narratives in science as it is seen as a threat to the objectivity and impartiality of science due to narratives persuading abilities (e.g. Katz, 2013; Blastland et. al., 2020). Dahlstrom (2014), on the other hand, argues that when storytelling is used to communicate scientific knowledge, rather than in the context of data collection, it can become both appropriate and important.

Stories help us understand the past and the possible futures we face. Storytelling has the ability to translate facts into comprehensive information and compelling transformative envisions for the future since people tend to think narratively rather than argumentatively. It is seen as the main method to persuade people and institutions that the vision we create is reachable (Moreno, 2020).

Storytelling is efficient in making people care (Joubert & Metcalfe, 2019) and can be seen as "facts wrapped in emotions" (Olson, in Joubert & Metcalfe, 2019). Stories can act as important transformative tools by compelling people to change their behavior or encourage people to delve more into a specific subject (Joubert & Metcalfe, 2019). Stories as potential tools for change are well recognized within research, especially within the field of medicine where storytelling has gained acknowledgment for its co-creating transformative ability. However, the effectiveness of the storytelling seems to depend on which topic is narrated (Krause & Rucker, 2020). For example, narrative information seemed to have the opposite effect when

communicating basic prevention information during public health emergencies (Bekalu et al., 2018).

In the context of genetic diversity and local varieties, the importance is acknowledged by science as well as official policies and national goals - however, the progress is slow, and knowledge is lacking amongst the general public. In the case of this study, the idea of storytelling would be to help us emotionally connect with the importance of genetic diversity and local varieties - to ultimately increase their value and reconnect people to food and landscape. In this case, storytelling has shown to be a promising tool (Pétursson, 2013; Moreno, 2020; Saltzman et al., 2020).

Storytelling and cultural heritage

Storytelling in the context of food and food production is not new. It is a common marketing tool to increase a sense of transparency and strengthen a brand. Jón Þór Pétursson (2013) examines food storytelling as a means to create effective bonds between local producers, consumers, and global food companies. In the study by Pétursson, storytelling is seen as a way to create a feeling of transparency and trust between producers and consumers. How food companies use personal stories as marketing strategies to promote a brand and create loyalty amongst morally driven co-consumers (slow food). However, the use of storytelling in this context can often be used as a mere marketing strategy that puts the responsibility of sustainable solutions on individual morally bonded consumers (Pétursson, 2013).

Storytelling in the context of heritage crop varieties differs slightly from other forms of storytelling. However, a study by Katarina Saltzman, Carina Sjöholm, and Tina Westlund (2020) argues that there are similarities since the stories are based on historical background and use histories of creation as a way to create value and a sense of a “historical aura” (2020:124). Plant and garden heritage differ from other types of heritage since it is in constant transformation, affected by factors such as climate, weather, and season. Therefore, Saltzman et al. suggest that this type of heritage should be regarded as *living heritage* (2020). When it comes to using living heritage in attraction places it has the clear benefit of allowing visitors to return throughout the season and follow the process of for example crops - from planting and harvesting to preparation and consumption.

In the field of gardening, POM has used storytelling to market their trademark *Grönt kulturarv* (oral. Persson, 2023). According to the study by Katarina Saltzman et al., storytelling is used as a sales tool in a context where garden heritage has become a commodity in a market. Stories about the different varieties' history are used to enhance value on the market, and a way to connect “plants, places, gardening practices to people, past and present” (2020:121). It has become an essential tool for anchoring experience by shedding light on the connection to the past. Just as storytelling is used to enhance ‘transparency’ in food production (Pétursson, 2013), stories of past use help create ‘authenticity’ in gardening. The use of place in storytelling can also help strengthen the sense of local identity (Saltzman et al., 2020).

According to Saltzman et al. selling plants that share a connection to the place is a way to help “telling and spreading stories of heritage” (2020:130). At museums and historical gardens, storytelling is also used when it comes to cultivation practices and therefore a way to spread the ‘craft knowledge’ needed for the management of the plants.

How to create successful compelling stories

For a story to be effective Moreno (2020) argues it has to include some specific aspects to build an atmosphere where an emotional link can be developed. Moreno argues that conflict is the heart of a successful story, and elements of struggle, suffering, and overcoming are key ingredients. Moreno argues that involving citizens to contribute to their stories increases the effectiveness of the stories. Creating space for people to share their own experiences and knowledge can help strengthen their transformational potential (2020).

While the stories tied to the old varieties might not follow the classic steps of a successful story, they include elements that may help create an emotional link. The history of the people behind the varieties, their passion, and their struggle to conserve the variety can help the visitors feel empathy. That the varieties and their stories are collected from 'ordinary' people might strengthen the sense of community and make it accessible for many. Touching on the subject of food and food culture might increase the effect since most of us have some sense of nostalgia or memories of food. However, it is important to articulate the *conflict* - why these varieties are important and why they are disappearing.

Nature-based education

The project at Bjäre Härad has created allotments for pupils (from preschool to high school) for educational purposes - to increase knowledge concerning cultivation, nutrition, local consumption, and food preparation. Involving children in gardening activities is a popular tool in Sweden, and many museums have allotments assigned for education (e.g. Julita, Fredriksdal). During the interview with the gardener at Katrinetorp, an allotment for children was mentioned as a potential future project (Becarevic, oral. 2023). Including knowledge concerning agrobiodiversity and local varieties in education could serve as an important tool to increase awareness from an early age.

Studies show (e.g. Ero-Tolliver. 2013; Ives et al., 2018; Colding, 2020) that nature-based education, such as the use of gardens, can play an important role in shaping active and informed community members and help nurture transspecies relations. Nature-based education is commonly used as a tool to re-connect the population with nature and increase understanding of concepts such as sustainability and limited resources (Ero-Tolliver et al. 2013). According to Hunter et al. (2020), school gardens are widely recognized as tools for increasing knowledge surrounding local food culture, local food biodiversity, conservation, nutrition, and health. Moore et al. (2015) argue that educational gardens are places where "alternative futures can be fostered". Including activities such as gardening in the curriculum can address deeper leverage points as children develop deep empathy for nature (Ives et al. 2018). Ives and colleagues (2018) also note that the effect might be more powerful in urban areas where children often lack interaction with nature in a daily setting, making it an important tool in the context of Katrinetorp. As green space decreases with a growing urban population, people's interaction with nature will become increasingly important.

Nature-based education and landrace varieties

Local varieties and traditional ecological knowledge, TEK, are interconnected and arguably codependent. Barthel et al. (2013) argue that for the conservation of local varieties to be

successful the plant material needs to be accompanied by knowledge concerning crop management and gastronomic values.

During several of the interviews, the topic of gastronomic use of the crops came up. The gardener at Katrinetorp expressed concerns about the chefs not knowing what to make of the older crops (Becarevic, oral. 2023). Bjäre Härad local heritage society mentioned that visitors, as well as chefs, often do not know how to either prepare or use the different crops (Thuresson & Öhman, oral. 2023). The lack of gastronomic knowledge was also a concern for Agneta Börjeson who works as a consultant at POM, arguing that for increased use of these varieties, there is a need for people to know how to use the harvested crop (oral. 2023).

According to Hunter et al. (2020), the use of school gardens can be beneficial for the conservation of agrobiodiversity, including local varieties of kitchen vegetables. School gardens have been used as a tool to revive food culture and encourage the development of recipes including such crops. The school gardens can also function as a conservation site where these varieties are grown and shared amongst the students and their families. The school gardens allow for continued farming of the crops - allowing them to evolve and adapt to the changes in the environment. In the Philippines 'The Crop Museum Initiative' in schools aims at conserving, multiplying, and sharing the diversity of locally adapted varieties. The Department of Education has installed 520 crop museums across the country (Hunter et al., 2020). They are gardens that allow teachers, students, and community members to learn more about agrobiodiversity and work as a platform for seed sharing.

Hunter et al. (2020) argue that local agrobiodiversity is hard to maintain in urban centers and school gardens can act as a platform where urban children can learn more about nature, the diversity of food - where it come from, and how it contribute to a healthy food system. However, Grazioli et al. (2020) argue for long-term visions in school gardens as the process of change takes time and will need to include more than one generation of students. They also recommend inviting the community through festivals to strengthen a sense of 'togetherness' in the community - something they argue is increasingly important in the context of increasing urbanization.

The project in the Philippines studied by Hunter et al. (2020) combined school gardening with nutritional knowledge. Growing, harvesting, and cooking indigenous vegetables helped increase knowledge concerning the conservation, management, and dissemination of indigenous vegetables. The Philippine government's school garden program also includes teaching seed-saving practices which further help enhance sustainability. The result of the project showed improvements in nutritional knowledge, attitudes, and practices among the children and their parents (Hunter et al., 2020).

Hunter et al. (2020) argues that frequent 'hands-on' nutritional learning, such as those in school gardens, has an impact on eating habits. Children who grow their own food were shown to be more likely to eat fruits and vegetables as well as showing a higher level of knowledge concerning nutrition. Studies suggest that taste preferences are partly formed after the experience (e.g. Capaldi, 1996; Brug et al., 2008; Hedegaard, 2018; Waterman, 2018), an early introduction to the cooking and tasting of local varieties allows broadening children's taste preferences which might simplify introducing older varieties in the diet. According to Grazioli et al. (2020), students visiting school gardens can influence eating habits in their

whole household since they can share their knowledge with their parents and siblings. However, Hunter et al. (2020) notes that there is a need for continued nutritional education (35-50 hours/year) for diet preferences amongst children to change over the long term.

Co-creation for long-term sustainability

A vital part of the Bjäre-härad project was the aspect of being a platform where different stakeholders can come together to learn from each other. The concept of co-creation has gained increased attention in both marketing and sustainability research as a tool for customer engagement (e.g. Grissemann & Stokburger-Sauer, 2012) and innovative solution development (e.g. Utter et al., 2021). Due to the term's diverse use, there is no clear definition. According to Grissemann and Stokburger-Sauer (2012) central to the concept of co-creation is the transformation of passive actors to active ones by involving them in different stages in the development process of products, services, or systems.

Co-creation of experience

The challenge for Katrinetorp is to not only spark interest during one single visit but to create long-term experiences encouraging the visitors to return or search for more information on the subject on their own. Research on co-creation as a marketing strategy in museums shows that allowing visitors to take an active role during and after the visit has the ability to make the experience more significant, create long-lasting memories, and enhance the attractiveness of museums (Antón et al., 2018; Campos et al., 2015; Barnes & McPherson, 2019; Yang et al., 2023b). Antón et al., (2018) define active participation as the process of placing individuals as key factors in developing and creating an experience, which in the case of a museum, can be either physical, emotional, and mental, planned or spontaneous and informal. Campos et al. (2015: 23) define co-creating tourism experiences as ”the sum of the psychological events a tourist goes through when contributing actively through physical and/or mental participation in activities and interacting with other subjects in the experience environment”. Hence, the more the visitor invests in the experience (such as active participation or positive interactions) the more memorable it can become (Yang et al., 2023b).

Antón et al. (2018) divide the visitors' co-creation into three stages: before, during, and after the visit. Before the visit involves aspects such as planning of visit and prior knowledge on the subject. During the visit, co-creation is possible through the act of participation and interaction (visitor to visitor and visitor–employee) on-site. Co-creation after a visit happens when the visitors share their experiences and memories with their community, either on- or offline, or intensify their experience by delving into further knowledge.

A study by Yang, Liu, and Song (2023b) showed that the experience of learning and escapism are vital elements of museum visits. The process of co-creation amongst visitors can be enhanced by providing sensory activities such as sound, smell, and taste (Antón et al., 2018). A study by Hollenbeck et al., (2008) showed that visitors allowed to physically touch, taste and smell the displayed exhibit had a longer-lasting impression of the experience. Antón et al., (2018) recommend activities such as guided tours, lectures, workshops, courses, seminars, showing films, theater performances, art activities, and publications as tools for museums to increase learning opportunities. Further, they note that providing opportunities for escapism is essential in the process of co-creation which could be strengthened by offering contextualization as well as interpretive assistance on the subject being exhibited. Prior

knowledge and familiarity with the subject displayed will increase the interaction with other visitors or staff (Antón et al., 2018; Yang et al., 2023b). To help foster participation and interaction among visitors lacking prior knowledge, Antón et al., (2018) suggest providing rooms where basic knowledge can be displayed in the form of for example videos to help people understand the context is important. The study by Antón et al., (2018) argues that to create engagement it is important for the museum to nurture involvement even after the visit. They suggest activities that allow visitors to rate and evaluate the exhibition. By using social networks visitors can be invited to reflect and share their experience. For example, a Swedish museum, Nordiska Museet, uses social media, such as Instagram, as a platform to engage people outside the museum. For example, they share pictures with stories from 'everyday people' in the past, a lot of the comments on the stories are people sharing their own histories or histories of relatives. This can be a way to encourage people to participate even before the visit and give a sense of inclusion amongst potential visitors, but also give space for people to ventilate after the visit.

Co-creation of knowledge

Utter et al., (2021: 1) define co-creation of knowledge as "a collaborative process involving 2 or more actors, who are intentionally integrating their knowledge and learning, resulting in the development of insights and solutions that would not otherwise be reached independently". Just like any other sustainability issue, the decreasing amount of local varieties is a complex problem and is caused by a multitude of different reasons. Finding a solution is not a simple task. Depending on which perspective you use the solutions might be different. Attempted solutions from one angle might cause new problems in another area. The system thinking perspective tries to reduce the negative effects by using multiple perspectives (Gliessman, 2015).

The idea of co-creation of knowledge is to include a diversity of societal actors and stakeholders in the process of developing solutions (Utter et al., 2021). Actors with different backgrounds enrich the picture by sharing experiences and knowledge. The process can help broaden the perspective by including a diversity of narratives acknowledging multiple types of knowledge and viewing them as equally valuable in the process. It is also a way to include different stakeholders and encourage an active role in the development of solutions that ultimately will affect their livelihood. It is a tool to build trust and a sense of community amongst stakeholders to be able to join in a common goal (Utter et al., 2021).

Traditionally, TEK is conserved by being passed down from one generation to another (Berkes, Colding & Folke, 2000). One of the causes of TEK erosion is that this transmission is no longer working when younger generations break from the practice of agriculture and pursue other forms of labor or lifestyles, often in urban areas (Berkes, Colding & Folke 2000). Aceituno-Mata et al. (2020) argue there is an increase of young people interested in agroecological practices in Europe but there is a gap between the main holders of TEK, often elders from rural communities, and the part of the population interested in the practices. The lack of tools for communicating the knowledge is resulting in the loss of TEK. Hernández-Morcillo et al. (2014) argues there are other paths for knowledge transmission. According to Hernández-Morcillo et al. (2014) "TEK should be understood as a collaborative concept inviting diverse populations to continually learn from one another about how each approaches

‘knowledge’ and how these approaches can be blended to better steward natural resources" (2014; 4). Improving communication between these groups might help not only conserve TEK but through the process of co-creation can emerge in the development of sustainable agroecological initiatives (Berkes, Colding & Folke, 2000; Aceituno-Mata et al. 2020).

Selection of crops

Today Katrinetorp grows only four local varieties of kitchen crops in their ‘POM’ garden (marked in Table 4) and the rest are non-local heirloom varieties. While the use of more common international ‘heirloom’ varieties might be seen accurate according to the historical vegetable cultivation at larger estates like Katrinetorp - the new ‘vision’ puts a greater emphasis on the location and hence varieties with a connection to the surrounding landscape. I, therefore, suggest using the same varieties (table 5) as was recommended to Bjäre härad by Agneta Börjeson, with an addition of the artichoke ‘Herrgårds’ which is already grown at Katrinetorp (table 4). However, the suggested list does not include any root- or fruit vegetables. Considering Swedish local varieties of these crops are scarce in the gene bank, Katrinetorp will probably still have to grow international heirloom varieties to get a diverse, historically correct garden. These varieties can still help increase genetic diversity in the cultivation system and be an interesting topic for discussion in the garden. It is possible that Katrinetorp in collaboration with for example NordGen in the future can grow some Swedish root- and fruit vegetables that currently only exist in the gene bank.

Discussion

In the following section I will briefly discuss local varieties in relation to agroecology and their role in supporting food system resilience. Through the example of Katrinetorp, I will then discuss how the suggested tools can increase interest in local varieties, and how this in extension can re-connect people to nature and help reach several of the national and global environmental goals.

Agroecology - The thesis relevance for agroecology

Diversification is a key element of agroecology and is seen as a way to strengthen the system's resilience. When talking about biodiversity in agriculture, diversification such as intercropping and flowerstrips often comes to mind. However, the diversity of varieties within agricultural crops is often less visible on the agenda. Advocates of agroecology often mention the importance of safeguarding local varieties and the richness of genetic material that lies within them (Atelier, 2009; Gliessman, 2015; Shiva, 2016; FAO, 2019). It is commonly applied to areas associated with indigenous and traditional farming, and often as a way to improve food sovereignty and farmers' right to access and save seeds. Vandana Shiva mentions seed freedom as one important element of agroecology. The seeds, Shiva argues, are the first link in the food chain, the foundation of our being, and carry the knowledge of agroecology (Shiva, 2016: 67). According to Shiva, native varieties have been systematically discredited by the modern agriculture paradigm. When we lose local varieties, we lose seeds bred for their taste, resilience, nutrition, and adaptation to the local agroecosystem (Shiva, 2016).

In Sweden, as presented in this thesis, many traditional farming practices have been replaced with modern ones, and the local varieties are preserved mainly by small-scale farmers or hobby growers and in the gene bank. That does, by any means, not imply that the genetic diversity in Sweden is less worth saving. But the idea of Sweden as a country “lacking culinary heritage”, as Jönsson (2020) puts it, perhaps makes it less visible or acknowledged.

According to the principles of agroecology, the older varieties and their genetic diversity are vital for a resilient food system - both for adapting and mitigating climate change and other environmental perturbations and for the cultural and traditional knowledge embedded in them. The use of local varieties in public gardens can help safeguard this diversity, increase the knowledge about the different varieties and their qualities, as well as spread awareness to the public about their cultural and sensory values.

Food sovereignty and locally adapted varieties

According to FAO (2019) agroecology is a means to food sovereignty. One important aspect often discussed within the concept of food sovereignty is the access to local, traditional seeds. And they do go hand in hand, since seeds are the foundation of the food we produce, access to them affects food sovereignty. The right to culturally appropriate food and the right to define your own food is seriously threatened as global food production becomes more and more uniform (Shiva, 2016). Many local and traditional foods are based on older varieties and more uncommon crops (Westling et al., 2019). From a food sovereignty perspective, the control over seeds must be given to the people, and the farmer, instead of multinational companies (Patel, 2009; Shiva, 2016).

During the Swedish seed call a massive amount of peas and broad beans were found, with different characteristics concerning size, look, and taste (POM, 2019). Keeping these varieties could be seen as a way to strengthen food sovereignty and keep traditions and cultural heritage alive. This is not only important in social aspects like people's rights, but also since it can keep important knowledge and genetic material alive for future needs (Altieri et al., 2015; Westling et al., 2019). Promoting access to and spreading awareness about local varieties not only enhances food sovereignty but can be seen as a precondition for the development of food security (Shiva, 2016).

Why history matters

Reed and Ryan (2019) argue that understanding the past is crucial for the development of a sustainable future. Examining Swedish agrarian and kitchen garden history gives us an understanding of how agriculture has changed and the reasons behind the loss of local varieties. As Tendall et al. (2018) argue, an important part of building a high level of food system resilience is to learn from past events and prevent them from happening again. Considering history while developing solutions for our food system is therefore highly relevant. However, acknowledging the importance of traditional farming practices and knowledge from the past is not about romanticizing the past, and seeing it as always equaling sustainability. Different practices and more and less toxic substances have been used to control pests and diseases, e.g. DDT (Lind, 1914; Hansson & Hansson, 2002). Owners at Katrinetorp were not solely dependent on local resources when they bought Guano as fertilizer (Andréasson, 2007). Europe's dependency on Guano contributed to the exploitation of natural resources and people in South America (Cushman, 2013). Perhaps it is here the concept of agroecology and co-creation can play an important role - how we with a combination of modern and traditional ecological knowledge and experiences can create a resilient food system.

Museums as platforms

Since local varieties need to be accompanied by related knowledge (gastronomic, farming methods, history, etc.) museums have a benefit since they can help connect several aspects of the museum (tools, buildings, history, food culture) and create a holistic overview of the place, its history and relation to present and future society. However, Barthel et al. (2013) argue that preservation in museums is insufficient in the safeguarding of genetic diversity - and that societies need to incorporate the knowledge and experiences existing in biocultural refugia in future strategies. Museums and other platforms can become a source of inspiration, but they should actively work on helping create space for continued traditional farming with older varieties.

Policies and legal frameworks will be vital for creating the instruments needed for large-scale change. However, I suggest that bringing the subject to the Swedish museum's agenda could help the work in a positive direction whilst creating financially profitable situations for the museum and connected restaurants. Many museums have already adopted this, but more work can be done. Since many public kitchen gardens in Sweden follow the same design, there is a potential for replicating this thesis suggestions in other parts of the country - if adapted to the local context.

Local varieties at Katrinetorp today

Located in the southwest corner of the kitchen garden is the compartment with ‘POM-plants’. The garden was a bit on the untidy side (weeds and cabbage affected by pests), compared to other compartments like the ‘regular’ cabbage compartment that looked very ‘clean’. Whether or not this was because this part of the garden is being under-prioritized, or that the varieties were unsuitable for the local climate is uncertain. The garden only contained 4 Swedish local varieties, the rest were heirloom varieties commonly used in Europe. One of the reasons that there are few local varieties today is that the gardener argues these varieties are no longer suitable for the location due to climate change.

Börjeson mentions that not all local varieties are suitable for agricultural production (Oral. 2023). Many local varieties are associated with lower yields compared to modern varieties. However, reports indicate that in many cases they are better at handling environmental stressors such as sudden, unexpected weather changes (e.g. Gerhardt et al., 2019). Most local varieties are preserved primarily for their distinctive taste, history, nostalgia, and, or connection to the place. Yet, it is stated in the description of several of the local varieties in the gene bank that the variety has been preserved since it is extra hardy and produces even under poor conditions (Leino, Nygårds & Börjeson, 2023). Nonetheless, there is a need to document the different characteristics of the local varieties, so the selection of suitable varieties is simplified (Börjeson, 2021). While this work would probably require more structured examinations and thorough tests, museums like Katrinetorp could potentially contribute as test-growers and document their experiences which can then be shared with people who are interested in trying to grow local varieties. The Swedish seed company Nordfrö, for example, has a project with a selected 'cultivation panel' consisting of farmers or hobby growers from different parts of the country. The purpose is to collect information on how their seeds and varieties perform in the country's different growing zones, and under different conditions. Information like this can help people choose varieties that are more suitable for the local conditions and their purpose. In addition, it is possible that the varieties used by Katrinetorp previously would have suited better if the cultivation applied more agroecological cultivation methods and TEK in general. Agneta Börjeson (2021) also notes that further studies are needed on how local varieties can be used in modern agriculture.

Even though the end goal is to increase genetic diversity in the farming systems, this thesis focuses on local Swedish kitchen crop varieties as they run a particularly high risk of disappearing. For the varieties to have ‘meaning’ there is a need to connect them to a *place* or a *context* (e.g. their gastronomic, agricultural, or social benefits) that emphasizes their different qualities as opposed to newer breeds. Otherwise, they risk losing their ‘added value’.

The signs in the POM garden were not updated as the list did not match the varieties found in the garden. Only brief information about POM and Grönt Kulturarv was available and there were no historical descriptions attached. The signs in the garden also lacked information about the context of local varieties and more explanations as to *why* they are so important to safeguard. The gardener mentioned that staff and budget were limiting factors for any larger changes in the garden (Becarevic, oral. 2023). Only 3 people were responsible for managing the whole park and kitchen garden, with an exception during periods when interns from different schools helped out on the estate. If the suggested solution is to be implemented there will be a need for more workers and a larger budget assigned to the garden.

Suggested tools for improvement

The idea of this thesis is not to develop new ideas on how to successfully increase knowledge and interest concerning older varieties, or 'reinvent the wheel', but rather to gather elements from previous work and create a suggestion on how Katrinetorp (or gardens as such) can become a catalysator for the spreading of information to the part of the public that is not already interested, and create opportunities to lift the question so it can be further included in the discussion of local sustainable food systems.

So how can we re-connect people with nature, and food? Ives and colleagues (2018) argue that what they call 'inner' connections such as cognitive, emotional, or philosophical leverage points are vital for larger transformations. However, there are different ideas of how connections on these levels can be nourished. Lessons from the study of the project at Bjäre-härad hembygdspark showed three areas in which Katrinetorp could improve their work on increasing interest in and knowledge about local varieties of kitchen vegetable crops. The three suggested tools were; storytelling, nature-based education, and co-creation.

Storytelling as a communication tool

According to Carolyn Steel, we need a *vision* - claiming we need more philosophy rather than technology, money, or physical resources to handle the great challenges we face. Visualizing what kind of life, we want to achieve allows us to act effectively. The crises we face are not threats to life itself but to our material existence (p:39). While imagining a sustainable future is the first step, Moreno (2020) argues the second step is to communicate this plan. The question is how this should be executed effectively. The interview with Bjäre-härad suggested they had problems with *how* to communicate the knowledge to visitors (Thuresson & Öhman, oral. 2023). POM uses storytelling which is a tool that has gained much attention in research as an effective tool to create emotional bonds.

The difference between older varieties and modern breeds is not very visible in the garden today, at least for the untrained eye. Not only does Katrinetorp need to articulate *what* is grown but helps people emotionally connect with the importance of safeguarding the local varieties. At Katrinetorp storytelling could be an important tool to help bring attention to older local varieties. The stories can be a way to differentiate the local varieties from newer ones and at the same time create bonds between the visitors and the varieties, the landscape, and the food. During the interview with Bjäre-härad it was mentioned that although the interest amongst the younger visitors was low, they showed interest especially when the variety was connected to a place they had visited, or knew (Thuresson & Öhman, oral. 2023). By lifting the varieties relationship to 'place' or 'terroir', through storytelling, it is possible to create a deeper connection and strengthen a sense of community.

The current 'POM' garden has signs briefly explaining what POM is and a list of varieties grown. By adding signs with stories of the history and people behind the varieties on the list it might invite the visitors to create a more emotional bond to the garden. Adding information about what and how these varieties were used in the past and what they can contribute to today might help people to better grasp the importance of older varieties. However, having signs about all the varieties in the garden might not be as visually pleasing and might create an overflow of information for the visitors. Therefore, I suggest that a few selected varieties will be accompanied by a sign in the garden and the rest be available for example with a QR

code that can be scanned at sight and perhaps accompanied by a bigger exhibition in one of the buildings. Storytelling could be used in the restaurant as well, giving the visitors an option to taste older varieties in a new setting.

Nature-based education

Nature-based education has shown to be an effective tool to re-connect children to nature and create environmentally oriented citizens. The use of educational gardens at Katrinetorp can therefore help not only increase knowledge about local varieties but foster a much deeper re-connection to nature, which according to Folke et al. (2011) is needed to handle the crisis we face.

While Katrinetorp might not be suited for a 'crop museum' in the sense of being able to work as a nursery or seed bank, it can take elements from the initiative and become a local platform for raising awareness and discussions about the importance of agrobiodiversity. By growing local varieties, they can help a continued cultivation of the important plant material and function as a visualization of genetic diversity. By offering an allotment where school classes can learn more about agrobiodiversity, local varieties, traditional farming practices, and gastronomy Katrinetorp can help spread the knowledge and interest amongst a wider part of the population as children will pass on what they learned to their families. By teaching seed-saving practices and sharing some seeds (for example more easily saved seeds such as peas and beans) they can help spread the cultivation of these varieties even if it might be on a smaller scale.

Allowing for children in the garden can help increase pupils familiarity with local varieties and how they can be used. It can also help improve overall health as it might help improve children's diet and understanding of nutrition, which is a goal in Skåne's regional food strategy. It can be a way to support national and international recommendations (such as the goal of *A varied agricultural landscape*) and help mobilize action by raising awareness of the importance of including these varieties in food policies (Grazioli et al. 2020). However, as Grazioli et al. (2020) note, the challenges of conserving local varieties and TEK require large networks of stakeholders and by itself, Katrinetorp might not be able to impact any great overall changes in production but can act as a part of the puzzle.

In addition to school garden allotment and education, Katrinetorp can host events directed to other members of the community, such as artisan cooking classes, seminars, and workshops related to food history and culture. This might help increase the spreading of knowledge to a large diversity of people.

Many of the stories found at POM include information on past use and in some cases old recipes can be found. This could be a way to help increase the gastronomic knowledge connected to the varieties. However, in many cases, old recipes of 'grey pea porridge' might only serve as a curiosity since it is no longer forming a vast part of the modern diet. Whilst re-introducing old recipes is a way to continue food traditions and culture, some might be hard to implement in a modern setting. Therefore, it is important to also place the older varieties in the modern food context and raise the discussion on what these varieties can be used for in everyday life. Several of the books by Agneta Magnusson include recipes using local varieties, many of which are adapted to modern food culture (e.g. grey pea falafel and hummus).

Co-creation

Co-creation and an acknowledgment of different types of knowledge as mutually important is seen as a vital part of agroecology. Co-creation could have two functions at Katrinetorp; as a tool to increase visitors' participation and increase their emotional bond to the subject, and as a tool to form a more sustainable, holistic view of the different steps needed for a re-introduction of local varieties in the food system and develop alternative paths for transferring TEK.

As mentioned in the two previous 'tools' the active participation of the visitors plays an important role in creating long-lasting effects on beliefs and attitudes. Storytelling becomes even more powerful when the voices of the public are allowed to be heard, and nature-based education becomes effective when children (or other members of the population) get hands-on experience with local varieties. Allowing the visitors to take on a more active participating role at the museum might help develop more profound attitude changes. Creating space for visitors to share their stories, and participating in guided tours, cooking, and tasting can have a positive effect on the experience and enhance learning opportunities.

Engaging visitors before the visit by inviting the public to specific activities such as seed saving, planting, harvesting, and processing (e.g. such as courses in fermentation) by announcing on social media can be useful. Visitors' interaction with staff was seen as an important tool to help co-creation at museums. Creating opportunities where visitors can interact with the gardeners at Katrinetorp, see how they work in the garden, and encourage visitors to ask the gardeners to explain what they are doing and why can be important for increasing participation. However, this will increase the workload for the staff, which is already limited.

Allowing visitors to explore sensory elements, such as taste and smell, could create long-lasting positive experiences. Having a greater collaboration with the restaurant, where visitors can taste local varieties can be beneficial. As prior knowledge was shown to be important for the visitors to gain a positive experience, Katrinetorp must provide information regarding the context of local varieties - such as what they are, their function in a resilient food system, and the reasons behind genetic erosion. This could be done by communication between staff and visitors, adding signs in the garden and sharing pamphlets on the subject at the museum, or hosting a larger exhibition on the subject in one of the buildings. It was also shown that it is important to encourage people to contribute and share their thoughts after the visit. By encouraging people to share their own knowledge or thoughts on the visit on social media platforms, Katrinetorp can help further improve the visitor's experience.

The success of re-introducing local varieties is dependent on transition in almost every step of the food system. Letting different stakeholders take an active part in the process is therefore vital for any greater, and lasting, changes. Katrinetorp could have the role of a "facilitator" or mediator helping bridge different stakeholders with a common interest in local varieties, or sustainable food systems in general, by creating a common platform for discussion and co-creation of knowledge. Creating space for knowledge sharing can also help create alternative paths for the transferring of TEK, between holders of knowledge and people interested in alternative practices, instead of the classic way of transferring from one generation to another. Katrinetorp can also help connect holders of TEK with schools and universities. For example,

by arranging meetings between traditional farmers and children from the school garden or students working as interns in the garden. During the harvest festival at Katrinetorp, there were some artisan food makers from Eldrimner. Having a deeper collaboration with Eldrimner and inviting them to have courses in artisan food making and culinary heritage might help keep important TEK associated with old varieties alive.

Co-creation, and greater collaboration, between different museums and public gardens that share an interest in local varieties (e.g. Bjäre-härad, Fredriksdal, Julita) can be a cost-effective way to improve the way the museums or gardens communicate the importance of local varieties to the public. The closeness to both POM, SLU, and Lunds University gives opportunities to involve researchers and students in the process - which could help enrich the picture of the past, food culture, and future sustainability. Studies can then be translated and made available to the public by being displayed at Katrinetorp. FAO's "Voluntary Guidelines for the Conservation and Sustainable Use of Farmers' Varieties/Landraces" stresses the importance of including farmers and farming communities in the process of sustainable conservation both as holders of knowledge but also as changes in agriculture ultimately affect their livelihoods (FAO, 2019). As the lack of seed producers is seen as one of the major obstacles in re-introducing local varieties in agriculture, the inclusion of seed cultivators is important and can help create links between seed producers and end-consumers. Inviting organizations like Sesam or Allkorn, or companies like Nordfrö can help increase understanding of the problems associated with local seed production. The local organization Malmö Food Council (n.d.) has established a great network of people working in different ways to create a sustainable local food system, (farmers, scientists, entrepreneurs, and business owners). Inviting them and their network to host and participate in seminars and workshops can help strengthen the co-creation of knowledge at Katrinetorp and further spread the awareness of genetic diversity amongst different stakeholders. In addition, co-creation at Katrinetorp can help re-connect producers and consumers.

These suggested tools help people connect on different levels - both physically and mentally, which increases their effectiveness. Together all the suggested tools have the potential to address every dimension of connectedness described by Ives et al. (2018). For example, the material and experiential dimensions can be nurtured by offering visitors to participate in the garden and taste the varieties through co-creation. Learning through nature-based education can address the cognitive and philosophical dimensions. With the help of storytelling, people can create stronger emotional attachments. By building stronger relationships on all of these dimensions there is a greater possibility for changing people's behaviors and larger shifts in social structures.

Limitations

All of the suggested tools would mean an increase in both workload and costs for Katrinetorp. As the gardener at Katrinetorp expressed during the interview, the current budget and limited staff act as major restraints on developments in the garden (Becarevic, oral. 2023). The gardener expressed that some areas in the museums are getting a larger part of the budget, while the garden is less prioritized. I argue that the garden is a highly important part of the museum and can help connect several parts of the museum holistically. As expressed by Bjäre-härad, putting local varieties in the center of the garden, or museum as a whole, can help create new paths of revenue and help create economic stability in the organization

(Thuresson & Öhman, oral. 2023). However, the project at Bjäre-härad is financed with project money from LEADER. Without it, the organization would not be able to finance the initial time of the project. If a similar project would be applied at Katrinetorp, it would most likely need project financing. Nevertheless, safeguarding genetic diversity is of high relevance in several national and international goals such as the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and *A varied agricultural landscape*. In addition, several aspects can be linked to the goals of both national and regional food strategy. For example, lifting local varieties and the stories behind them can help promote the region (national food strategy) and strengthen a “sense of pride” (Skåne food strategy). Nature-based education can increase children's knowledge of nutrition and have a positive effect on healthy diets (national and regional food strategy). Co-creation can help collaboration and innovation to improve resilience in the food system (national and regional food strategy) and Katrinetorp can become a much-needed platform for knowledge exchange (regional food strategy). Since the project addresses several environmental goals, it would be in the interest of the government to apply these types of tools and hence help finance the implementation.

Small steps

The project at Katrinetorp would perhaps not lead to any larger changes in the overall use of local varieties but can act as a small step in the process of incorporating genetic diversity in the food system for increased resilience. Since museums are insufficient in conserving TEK in situ and only act as a part of the solution (Barthel et al. 2013), Katrinetorp must support the work of placing bio refugia in food policies. According to Agneta Magnusson, the first step in any attempt to safeguard local varieties and genetic diversity is to continue the search for the varieties that are still in use but not already saved in the gene bank and find holders of TEK before the material and people with knowledge disappears (Oral. 2023)

The Import of seeds has always been a vital source for seeds in Sweden. However, both new (Börjeson, 2021) and older sources show that it is both possible and, in many ways, better to also have a local production of seeds. Not only in the sense of decreasing dependency on other countries but to develop seeds that are more adapted to the local climate. Supporting projects like Nordfrö, Allkorn, and Sesam, with local seed production, is an important step in increasing genetic diversity. Agneta Börjeson argues that the lack of sufficient amount of seeds and seed producers are two of the major issues in re-introducing local varieties in Swedish agriculture (Oral, 2023). The lack of producers is mainly because it is time-consuming work with no profit until the seeds reach the market. There is a need for increased education in seed saving and reducing the administrative workload of producing seeds of conservation- or amateur- varieties (Börjeson, 2021).

This thesis focuses on the aspect of increasing knowledge and interest amongst people - but for it to be successful there is a need to reach out to all the sectors of the food system. For consumers to be able to purchase seeds or crops of older varieties a sufficient amount of seeds needs to be available on the market. More farmers need to want to grow the varieties and consumers (all from chefs to private consumers) need to know what they are buying and what to do with it. Marketing strategies targeting all the stages of the food system are therefore needed. While Katrinetorp might not be able to increase the number of seed producers, it can help bring awareness amongst a diversity of stakeholders and private consumers.

Agneta Börjeson (oral. 2023) argued that as an initial stage, the older varieties would probably mainly be a ‘niche’ product on the market, as the cost of producing demands a higher price to be economically sustainable to produce. However, this can be seen as a threat to food sovereignty, reducing access as TEK becomes capitalized. It is therefore important that the material and knowledge becomes available through other sources.

The study by Saltzman et al. (2020) points to the risk that highlighting a few selected varieties as ‘cultural heritage’ might mean an exclusion of other, equally important varieties as they become ‘invisible’. The importance of genetic diversity is precisely to preserve the diversity and not only selected parts. However, overestimating the risk of heritagization can result in the idea that Sweden lacks an important green heritage (Jönsson, 2020). By emphasizing the importance of great genetic diversity when informing visitors about the context of local varieties, the risk can perhaps be reduced.

Future research and suggestions

This thesis focused on finding suggested solutions to how museums like Katrinetorp Landeri can help spread both knowledge and interest in local varieties. To assess the efficiency of the suggested tools there is a need for continued evaluation of the tools after being implemented. This thesis focuses on the perspective of the museums, for future studies after implementation more focus would preferably be directed to the consumers or visitors and their perceived experiences.

However, to increase interest amongst consumers, there must be something to consume (Magnusson, oral. 2023). Magnusson believes that it is extremely important that we, as soon as possible, search for more varieties that are hiding in home gardens or on small-scale farms across the country. More research should therefore be devoted to collecting both the material and the knowledge that the owners possess before it is too late. In addition, more research is needed on how to increase seed producers in Sweden, as Börjeson (oral. 2023) argues the lack of seed producers is a large obstacle in the process of re-introducing local varieties in the food system.

Furthermore, to increase the production of local varieties we must have an understanding of the different varieties and their character. There is a need for more studies testing the different varieties to better describe their characteristics and assess their suitability in agriculture, determining whether they are valuable for their gastronomic qualities or cultural heritage. This can perhaps encourage more farmers to use local varieties and help them choose which ones are suited for their local conditions and purposes.

Conclusion

Local varieties and traditional ecological knowledge (TEK) are important for ensuring food system resilience. To safeguard the genetic diversity of these varieties, and the interlinked TEK, ex situ conservation in gene banks is not enough - they must also be cultivated. Despite being mentioned in several global and national environmental goals the process of (re)introduction is slow. Research indicates that large-scale changes will not happen until the general public cares, and in order to care we need to be connected.

This thesis is based on the example of Katrinetorp Landeri in Malmö, Sweden, and shows that museums and visitors gardens can support the promotion of local varieties and TEK by fostering connections. Lessons from the reference case, Bjäre-härad hembygdsförening, resulted in three suggested tools that can help raise the awareness and motivate further action; *storytelling, nature-based education*, and *co-creation.* The suggested tools are believed to be effective in spreading interest and knowledge concerning local varieties and TEK since they can help create emotional bonds between visitors and varieties - which can influence people's beliefs and actions. In addition, the museum has the potential to reach people who are not previously interested in local varieties. By offering different 'entrance points' to the subject - whether it is from food, how it is produced, or the traditions and history behind it, museums can help shed light on the multiple angles of local varieties and their place in the food system. But, for the varieties to be conserved and used it is important that different aspects of TEK - such as history, gastronomic potential use, and crop management, are included.

The tools also means that the visitors can experience a mental and physical re-connection to nature, food and each other, that can reduce urban dwellers cognitive disconnection and help address deep-rooted environmental challenges. These deeper connections are important if we are to seriously improve food system resilience and reach the environmental goals such as *A Varied Agricultural Landscape*.

However, any museum alone will probably not generate any larger re-introduction of local varieties in agriculture as one of the major obstacles, the lack of seed producers, remains. Katrinetorp could act as a way to bring genetic diversity to the agenda of sustainable food systems and create a network of different stakeholders. While the suggested strategies can be applied to other similar museums or visitors' gardens, it is important that the tools and selection of varieties are adapted to the local context.

Limiting factors are related to budget as many museums already struggle with finances. Yet, placing local varieties and TEK in the center of the museum can help boost the attractiveness of the place, create a more coherent operation, and therefore be economically beneficial in the long run. Since the suggested tools can help strengthen and reach several goals set up by local, national, and global policies it can be argued that more subsidies should be provided to similar projects. But for more general application of the suggestion further studies will be needed to assess the efficiency of the tools once they are implemented.

References

Aceituno-Mata, L., Benyei, P., Calvet-Mir, L., Pardo-de-Santayana, M. & Reyes-García, V. (2020). CONECT-e: Documenting, sharing and protecting Spanish traditional knowledge on landraces: In. *Farmers Pride. Establishing the European Network for In Situ Conservation and Sustainable Use of Plant Genetic Resources.* Issue 5, January 2020. ISSN: 2281-2067 https://www.ecpgr.cgiar.org/fileadmin/templates/ecpgr.org/upload/PHASE_X/WORKING_GROUPS/On-farm/Landraces_Issue_5_Optimized.pdf#page=9

Adams, W. C. (2015). Conducting semi-structured interviews. *Handbook of Practical Program Evaluation*, 1(4), 492–505. https://doi.org/10.1002/9781119171386.ch19

Almeida, M. J., Pinheiro de Carvalho, M. A., Barata, A. M., Magos Brehm, J. & Maxted, N. (2023). Crop landraces inventory for Portugal. *Genetic resources and crop evolution*, 70 (4), 1151–1161. https://doi.org/10.1007/s10722-022-01492-6

Altieri, M. & Nicholls, C. I. (2005). *Agroecology and the Search for a Truly Sustainable Agriculture*, UNEP, Mexico. http://www.agroeco.org/doc/agroecology-engl-PNUMA.pdf

Altieri, M., Kang Bartlett, A., Callenius, C., Campeau, C., Elsasser, K., Hagerman, P., Kenny, G., Lambrechts, K., Miga, W., Prado, J. P., Prove, P., Saracini, N., & Ulmer, K. (2012). *Nourishing the world Sustainably - scaling up Agroecology*. P. Prove & S. Speicher, eds. Ecumenical Advocacy Alliance

Altieri, M. A., Nicholls, C. I., Henao, A. & Lana, M. A. (2015). Agroecology and the design of climate change-resilient farming systems. *Agronomy for sustainable development,* 35 (3), 869–890. https://doi.org/10.1007/s13593-015-0285-2

Andersson, E., Barthel, S., Borgström, S., Colding, J., Elmqvist, T., Folke, C. & Gren, S. (2014). *Reconnecting Cities to the Biosphere: Stewardship of Green Infrastructure and Urban Ecosystem Services*. Ambio, 43 (4), 445–453. https://doi.org/10.1007/s13280-014-0506-y

Andréasson, A. (2007). *Lusthuskullen på Katrinetorp.* Trädgårdsarkeologisk undersökning i den engelska parken. Bunkeflo socken i Malmö stad, Skåne län. Enheten för Arkeologi Rapport 2007:001 , Malmö Kulturmiljö. Available at: https://archaeogarden.se/Hem%20-%20publikationer/Rapport_2007_001_low%20Katrinetorp.pdf

Antón, C., Camarero, C. & Garrido, M. -J. (2018). Exploring the experience value of museum visitors as a co-creation process. *Current issues in tourism*, 21 (12), 1406–1425. https://doi.org/10.1080/13683500.2017.1373753

Arnold, R. D., Wade, J. P. (2015). *A definition of systems thinking: a systems approach*. Procedia Comput. Sci. https://doi.org/10.1016/j.procs.2015.03.050

Bager, E. (1991). Catharinetorp-Katrinetorp. Frälsehemman i Vintrie blir storgård på utmarkerna. In *Elbogen MALMÖ FORNMINNESFÖRENINGS ÅRSSKRIFT*. Årgång 59 - Malmö 1991 http://www.elbogen.nu/Skrifter_pdf/MaFo1991L.pdf

Balmford, A. & Cowling, R. M. (2006). Fusion or failure? The future of conservation biology. *Conservation Biology* 20:692–695: p 694

Barnes, P. & McPherson, G. (2019). Co-Creating, Co-producing and Connecting: Museum Practice Today. *Curator* (New York, N.Y.), 62 (2), 257–267. https://doi.org/10.1111/cura.12309

Barot, S., Allard, V., Cantarel, A., Enjalbert, J., Gauffreteau, A., Goldringer, I., Lata, J. -C., Le Roux, X., Niboyet, A. & Porcher, E. (2017). Designing mixtures of varieties for multifunctional agriculture with the help of ecology. A review. *Agronomy for sustainable development* 1–20. Paris: Springer Paris. https://doi.org/10.1007/s13593-017-0418-x

Bekalu, M. A., Bigman, C. A., McCloud, R. F., Lin, L. K. & Viswanath, K. (2018). The relative persuasiveness of narrative versus non-narrative health messages in public health emergency communication: Evidence from a field experiment. *Preventive medicine*, 111, 284–290. https://doi.org/10.1016/j.ypmed.2017.11.014

Bengtsson, E., & Svensson, P. (2020). *The living standards of the labouring classes in Sweden, 1750–1900: Evidence from rural probate inventories*. Lund Papers in Economic History. General Issues; No. 2020:213.

Berge, G. (1939). *Hemträdgården - dess anläggning och skötsel.* Lantbrukssällskapets tidskriftsaktiebolag, Stockholm.

Berkes, F., Colding, J. & Folke, C. (2000). Rediscovery of Traditional Ecological Knowledge as adaptive management. *Ecological applications*, 10 (5), 1251–. https://doi.org/10.2307/2641280

Berry, P. M., Fabók, V., Blicharska, M., Bredin, Y. K., Llorente, M. G., Kovács, E., Geamana, N., Stanciu, A., Termansen, M., Jääskeläinen, T., Haslett, J. R. & Harrison, P. A. (2018). Why conserve biodiversity? A multi-national exploration of stakeholders' views on the arguments for biodiversity conservation. *Biodivers Conserv*. 27: 1741. https://doi.org/10.1007/s10531-016-1173-z

Bertram, C. & Rehdanz, K. (2014). The role of urban green space for human well-being. *Kiel Working Paper*, no. 1911

Bjäre härad hembygdsförening (n.d.). *Om oss*. Available at: https://www.hembygd.se/bjare-harads/about (Accessed 29 October 2023)

Bjäre härad hembygdsförening (2023). *Projekt Kulturcenter för historiska matkulturgrödor*. Available at : https://www.hembygd.se/bjare-harads/ny-sida-3 (Accessed 29 October 2023)

Blastland, M., Freeman, A. L. J., van der Linden, S., Marteau, T. M. & Spiegelhalter, D. (2020). Five rules for evidence communication. *Nature* (London), 587 (7834), 362–364. https://doi.org/10.1038/d41586-020-03189-1

Bloomfield, E. F. & Manktelow, C. (2021). Climate communication and storytelling. *Climatic change*, 167 (3-4). https://doi.org/10.1007/s10584-021-03199-6

Bocci, R. (2011). Seed Legislation and agrobiodiversity: conservation varieties. *Journal of agriculture and environment for international development*, 103 (1), 31–49. https://doi.org/10.12895/jaeid.20091/2.23

Bratspies, R. (2017). ARTICLES: OWNING ALL THE SEEDS: CONSOLIDATION AND CONTROL IN AGBIOTECH. *Environmental Law*, 47, 583. Retrieved from https://advance-lexis-com.ludwig.lub.lu.se/api/document?collection=analytical-materials&id=urn:contentItem:5PNR-BXH0-00CW-B109-00000-00&context=1516831

Brug, J., Tak, N. I., te Velde, S. J., Bere, E. & de Bourdeaudhuij, I. (2008). Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: results from observational studies. *British journal of nutrition*, 99 (S1), S7–S14. https://doi.org/10.1017/S0007114508892458

Brush, S. B. (1995). In situ conservation of landraces in centers of crop diversity. *Crop Sci.*, 35, 346–354.

Börjeson, A. (2011). *Amatör- och bevarandesorter– regler kring utsädesodling och försäljning.* Jordbruksverket: https://www2.jordbruksverket.se/webdav/files/SJV/trycksaker/Pdf_ovrigt/ovr230.pdf (Accessed 12 May 2023)

Börjeson, A. (2015). *Sorter av köksväxter -Svenska priskuranter från 1800-talet till 1930*. NordGen publication series 2015:01 https://www.slu.se/globalassets/ew/org/centrb/pom/sorter_av_koeksvaexter_komplett.pdf (Accessed: 17 September 2023)

Börjeson, A. (2018). *Från fröuppropet till gråärtsfalafel*: https://www.slu.se/globalassets/ew/org/centrb/pom/fran-froupropet-till-graartsfalafel.pdf (Accessed 12 May 2023)

Börjeson, A. (2021). *Från genbanksmängd till utsädesvolym*. Rapport 3. SLU. Available at: https://www.slu.se/globalassets/ew/org/centrb/pom/fran-genbanksmangd-till-utsadesvolym.pdf (Accessed 02 November 2023)

Börjeson, A. (n.d.). *Fröregler och äldre sorter*. Röttle Natur och Kultur: http://www.rottle.se/Utsade.htm (Accessed 12 May 2023)

Campos, A., Mendes, J., Oom do Valle, P., & Scott, N. (2015). Co-creation experiences: A literature review. *Current Issues in Tourism*, 18. Published online September 15. doi:10.1080/13683500.2015.1081158.

Cannarella, C. & Piccioni, V. (2011). Traditiovations: Creating innovation from the past and antique techniques for rural areas. *Technovation*, 31 (12), 689–699. https://doi.org/10.1016/j.technovation.2011.07.005

Capaldi, E. D. (1996). *Why We Eat What We Eat: The Psychology of Eating*. Washington, DC: American Psychological Association. pp. 53–80

Ciancaleoni, S. & Negri, V. (2020). A method for obtaining flexible broccoli varieties for sustainable agriculture. *BMC genetics*, 21 (1), 51–51. https://doi.org/10.1186/s12863-020-00846-2

Clark, M. & Tilman, D. (2017) Comparative analysis of environmental impacts of agricultural production systems, agricultural input efficiency, and food choice. *Environmental Research Letters* 12:1-11.

Colding, J., Giusti, M., Haga, A., Wallhagen, M. & Barthel, S. (2020). Enabling relationships with nature in cities. *Sustainability* (Basel, Switzerland), 12 (11), 4394–. https://doi.org/10.3390/su12114394

Collado, S., Staats, H., and Corraliza, J. A. (2013). Experiencing nature in children's summer camps: affective, cognitive and behavioural consequences. J. *Environ. Psychol*. 33, 37–44. doi: 10.1016/j.jenvp.2012.08.002

Coyne, I. T. (1997). Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries? *Journal of advanced nursing*, 26 (3), 623–630. https://doi.org/10.1046/j.1365-2648.1997.t01-25-00999.x

Cumming, G. S., Buerkert, A., Hoffmann, E. M., Schlecht, E., von Cramon-Taubadel, S. & Tscharntke, T. (2014). Implications of agricultural transitions and urbanization for ecosystem services. *Nature (London)*, 515 (7525), 50–57. https://doi.org/10.1038/nature13945

Cushman, G. T. (2013). *Guano and the opening of the Pacific world : a global ecological history.* Cambridge: Cambridge University Press.

Dahlstrom, M. F. (2014). Using narratives and storytelling to communicate science with nonexpert audiences. *Proceedings of the National Academy of Sciences* - PNAS, 111 (Supplement 4), 13614–13620. https://doi.org/10.1073/pnas.1320645111

Daymon, C. & Holloway, I. (2011). *Qualitative research methods in public relations and marketing communications*. 2nd ed. New York: Routledge. https://doi.org/10.4324/9780203846544

Dwivedi, S., Goldman, I. & Ortiz, R. (2019). Pursuing the Potential of Heirloom Cultivars to Improve Adaptation, Nutritional, and Culinary Features of Food Crops. *Agronomy* (Basel), 9 (8), 441-. https://doi.org/10.3390/agronomy9080441

Dorninger, C., Abson, D. J., Fischer, J. & von Wehrden, H. (2017). Assessing sustainable biophysical human-nature connectedness at regional scales. *Environmental research letters*, 12 (5), 55001-. https://doi.org/10.1088/1748-9326/aa68a5

Ero-Tolliver, I., Lucas, D. & Schauble, L. (2013). 'Young Children's Thinking about Decomposition: Early Modeling Entrees to Complex Ideas in Science', *Research in Science Education*, 43(5), pp. 2137–2152. Available at: https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1039209&site=eds-live&scope=site

European Commission (2020). *Farm to fork - action plan*. https://food.ec.europa.eu/system/files/2020-05/f2f_action-plan_2020_strategy-info_en.pdf (Accessed 23 May 2023)

Ewert, A., Place, G. & Sibthorp, J. (2005). Early-Life Outdoor Experiences and an Individual's Environmental Attitudes. *Leisure sciences*, 27 (3), 225–239. https://doi.org/10.1080/01490400590930853

FAO (1995). *SWEDEN: Country report to the FAO international technical conference on plant genetic resources.* Prepared by Swedish University of Agricultural Sciences, Svalöv, May 1995 https://www.fao.org/fileadmin/templates/agphome/documents/PGR/SoW1/Europe/SWEDEN.pdf (Accessed: 13 June 2023).

FAO (1999). A*gricultural Biodiversity, Multifunctional Character of Agriculture and Land Conference*, Background Paper 1. Maastricht, Netherlands. September 1999

FAO (2009). *International Treaty on Plant Genetic Resources for Food and Agriculture.* Available at: https://www.fao.org/3/i0510e/i0510e.pdf (Accessed: 20 May 2023)

FAO (2019). *Voluntary Guidelines for the Conservation and Sustainable Use of Farmers' Varieties/Landraces.* Rome https://www.fao.org/3/ca5601en/ca5601en.pdf (Accessed: 20 May 2023)

Folke, C., Jansson, Å., Rockström, J., Olsson, P., Carpenter, S. R., Stuart Chapin, F., Crépin, A. -S., Daily, G., Danell, K., Ebbesson, J., Elmqvist, T., Galaz, V., Moberg, F., Nilsson, M., Österblom, H., Ostrom, E., Persson, Å., Peterson, G., Polasky, S., Steffen, W., Walker, B. & Westley, F. (2011). Reconnecting to the Biosphere. *Ambio*, 40 (7), 719–738. https://doi.org/10.1007/s13280-011-0184-y

Fowler, C. & Mooney, P .R. (1990). *Shattering : food, politics, and the loss of genetic diversity.* Tucson: University of Arizona Press.

Francis, C., Lieblein, G., Gliessman, S., Breland, T. A., Creamer, N., Harwood, R., Salomonsson, L., Helenius, J., Rickerl, D., Salvador, R., Wiedenhoeft, M., Simmons, S., Allen, P., Altieri, M., Flora, C. & Poincelot, R. (2003). Agroecology: The Ecology of Food Systems. *Journal of sustainable agriculture*, 22 (3), 99–118. https://doi.org/10.1300/J064v22n03_10

Frison, E. A., Cherfas, J., & Hodgkin, T. (2011). Agricultural Biodiversity Is Essential for a Sustainable Improvement in Food and Nutrition Security. *Sustainability,* 3, 238–53 Online: http://dx.doi.org/10.3390/su3010238

Gerhardt, K., Wallman, D. & Axelsson Linkowski, W. (2019). *Äldre sorters spannmål och extremvädret 2018 – hur gick det?* SLU Future Food Reports 8. Sveriges lantbruksuniversitet. https://www.slu.se/globalassets/ew/org/centrb/fu-food/publikationer/future-food-reports/aldre-sorters-spannmal-ff8-web.pdf

Gordon, L. J., Bignet, V., Crona, B., Henriksson, P. J. G., Van Holt, T., Jonell, M., Lindahl, T., Troell, M., Barthel, S., Deutsch, L., Folke, C., Haider, L. J., Rockström, J. & Queiroz, C. (2017). Rewiring food systems to enhance human health and biosphere stewardship. *Environmental Research Letters,* 12(10). https://doi.org/10.1088/1748-9326/aa81dc

Gosling, E. & Williams, K. J. H. (2010). Connectedness to nature, place attachment and conservation behaviour: Testing connectedness theory among farmers. *Journal of environmental psychology,* 30 (3), 298–304. https://doi.org/10.1016/j.jenvp.2010.01.005

Gourmetgarden (n.d.) *Katrinetorp*. Available at: https://www.gourmetgarden.se/ (Accessed 25 May 2023)

Gliessman, S. R. (2015). *Agroecology: the Ecology of Sustainable Food Systems*. CRC Press.

Gliessman, S. R. (2020). Transforming food and agriculture systems with agroecology. *Agriculture and human values,* 37 (3), 547–548. https://doi.org/10.1007/s10460-020-10058-0

Grazioli, F., Turdieva, M., & Kettle, J. (2020). The role of school gardens as conservation networks for tree genetic resources . In Hunter et al. (RED.) *Agrobiodiversity, school gardens and healthy diets: Promoting biodiversity, food and sustainable nutrition.* Issues in Agricultural Biodiversity. London (UK): Routledge. Chapter 7 (105-114). ISBN: 9780367148850

Grissemann, U. S. & Stokburger-Sauer, N. E. (2012). Customer co-creation of travel services: The role of company support and customer satisfaction with the co-creation performance. *Tourism management* (1982), 33 (6), 1483–1492. https://doi.org/10.1016/j.tourman.2012.02.002

Hammer, K., Arrowsmith, N. & Gladis, T. (2003). Agrobiodiversity with emphasis on plant genetic resources. *Die Naturwissenschaften*, 90 (6), 241–250. https://doi.org/10.1007/s00114-003-0433-4

Hansson, B. & Hansson, M. (2002). *Kökträdgårdens historia*. Norstedts Förlagsgrupp AB; ISBN 978-91-1-303294-8

Hedegaard, L. (2018). Educated tastes. *Studier i pædagogisk filosofi*, 6 (2), 1–14. https://doi.org/10.7146/spf.v6i2.26268

Hernández-Morcillo, M., Hoberg, J., Oteros-Rozas, E., Plieninger, T., Gómez-Baggethun, E., Reyes-García, V. (2014). Traditional Ecological Knowledge in Europe: Status Quo and Insights for the Environmental Policy Agenda. *Environment: Science and Policy for Sustainable Development.* 56 (1): 1-17

Hollenbeck, C. R., Peters, C., & Zinkhan, G. (2008). Retail spectacles and brand meaning: Insights from a brand museum case study. *Journal of Retailing*, 84(3), 334–353. doi: 10.1016/j.jretai.2008.05.003

Hufford, M. B., Berny Mier y Teran, J. C. & Gepts, P. (2019). Crop Biodiversity: An Unfinished Magnum Opus of Nature. *Annual review of plant biology,* 70 (1), 727–751. https://doi.org/10.1146/annurev-arplant-042817-040240

Hunter, D., Monville-Oro, E., Burgos, B., Rogel, C. N., Calub, B., Gonsalves, J., Lauridsen, N. O. (2020). Agrobiodiversity, school gardens and healthy diets: Promoting

biodiversity, food and sustainable nutrition. Issues in *Agricultural Biodiversity*. London (UK): Routledge. 302 p. ISBN: 9780367148850

IPBES (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. https://www.ipbes.net/news/ipbes-global-assessment-summary-policymakers-pdf (Accessed: 20 May 2023).

Isendahl, C. & Barthel, S. (2018). Archaeology, history, and urban food security: Integrating cross-cultural and long-term perspectives. *Routledge Handbook of Landscape and Food*. 1. ed Routledge, (61–72). https://doi.org/10.4324/9781315647692-5

Ives, C. D., Abson, D. J., von Wehrden, H., Dorninger, C., Klaniecki, K. & Fischer, J. (2018). Reconnecting with nature for sustainability. *Sustainability science*, 13 (5), 1389–1397. https://doi.org/10.1007/s11625-018-0542-9

Jeanneret, P., Aviron, S., Alignier, A., Lavigne, C., Helfenstein, J., Herzog, F., Kay, S. & Petit, S. (2021). Agroecology landscapes. *Landscape ecology*, 36 (8), 2235–2257. https://doi.org/10.1007/s10980-021-01248-0

Jordbruksverket (2023a). *Registrering av nya sorter och växtförädlarrätter*. Available at: https://jordbruksverket.se/vaxter/odling/utsade-och-registrering-av-vaxtsorter/registrering-av-nya-sorter-och-vaxtforadlarratter (Accessed: 12 October 2023)

Jordbruksverket (2023b). *Ett rikt odlingslandskap – fördjupad utvärdering 2023,* Rapport 2022:17 https://www2.jordbruksverket.se/download/18.7045f0cf184c20a13ed500a8/1669795787915/ra22_17.pdf (Accessed: 21 May 2023)

Joubert, M. Davis L.& Metcalfe, J. (2019). 'Storytelling: the soul of science communication'. *JCOM* 18 (05), E. https://doi.org/10.22323/2.18050501.

Jönsson, H. (2020). A Food Nation Without Culinary Heritage? Gastronationalism in Sweden. *Journal of Gastronomy and Tourism* 4 (4): 223–237.

Katz, Y. (2013). Against storytelling of scientific results. *Nature methods*, 10 (11), 1045–1045. https://doi.org/10.1038/nmeth.2699

Kewenter, E. (2010). *Landeriet Katrinetorp: historien, empiren, trädgården och den engelska parken under 1800-talet.* [Malmö]: [Arena,]

Khoury, C. K., Brush, S., Costich, D. E., Curry, H. A., Haan, S., Engels, J. M. M., Guarino, L., Hoban, S., Mercer, K. L., Miller, A. J., Nabhan, G. P., Perales, H. R., Richards, C., Riggins, C. & Thormann, I. (2022). Crop genetic erosion: understanding and responding to loss of crop diversity. *The New phytologist*, 233 (1), 84–118. https://doi.org/10.1111/nph.17733

Krause, R. J. & Rucker, D. D. (2020). Strategic Storytelling: When Narratives Help Versus Hurt the Persuasive Power of Facts. *Personality & social psychology bulletin*, 46 (2), 216–227. https://doi.org/10.1177/0146167219853845

KSLA (2010). *Om KSLA*. Published 28 OKTOBER, 2010 https://www.ksla.se/om-ksla/om-ksla/ (Accessed: 27 September 2023)

La Via Campesina (2011). *A struggle for food sovereignty.* https://tv.viacampesina.org/La-Via-Campesina-in-movement-Food?lang=fr (Accessed. 02 May, 2023)

Lara, S. W., Tsiami, A. & Cross, P. (2023). Discovering and Mapping Colloquial Terminologies Describing Underutilized and Neglected Food Crops - A Comprehensive Review. *Foods,* 12 (12), 2428-. https://doi.org/10.3390/foods12122428

Leino, M. W., Nygårds, L. & Börjeson, A. (2023). *Klint Karins kålrot och Kurt Jönssons bondböna: Svenska lokalsorter och deras historia.* POM, SLU

Lin, B. B. (2011). Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change. *Bioscience*, 61 (3), 183–193. https://doi.org/10.1525/bio.2011.61.3.4

Lind, G, (1914). *Småbrukarens trädgårdsbok. Handledning vid skötseln af trädgårdar vid mindre landtbruk och egna hem.* [2 ed.] Siléns praktiska bibliotek, Stockholm

Länsstyrelsen Skåne (2017). *Skånes livsmedelsstrategi 2030 - Smart mat.* Available at: https://www.lansstyrelsen.se/download/18.4dc15f2816a53b76de77bfb/1556879681828/Sk%C3%A5nes%20livsmedelsstrategi%202030%20-%20Smart%20mat.pdf (Accessed: 25 October 2023)

Länsstyrelsen Skåne (n.d.). *Pilevallar och pilerader.* Available at: https://www.lansstyrelsen.se/skane/besoksmal/kulturmiljoprogram/kulturmiljoprogram-skanes-historia-och-utveckling/kulturmiljoprogram-jordbrukets-landskap/pilevallar-och-pilerader.html (Accessed: 17 September 2023)

Malmö Stad (n.d.). *Katrinetorp Landeri.* Available at: https://malmo.se/Uppleva-och-gora/Natur-och-parker/Katrinetorp-landeri.html?num=6 (Accessed: 17 July 2023)

Malmö Stad (2023a). *Katrinetorps historia*. Available at: https://malmo.se/Uppleva-och-gora/Natur-och-parker/Katrinetorp-landeri/Katrinetorps-historia.html (Accessed: 17 July 2023)

Malmö stad (2023b). *Lindängelunds rekreationsområde*. Available at: https://malmo.se/Uppleva-och-gora/Natur-och-parker/Lindangelunds-rekreationsomrade.html (Accessed: 2 September 2023)

Malmö Food Council (n.d.). *Tillsammans för världens bästa mat i Malmö*. Available at: https://www.malmofoodcouncil.org/ (Accessed 3 September 2023)

Mathew, E., Mathew, L. (2023). Conservation of Landraces and Indigenous Breeds: An Investment for the Future. In: Sukumaran, S.T., T R, K. (eds) Conservation and Sustainable Utilization of Bioresources. *Sustainable Development and Biodiversity.* Springer, Singapore. https://doi.org/10.1007/978-981-19-5841-0_12

Mehrabi, S., Perez-Mesa, J. C. & Giagnocavo, C. (2022). The Role of Consumer-Citizens and Connectedness to Nature in the Sustainable Transition to Agroecological Food Systems: The Mediation of Innovative Business Models and a Multi-Level Perspective. *Agriculture* (Basel), 12 (2), 203–. https://doi.org/10.3390/agriculture12020203

Merriam, S. B. (1998). *Qualitative research and case study applications in education.* San Francisco, CA: Jossey-Bass.

Mercer, K. L. & Perales, H. R. (2010). Evolutionary response of landraces to climate change in centers of crop diversity. *Evolutionary applications*, 3 (5-6), 480–493. https://doi.org/10.1111/j.1752-4571.2010.00137.x

Migliorini, P., Spagnolo, S., Torri, L., Arnoulet, M., Lazzerini, G. & Ceccarelli, S. (2016). Agronomic and quality characteristics of old, modern and mixture wheat varieties and landraces for organic bread chain in diverse environments of northern Italy. *European journal of agronomy*, 79, 131–141. https://doi.org/10.1016/j.eja.2016.05.011

Mikkelsen, B. E. (2011). Images of foodscapes: Introduction to foodscape studies and their application in the study of healthy eating out-of-home environments. *Perspectives in Public Health*, 131(5), 209-216. https://doi.org/10.1177/1757913911415150

Mirzabaev, A., Olsson, L., Kerr, R. B., Pradhan, P., Ferre, M. G. R., & Lotze-Campen, H. (2023). Climate change and food systems. *Science and Innovations for Food Systems Transformation*, 511.

Moore, S. A., Wilson, J., Kelly-Richards, S. & Marston, S. A. (2015). School Gardens as Sites for Forging Progressive Socioecological Futures. *Annals of the Association of American Geographers*, 105 (2), 407–415. https://doi.org/10.1080/00045608.2014.985627

Moreno, L. D. R. (2020). Sustainable city storytelling: cultural heritage as a resource for a greener and fairer urban development. *Journal of cultural heritage management and sustainable development*, 10 (4), 399–412. https://doi.org/10.1108/JCHMSD-05-2019-0043

Morfi, C. (2020). The Wizards of Svalöf. *Agricultural and food science*, 29 (1). https://doi.org/10.23986/afsci.86937

Moudry, J., Konvalina, P., Stehno, Z., & Capouchová, I. (2011). Ancient wheat species can extend biodiversity of cultivated crops. *Scientific Research and Essay*, 6(20), 4273-4280.

Myrdal, J. & Morell, M. (2011). *The agrarian history of Sweden : from 4000 BC to AD 2000.* Lund: Nordic Academic Press.

Möller, J. (1990). Towards Agrarian Capitalism: The Case of Southern Sweden during the 19th Century. Geografiska annaler. Series B, *Human geography,* 72 (2/3), 59–. https://doi.org/10.2307/490551.

Naturvårdsverket (n.d). *Environmental objectives*. Available at: https://www.naturvardsverket.se/en/environmental-work/environmental-objectives/ (Accessed: 2 May 2023)

Nasr, J. & Komisar, D., J. (2011). :In Viljoen, A. & Wiskerke, J.S.C. The integration of food and agriculture into urban planning and design practices. *Sustainable food planning: evolving theory and practice.* (47-70) The Netherlands: Wageningen Academic Publishers. https://doi.org/10.3920/978-90-8686-826-1_3

Nisbet, E. K., Zelenski, J. M. & Murphy, S. A. (2009). The nature relatedness scale: linking individuals' connection with nature to environmental concern and behaviour. *Environ Behav* 41:715–740

NordGen (n.d.). *Vad är NordGen?* Available at: https://www.nordgen.org/skand/om-oss/

Nygårds, L., & Leino, M. W. (2013). *Klint Karins kålrot och mor Kristins böna: om fröuppropets kulturarv*. Alnarp: SLU, Programmet för odlad mångfald

OECD. (2018). *Concentration in Seed Markets: Potential Effects and Policy Responses*, OECD Publishing, Paris, https://doi-org.ludwig.lub.lu.se/10.1787/9789264308367-en

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N. & Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and policy in mental health and mental health services research*, 42 (5), 533–544. https://doi.org/10.1007/s10488-013-0528-y

Patel, R. Guest Editor (2009). Food sovereignty, *The Journal of Peasant Studies*, 36:3, 663-706, DOI: 10.1080/03066150903143079

Pálsdóttir, A. M., Persson, D., Persson, B. & Grahn, P. (2014). The journey of recovery and empowerment embraced by nature - clients' perspectives on nature-based rehabilitation in relation to the role of the natural environment. *International journal of*

environmental research and public health, 11 (7), 7094–7115. https://doi.org/10.3390/ijerph110707094

Petursson, J. T. (2013). Eduardo's Apples : The Co-Production of Personalized Food Relationships. *Ethnologia Europaea,* 43 (2), 17–

Pilling, D. (2015). *Coping with climate change : the roles of genetic resources for food and agriculture.* Rome: Food and Agriculture Organization of the United Nations.https://www.fao.org/3/i3866e/i3866e.pdf

POM (n.d.). *Phaseolus vulgaris (Kokböna-Gruppen) 'Båstad'*. SLU. Available at: https://www.slu.se/globalassets/ew/org/centrb/pom/gront-kulturarv/bastad.pdf) (Assessed 02 November 2023).

POM (2019). *Fröuppropet- Agneta Börjeson*. Available at: https://www.slu.se/centrumbildningar-och-projekt/programmet-for-odlad-mangfald-pom/projekt-och-uppdrag/inventering/froupropet/ (Accessed 12 May 2023)

Poore, J. & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science* 360:987–992.

Pothukuchi, K. & Kaufman, J. L. (1999). Placing the food system on the urban agenda: the role of municipal institutions in food systems planning. *Agriculture and human values,* 16 (2), 213–224. https://doi.org/10.1023/A:1007558805953

Pretty, J., Adams, B., Berkes, F., de Athayde, S. F., Dudley, N., Hunn, E., Maffi, L., Milton, K., Rapport, D., Robbins, P., Sterling, E., Stolton, S., Tsing, A., Vintinner, E. & Pilgrim, S. (2009). The Intersections of Biological Diversity and Cultural Diversity: Towards Integration. *Conservation and society,* 7 (2), 100–112. https://doi.org/10.4103/0972-4923.58642

Priyadarshan, P. M. & Jain, S. M. (eds.) (2022). *Cash crops : genetic diversity, erosion, conservation and utilization*. Cham, Switzerland: Springer.

Prop. 2016/17:104. *En livsmedelsstrategi för Sverige − fler jobb och hållbar tillväxt i hela landet*. Available at: https://faolex.fao.org/docs/pdf/swe195360S.pdf (Accessed 05 November 2023)

Pyle, R. M. (1993). *The thunder tree: Lessons from an urban wildland*. Boston, MA: Houghton Mifflin.

Qvarnemark, L. (n.d.). *Statens jordbruksverks föreskrifter om bevarandesorter och amatörsorter av köksväxter*. Jordbruksverket. Available at: https://www.nordgen.org/ngdoc/plants/Konsekvensutredning.pdf

Raggi, L., Pacicco, L. C., Caproni, L., Álvarez-Muñiz, C., Annamaa, K., Barata, A. M., Batir-Rusu, D., Díez, M. J., Heinonen, M., Holubec, V., Kell, S., Kutnjak, H., Maierhofer, H., Poulsen, G., Prohens, J., Ralli, P., Rocha, F., Rubio Teso, M. L., Sandru, D., Santamaria, P., Sensen, S., Shoemark, O., Soler, S., Străjeru, S., Thormann, I., Weibull, J., Maxted, N. & Negri, V. (2022). Analysis of landrace cultivation in Europe: A means to support in situ conservation of crop diversity. *Biological conservation*, 267, 109460-. https://doi.org/10.1016/j.biocon.2022.109460

Reed, K. & Ryan, P. (2019). Lessons from the past and the future of food. *World archaeology*, 51 (1), 1–16. https://doi.org/10.1080/00438243.2019.1610492

Reddy, P. P. (2015). Climate Resilient Agriculture for Ensuring Food Security. 1st ed. 2015. New Delhi: *Springer India*. https://doi.org/10.1007/978-81-322-2199-9

Riksarkivet (n.d.). *Skånska rekognosceringskartan.* Available at: https://sok.riksarkivet.se/Home/?postid=Arkis+30c3c29b-cbdb-479a-b715-9102997bdd90&flik=1&s=Balder (Accessed 02 June, 2023)

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R. W., Fabry, V. J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P. & Foley, J. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society*, 14(2), 32 http://www.ecologyandsociety.org/vol14/iss2/art32

Rockström, J., Gupta, J., Qin, D., Lade, S. J., Abrams, J. F., Andersen, L. S., Armstrong McKay, D. I., Bai, X., Bala, G., Bunn, S. E., Ciobanu, D., DeClerck, F., Ebi, K., Gifford, L., Gordon, C., Hasan, S., Kanie, N., Lenton, T.M., Loriani, S., Liverman, D.M., Mohamed, A., Nakicenovic, N., Obura, D., Ospina, D., Prodani, K., Rammelt, C., Sakschewski, B., Scholtens, J., Stewart-Koster, B., Tharammal, T., van Vuuren, D., Verburg, P. H., Winkelmann, R., Zimm, C., Bennett, E. M., Bringezu, S., Broadgate, W., Green, P. A., Huang, L., Jacobson, L., Ndehedehe, C., Pedde, S., Rocha, J., Scheffer, M., Schulte-Uebbing, L., de Vries, W., Xiao, C., Xu, C., Xu, X., Zafra-Calvo, N. & Zhang, X. (2023). Safe and just Earth system boundaries. *Nature (London)*, 619 (7968), 102–111. https://doi.org/10.1038/s41586-023-06083-8

Saj, S., Torquebiau, E., Hainzelin, E., Pages, J. & Maraux, F. (2017). The way forward: An agroecological perspective for Climate-Smart Agriculture. *Agriculture, ecosystems & environment*, 250, 20–24. https://doi.org/10.1016/j.agee.2017.09.003

Saltzman, K., Westerlund, T. & Sjöholm, C. (2020). Sellable stories. The use of history in the marketing of heritage plants and gardens. *Ethnologia Scandinavica*, 50, 121–

SAOB. (1933). *INSPEKTOR*. https://www.saob.se/artikel/?unik=I_0679-0169.w9ou&pz=3 (Accessed; 22 December, 2023)

Shipanski, M.E., MacDonald, G.K., Rosenzweig, S., Chappell, M.J., Bennett, E.M., Kerr, R.B., Blesh, J., Crews, T., Drinkwater, L., Lundgren, J.G & Schnarr, C. (2016). Realizing Resilient Food Systems. *Bioscience*, 66 (7), 600–610. https://doi.org/10.1093/biosci/biw052

Shiva, V. (2016). *Who really feeds the world? The failures of Agribusiness and the promise of Agroecology*. North Atlantic Books. Berkeley, California.

Singh, R. P. (2018). Integration and commercialization of local varieties under sub-optimal environments for food security, promoting sustainable agriculture and agro-biodiversity conservation. *MOJ Ecology & Environmental Sciences*, 3(2), 65–67. https://doi.org/10.15406/mojes.2018.03.00068

Solberg, S. O. & Breian, L. (2015). Commercial cultivars and farmers' access to crop diversity: A case study from the Nordic region. *Agricultural and food science*, 24 (2), 150–163. https://doi.org/10.23986/afsci.48629

Sonesson, N. (1947). *Handbok för trädgårdsodlare*, Albert Bonniers förlag, stockholm updated version 1919

Steel, C. (2011). Sitopia - harnessing the power of food :In Viljoen, A. & Wiskerke, J.S.C. (RED) *The integration of food and agriculture into urban planning and design practices.* Sustainable food planning: evolving theory and practice. (47-70) The Netherlands: Wageningen Academic Publishers. https://doi.org/10.3920/978-90-8686-826-1_3

Steel, C. (2020). *Sitopia : how food can save the world*. London: Chatto & Windus.

Swaisgood, R. R. & Sheppard, J. K. (2011). Reconnecting people to nature is a prerequisite for the future conservation agenda: response from Swaisgood and Sheppard. *Bioscience* 61:94–95

Swedish government (2017). *A National Food Strategy for Sweden – more jobs and sustainable growth throughout the country.* Short version of Government bill 2016/17:104. Available at https://www.government.se/contentassets/16ef73aaa6f74faab86ade5ef239b659/livsmedelsstrategin_kortversion_eng.pdf (Accessed 05 November 2023)

Swiderska, K., Song,Y., Li, J., Reid, H., Mut, D. (2011). *Adapting agriculture with traditional knowledge*. iied. Oct. 1, 2011. URL: https://www.jstor.org/stable/resrep01470 [Accessed: 2023-07-07]

Sydväst (2013). *Lindängelund - ett nytt landskap* ; https://sydvast.se/projekt/lindangelund/ (Accessed 4 September 2023)

Sydväst (2021) *Lindängelund växer fram*. 2021-03-19. URL: https://sydvast.se/nyheter/lindangelund-vaxer-fram/ (Accessed 4 September 2023)

Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., Kruetli, P., Grant, M. & Six, J. (2015). Food system resilience: Defining the concept. *Global food security,* 6, 17–23. https://doi.org/10.1016/j.gfs.2015.08.001

Tittonell, P. (2014). Ecological intensification of agriculture – sustainable by nature. Current Opinion in Environmental Sustainability 2014, 8:53–61.*Science Direct*.

Turner, B. (2011). Embodied connections: sustainability, food systems and community gardens. *Local environment*, 16 (6), 509–522. https://doi.org/10.1080/13549839.2011.569537

Turner, S. F., Cardinal, L. B. & Burton, R. M. (2017). Research Design for Mixed Methods: A Triangulation-based Framework and Roadmap. *Organizational research methods*, 20 (2), 243–267. https://doi.org/10.1177/1094428115610808

Uhlmann, K., Lin, B. & Ross, H. (2018). Who Cares? The Importance of Emotional Connections with Nature to Ensure Food Security and Wellbeing in Cities. *Sustainability* (Basel, Switzerland), 10 (6), 1844-. https://doi.org/10.3390/su10061844

UPOV. (2002). *General introduction to the examination of Distinctness, Uniformity and Stability and the development of Harmonized descriptions of new varieties of plants.* TG/1/3 . April 19, 2002: https://www.upov.int/export/sites/upov/resource/en/tg_1_3.pdf

Utter, A., White, A., Méndez, V. E. & Morris, K. (2021). Co-creation of knowledge in agroecology. *Elem Sci Anth,* 9: 1. DOI: https://doi.org/10.1525/elementa.2021.00026

Van de Wouw, M., Kik, C., van Hintum, T., van Treuren, R. & Visser, B. (2010). Genetic erosion in crops: Concept, research results and challenges. Plant Genetic Resources, 8(1), 1-15. doi:10.1017/S1479262109990062

Vijayan, D., Ludwig, D., Rybak, C., Kaechele, H., Hoffmann, H., Schönfeldt, H. C., Mbwana, H. A., Rivero, C. V. & Löhr, K. (2022). Indigenous knowledge in food system transformations. *Communications earth & environment*, 3 (1), 1–3. https://doi.org/10.1038/s43247-022-00543-1

Villa, C., Maxted, T. C., Scholten, M. & Ford-Lloyd, B. (2005). Defining and identifying crop landraces. *Plant Genetic Resources: characterization and utilization,* 3(3), 373-384. doi:10.1079/PGR200591

Walliman, N. (2011). *Research methods: the basics*. London: Routledge

Warren, V., & Bell, R., (2022). *The role of context in qualitative case study research: understanding service innovation*. In Sage Research Methods Cases Part 1. SAGE Publications, Ltd., https://doi.org/10.4135/9781529604467

Waterman, T. (2018). Taste, foodways, and everyday life. *Routledge Handbook of Landscape and Food*. 1. ed Routledge, 517–530. https://doi.org/10.4324/9781315647692-35

Weibull, J. (2019). *PROGRAMMET FÖR ODLAD MÅNGFALD 2021-2025: SAMARBETE FÖR HÅLLBARHET.* Jordbruksverket. https://www2.jordbruksverket.se/download/18.11c1937416fed13fb08d2c9d/1580386030153/ra19_25v2.pdf (Accessed: 26 May 2023)

Westling, M., Leino, M. W., Nilsen, A., Wennström, S. & Öström, Å. (2019). Crop and Livestock Diversity Cultivating Gastronomic Potential, Illustrated by Sensory Profiles of Landraces. *Journal of food science,* 84 (5), 1162–1169. https://doi.org/10.1111/1750-3841.14582

Wolf, F. (2004). *Legal Factors Driving Agrobiodiversity Loss*. https://pdfs.semanticscholar.org/b529/a5c4fea74ff0153ca7e76c16f75db327b197.pdf (Accessed: 16 May 2023)

Wästfelt, A. (2021). *Nordiska museets gårdar.* Available at: https://www.diva-portal.org/smash/get/diva2:1588451/FULLTEXT02 (Accessed 04 September 2023)

Yang, L. -N., Ren, M. & Zhan, J. (2023a). Modeling plant diseases under climate change: evolutionary perspectives. *Trends in plant scienc*e, 28 (5), 519–526. https://doi.org/10.1016/j.tplants.2022.12.011

Yang, Y., Liu, S. & Song, X. (2023b). *The Co-creation of Museum Experience Value From the Perspective of Visitor Motivation.* SAGE open, 13 (4). https://doi.org/10.1177/21582440231202118

Yin, Robert K. (2014). *Case study research: design and methods*. 5. ed. London: SAGE. ISBN: 9781452242569

Zamaratskaia, G., Gerhardt, K. & Wendin, K. (2021). Biochemical characteristics and potential applications of ancient cereals - An underexploited opportunity for sustainable production and consumption. *Trends in Food Science & Technology*, 107, 114–123. https://doi.org/10.1016/j.tifs.2020.12.006

Zaradic, P. A., Pergams, O. R. W. & Kareiva, P. (2009). The impact of nature experience on willingness to support conservation. *PloS one*, 4 (10), e7367–e7367. https://doi.org/10.1371/journal.pone.0007367

Zylstra, M. J., Knight, A. T., Esler, K. J. & Le Grange, L. L. L. (2014). Connectedness as a Core Conservation Concern: An Interdisciplinary Review of Theory and a Call for Practice. *Springer science reviews*, 2 (1–2), 119–143. https://doi.org/10.1007/s40362-014-0021-3

Archive references:

Jönköpingsbladet (1872). *Priskurant öfver friska och pålitliga trädgårds-, gräs-, och blomster-frön.* N:o 28, 1872. Kungliga biblioteket. Available at: https://tidningar.kb.se/2746108/1872-03-07/edition/146885/part/2/page/1/?q=fr%C3%B6odling%20k%C3%B6ksv%C3%A4xter&sort=&from=1872-01-01&to=1872-12-31 (Accessed 20 September 2023).

Karlshamns Allehanda (1863). *Huru skall trädgårdsodling bedrifvas för att blifva vinstgifvande.* N:o 1, 1863- 05-13. Kungliga biblioteket. Available at: https://tidningar.kb.se/2506033/1863-05-13/edition/148375/part/1/page/3/?q=fr%C3%B6dling%20k%C3%B6ksv%C3%A4xter&sort=&from=1863-01-01&to=1863-12-31 (Accessed 20 September 2023).

Malmö Allehanda (1828). *Annonser*. N:o 27, 1828-07-01. Kungliga biblioteket. Available at: https://tidningar.kb.se/2654102/1828-07-01/edition/147700/part/1/page/4/?q=catharinetorp&sort= (Accessed 10 June 2023).

Malmö Tidningen (1843). *Till salu.* N:r 6, 1843-02-11. Kungliga biblioteket. Available at: https://tidningar.kb.se/2656742/1843-02-11/edition/154818/part/1/page/4/?q=Cathrinetorp%20&sort=&from=1843-01-01&to=1843-12-31

Nytt och gammalt (1810) *Bihang.* N:o 24, 1810, 06-13. Kungliga biblioteket. Available at: https://tidningar.kb.se/2801121/1810-06-14/edition/147487/part/2/page/1/?q=catharinetorp%20salu&sort= (Accessed 10 June 2023).

Post- Och Inrikes Tidningar (1823). *Notificationer, Auctioner.* N:o 122, 1823-05-30. Kungliga biblioteket. Available at: https://tidningar.kb.se/8206782/1823-05-30/edition/144010/part/1/page/4/?q=catharinetorp&sort= (Accessed 10 June 2023).

Snällposten (1856). *N:r 43, 1856-04-12*. Kungliga biblioteket. Available at: https://tidningar.kb.se/2810472/1856-04-12/edition/153656/part/1/page/4/?q=Cathrinetorp%20&sort=&from=1856-01-01&to=1856-12-31 (Accessed 22 June 2023).

Snällposten (1863). *N:o 120, 1863-10-08*. Kungliga biblioteket. Available at: https://tidningar.kb.se/2810472/1863-10-08/edition/153656/part/1/page/4/?q=Cathrinetorp%20&sort=&from=1863-01-01&to=1863-12-31 (Accessed 22 June 2023).

Ystadsposten, Dagbladet (1896). *Ystad. Ystadstraktens skolförening*. N:r 147, 1896-06-28. Kungliga biblioteket. Available at: https://tidningar.kb.se/2621898/1896-06-29/edition/168759/part/1/page/2/?q=Balk%C3%A5kra%20skolhus%20%C3%A5rsm%C3%B6te&sort=&from=1896-01-01&to=1896-12-31 (Accessed 10 June 2023)

Oral references:

Agneta Magnusson, Am Kultur, 2023-02-02

Agneta Börjeson, POM, 2023-02-06

Helena Persson, POM, 2023-02-08

Ahmet Becarevic, Katrinetorp Landeri, 2023-07-03

Ingrid Thuresson and Julia Öhman, Bjäre Härad hembygdsförening, 2023-09-11

Popular science summary

As our food system is facing several serious challenges it is increasingly important to examine how to secure future food supply. There is a growing concern that our food system is increasingly uniform - not only do we rely on fewer varieties of crops, but we have reduced the genetic diversity within the varieties. Genetic diversity can be described as the range of genetic characteristics in a crop and plays a vital role in ecosystem functioning. Modern agriculture has focused on fewer, more uniform varieties, leading to an increasing loss of traditional local varieties.

Local varieties are varieties that have been grown in the same place for a long period of time, and which seeds have been collected by the farmer each year. They have a high cultural value as these varieties are embedded in local culture and traditional ecological knowledge (TEK). Most local varieties are preserved primarily for their distinctive taste, history, nostalgia, and, or connection to the place, traditions, and identity. However, research suggests that local varieties have a greater ability to handle sudden changes in climate and can be important for future breeding. Safeguarding these varieties is therefore highly important for food security.

Through the example of Katrinetorp Landeri, this thesis examines how museums and public gardens can support the work of increasing local varieties in the food system by raising awareness and knowledge amongst the general public. Previous research argues that in order for people to care, they need to be emotionally connected. This thesis formed three suggested tools (*storytelling, nature-based education,* and *co-creation*) that could help create emotional, and stronger connection between people and the local varieties. However, further research is needed, for example documenting characteristics of the local varieties and examining how to increase the number of local seed producers, for any greater re-introduction to happen. Still, bringing local varieties to the center of the public kitchen garden, and incorporating the suggested tools, can help build the foundational awareness needed for further action.

Appendix I

Table 6 - List over kitchen vegetables grown in Sweden 1700-1800, retrieved from Björn Hansson and Marie Hansson (2002). Note that even if the crops were available, they were more or less common, and what was grown differed depending on wealth, status, and region.

Kitchen vegetables available in Sweden 1700	
Onion (*Matlök)*	*Allium cepa*
Shallots	*Allium cepa* Aggregatum
Spring onion	Allium fistulosum
Leek	*Allium porrum*
Garlic	*Allium sativum*
Sandleek	Allium scorodoprasum
Victory onion	Allium victoralis
Chervil common	Anthriscus cerefolium
Celery	Apium graveolens
Aspergus	Asparagus officinalis
Garden orache	*Atriplex hortensis*
Wintercress	*Barbarea verna*
Mangold	*Beta vulgaris* Mangold gruppen
Beets	*Beta vulgaris* Rödbeta gruppen
Swede	*Brassica oleracea*
Winter cabbage (*Vinterkål)*	*Brassica oleracea* Alba
White cabbage	*Brassica oleracea* Alba
Cauliflower	*Brassica oleracea* Botrytis
Kohlrabi	*Brassica oleracea* Gongylodes
Broccoli	*Brassica oleracea* Italica
Red cabbage	*Brassica oleracea* Rubra
Savoy cabbage	Brassica oleracea Sabauda
Green kale	Brassica oleracea Sabellica
Cabbage *(krusig brunkål)*	Brassica oleracea Sabellica
Cabbage *(kruskål)*	Brassica oleracea Sabellica
Cabbage *(fjäderkål, plumasiekål)*	Brassica oleracea ssp. acephala var. selensia
Turnip	Brassica rapa
Rampion	Campanula rapunculus
Endive	Cichorium endivia
Chicory	Cichorium intybus
Common scurvy-grass	Cochlearia officinalis

Cardoon	Cynara cardunculus
Artichoke	Cynara cardunculus Scolymus
Carrot; yellow, white, red	Daucus carota ssp. sativus
Fennel	Foeniculum vulgare
Strawberry	Fragaria X ananassa
Jerusalem artichoke	Helianthus tuberosus
Lettuce	Lactuca sativa
Garden cress	Lepidium sativum
Parsnip	Pastinaca sativa
Parsley Moss Curled	Petroselinum crispum
Flat-leaf parsley	Petroselinum crispum Foliosum
Root parsley	Petroselinum crispum Tuberosum
Runner bean	Phaseolus coccineus
Bean	Phaseolus Vulgaris
Brown beans	Phaseolus Vulgaris kokböna
Pea; e.g. Green pea, sugar snap pea, snow peas	Pisum sativum
Garden portlac	Portulaca oleracea ssp. sativa
Radish	Raphanus sativus rädisa
Black radish	Raphanus sativus rättika
Patience Dock	Rumex patientia
Acid sorrel	Rumex rugosus
Scorzonera	Scorzonera hispanica
Skirret	Sium sisarum
Potato	Solanum tuberosum
Spinach	Spinacia oleracea
Dandelion	Taraxacum officinale
Salsify	Tragopogon porrifolius
Corn Salad	Valerianella locusta var. oleracea
In greenhouse	
Pineapple	Ananas comosus
Watermelon	Citrullus lanatus
Melon	cucumis melo
Cucumber	cucumis sativus
Pumpkin	cucurbita pepo
Spanish pepper, chili	Capsicum annuum

Appendix II

Interview guides

Katrinetorp Landeri

Historia

- När byggdes Katrinetorp?
- Av vem och i vilket syfte?
- Vad odlades och till vem? Vilka sorter och varifrån kom frön?
- Hur såg kökträdgårdens design ut jämfört med idag?

Katrinetorp idag

- Vem äger Katrinetorp idag?
- När blev det ett museum, och varför?
- Verksamhetens olika delar?
- Vad är syftet/målet med verksamheten?

Kökträdgården

- Hur stor är trädgården?
- Hur många arbetare?
- Vad odlas, varför?
- Vad görs med skörden?

Besökarna

- Vem besöker Katrinetorp idag? Vilka är er målgrupp?
- Hur många besökare kommer? Hur når man hit?
- Intresse för trädgård och kultur hos besökarna?
- Hur når informationen ut till besökare? Varför har just de metoder valts?

Äldre sorters köksväxter

- Används äldre sorters köksväxter idag? På vilket sätt? För- och nackdelar?
- Hur ser intresset ut hos besökare?

Utveckling

- Hur skulle ett större fokus på äldre sorters köksväxter se ut på Katrinetorp?
- Vilka möjligheter och/eller hinder finns?

Bjäre härads hembygdsförening

Verksamheten

- Hur ser projektet ut?
- Hur länge har projektet pågått?
- Hur har det finansierats?
- Varför startades det?
- Vad är målsättningen med projektet?
- Vilka fördelar ser ni med ökat intresse och användning av äldre sorters grödor?

Besökarna

Vilka är besökarna och har ni sett någon effekt av projektet än?

- Vilka är er målgrupp?
- Hur bedömer ni att intresset för projektet sett ut bland era besökare?
- Bedömer ni att de flesta har ett för-intresse för matkultur/äldre sorter/kulturarv redan innan de besöker er?
- Ser ni någon effekt av ert arbete hos besökarna, i så fall vilken? Uttrycket ökat intresse, kunskap eller användning av äldre sorter etc.?
- Hur tycker ni att projektet mottagits av andra aktörer, så som kockar, odlare, kommuner, länsstyrelse etc.?

Metoder

Kan du beskriva på vilket sätt ni arbetar för att sprida intresse och vad du tror krävs för att lyckas få genomslag även hos de som saknar förkunskaper eller intresse?

- Vilka metoder använder ni er av för att sprida kunskap och intresse?
- Varför har ni valt just de metoderna?
- Är det någon metod ni bedömer funkat bättre än andra?
- Är det någon metod ni skulle vilja testa eller utveckla? Hur och varför?

Utveckling

Kan du beskriva mer hur ni ser på framtida möjligheter?

- Vad tror ni projekt som detta kan bidra med till ett hållbart samhälle och matproduktion?
- Har ni sett några andra positiva (eller negativa) effekter av projektet?
- Vad bedömer ni är de största hindren i skapandet av ett kulturcenter och arbetet med att sprida kunskap om äldre sorters grödor?
- Finns det några särskilda strategier eller liknande som ni saknar eller skulle vilja se mer av?
- Vad är nästa steg enligt er? Varför?
- Hur hade ert arbete kunnat appliceras på andra verksamheter eller i andra kommuner?

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