Summer School Agrobiodiversity

Life Sciences und Facility Management

IUNR Institut für Umwelt und Natürliche Ressourcen

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Mini Case Studies

2024

QUERBEET - COMMUNITY SUPPORTED AGRICULTURE (CSA)

INTRODUCTION

- CSA: Direct cooperation between farmers and consumers; it involves participation, commitment & contributing to production costs instead of paying for product prices [1]
- Planetary Food Commons as another way to think about food & agriculture systems [2]
- Querbeet: Association founded in 2020; located in Grosswangen LU; cultivates vegetables on 0.9 ha for currently 96 members [3]

Research question:

- What are challenges and possibilities for CSA in general, and for Querbeet specifically?

RESULTS

- Challenges: Sustainable farming practices & taking on too much; time & changing food consumption habits; members recruitment & competition [4]
- Possibilities: strengthening membership support, increasing resources, changing laws [4]
- Resilience through: cooperative local food supply; market-independency & relationship between consumers/producers; transformative learning through practical empowerment [5]
- Querbeet: economic framework & keeping members as the biggest challenges; strong community support & resilience through sustainable and local cultivation of a variety of vegetables in different phases as key opportunities [3]

CONCLUSION

- CSA as a relevant player for sustainable transformation of food sector; they embody a form of economy in which new lifestyles and patterns of action can develop [5]
- What is the scalability of CSA?




Querbeet garden; working contribution; social event; delivery of vegetable bags (pictures of Querbeet members)

REFERENCES

[1] Kooperationsstelle für solidarische Landwirtschaft (o.J.). Kooperationsstelle. https://www.solawi.ch/kooperationsstelle/was-ist-solawi/

[2] Healy, S., Chitranshi, B., Diprose, G., Eskelinen, T., Madden, A., Santala, I. & Williams, M. (2020). Planetary Food Commons and Postcapitalist Post COVID Food Futures. Development, 63(2), 277–284.

[3] Interview with Philipp Z'Rotz, gardener and founder of Querbeet

[4] Sulistyowati, C. A., Afiff, S. A., Baiquni, M., & Siscawati, M. (2023). Challenges and potential solutions in developing community supported agriculture: A literature review. Agroecology and Sustainable Food Systems, 47(6), 834–856.

[5] Paech, N., Rommel, M., Antoni-Komar, I., & Posse, D. (2020). Das Wirtschaftsprinzip der kleinen Einheiten. Resilienz durch gemeinschaftsgetragene Versorgungsstrukturen am Beispiel Solidarischer Landwirtschaftsbetriebe. Haushalt in Bildung & Forschung, 9(4), 47–63.

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BREEDING FOR FUTURE

Motivation and Challenges of Small-Scale Breeders. A Case-Study of the GZPK in Feldbach, Switzerland

Over the last 20 years, the concentration of power in the seed market has increased significantly, with the ten largest companies now controlling about seventy percent of it [1]. This concentration of power affects biodiversity, as it often leads to a focus on the development of only a few high-yield crops, crops that are typically highly dependent on inputs and/or crops which are highly specialized and poorly resistant to unexpected wheather events [1], [2], [3]. This concentration of power also increases the financial dependency of farmers, who, due to the rise in unexpected events and market pressures, are constrained to work with only a few actors and know-how on breeding techniques is getting loss [2]. Around the globe, small-scale breeders are addressing these challenges by offering alternatives to conventionally bred crops. They work to meet the needs of organic farmers, develop crops that are resilient to extreme weather events, offer an alternative to large private companies and thereby contribute to preserving biodiversity. This poster presents a pioneer initiative, Getreidezüchtung Peter Kunz (GZPK), based in Feldbach, Switzerland, which has been engaged in organic breeding of cereals, legumes, and other crops since 1970.

BREEDING PROCESS IN A NUTSHELL

Fig 1: GZPK

Genetic diversity of crops and livestocks

Cereals (wheat, spelt, emmer, triticale), **legumes** (peas and lupins), **sunflowers** and **maiz** are bred for organic and biodynamic farms in Europe. By enlarging and increasing their offer, they allow farmers a greater choice in food crops. They work on project to increase the use of legumes in agriculture and advocate for their implementation.

Species diversity within crops and livestocks

GZPK focuses on breeding crops that are tailored-made to a farm's climatic enviroment, that are resilient to unexpected wheather events and that provide an acceptable yield: all-rounders. On the contrary, conventional breeders will mostly focus on yield. Wiwa, a wheat crop that was authorized in 2005 is now the main used wheat in germany and switzerland in organic farming and has shown many good results over the years [5].

Diversity of stakeholders

GZPK offers an alternative to conventional breeding programs. Additionally, **they work closely with stakeholders across the entire food system**—farmers, researchers, policymakers, producers, and others—to actively bring their newly bred seeds to market and **strengthen the network** of organic breeding. They also advocate for greater financial **involvement from the entire food system**. For that, they currenty are starting a project with a supermarket chain in Switzerland.

Ecological adaptation, Resilience and Sustainability

The work of GZPK enables the breeding of resistant varieties for organic farming. One breeding program focuses on creating **varieties that can be tailored to specific farms** (cf. Klimafenster), thereby enhancing farm resilience to climate change. They closely with partner farms to create species that are adapated to the site.

Social adaptation, Resilience and Sustainability

GZPK currently focuses on **collaborating with various stakeholders along the food chain,** thereby strengthening existing networks. Additionally, GZPK offers internships that enable career changers to begin working as breeders. This program **facilitates knowledge transfer, ensures a well-educated next generation of breeders**.

Economical adaptation, Resilience, and Sustainability

GZPK's costs for bred seeds are mostly covered by foundations, companies or association, thereby reducing the financial burden on farmers. Due to a **strong network**, they maintain close collaborations with other associations and farmers, thereby strengthening their economic stability. Additionally, they participate in **reducing the economic dependance of farmers** on conventional breeding companies and developing alternative markets.

GZPK plays an important role in providing farmers with an alternative to conventional seed companies, significantly contributing to increased crop and species biodiversity on the seed market and across European fields. Their crops are mostly all-rounders, and their breeding focuses on enhancing resilience, which is **essential for adapting to climate change.** Additionally, the organization collaborates with various actors in the food system, strengthening relationships, creating networks, promoting the craftsmanship of breeders, and thereby contributing to social resilience.

One major challenge is funding. Currently, GZPK's financial support comes from 17% licensing fees, 23% by projects financed by the government, and 48% from private donors. Another issue GZPK faces is **the seed certification policies** in Switzerland. Although the country has achieved high quality and yields, the genetics of current varieties are relatively uniform and these resistant all-rounders seeds often fail to pass certification due to not meeting the yield standards.

[1] Public Eyes, "Gefährliche Marktkonzentration."
[2] IPES-FOOD, "De l'uniformité à la diversité: Changer de paradigme pour passer de l'agriculture industrielle à des systèmes agroécologiques diversifiés.," 2016. [Online]. Available: www.ipes-food.org
[3] C. K. Khoury et al., "Crop genetic erosion: understanding and responding to loss of crop diversity," Jan. 01, 2022, John Wiley and Sons Inc. doi: 10.1111/nph.17733.
[4] C. Grovermann, M. Weiner, L. Levy, M. Locher, J. Manuel Herrera, and E. Winter, "Three decades of organic wheat improvement: Assessing the impact and returns on investment," Q Open, vol. 2, no. 1, 2022, doi: 10.1093/qopen/qoac005.
[5] J. Kotschi, J. Wirz, and M. / Dornach, "Wer zahlt für das Saatgut? Gedanken zur Finanzierung ökologischer Pflanzenzüchtung," 2015. [Online]. Available: www.sektion-landwirtschaft.org
[6] German Cooperation, "Agrobiodiversity – the key to food security, climate adaptation and resilience." [Online]. Available: www.bmz.de
[7] Swiss Academies, "Varietiy is the source of lige: Agrobiodiversity benefits, challenges, and needs," 2020.
[8] "Zu Besuch bei Freund*innen der Agrobiodiversität in ganz Europa." [Online]. Available: www.biobreeding.org/breeding
[9] GZPK, Available: https://www.gzpk.ch/

Would you like to discover more small-scale organic breeding initiatives in Europe? -->

The author's tip? Visit GZPK's fields next to lake Zürich before the harvesting and discover the colorful beauty of agrobiodiversity!

www.biobreeding.org/breeding

Agroecological Benefits of Chicken Egg Subscriptions

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Introduction to the Project

Grüezi Garte is an organic regenerative permaculture farm located in Allenwinden (ZG), Switzerland. Initiated in 2022 with a generational shift, the farm emphasizes preserving Switzerland's native species and varieties through various sustainable farming practices[1]. This case study is focusing on their most recent project initiated in 2024, the Chicken Egg Subscription, a community-supported animal husbandry model.

Background: The Poultry Sector

The global consumption of poultry products and eggs is increasing, leading to a corresponding rise in mass production[3]. Intensive breeding practices in the poultry sector are associated with a significant reduction in animal genetic diversity, leading to a narrowing of the genetic pool. This trend increases the reliance on feed resources that are suitable for human consumption, thereby competing with food production for valuable land resources[4]. Furthermore, these practices pose challenges to maintaining animal health and welfare, as the emphasis on high productivity often results in compromised living conditions and increased susceptibility to diseases.

Figure [2] : Chicken and Rooster at Grüezi Garte , May 2024.

Agrobiodiversity Contributions

A mobile henhouse and spreading of chicken manure on surrounding pastures and trees enhances biodiversity on the farm, promoting a rich ecosystem of microorganisms, which improves animal and soil health.

The dual-purpose breed "Coffee and Cream" enhances genetic diversity on the farm, while enabling the avoidance of vaccinations, medications, and antibiotics[5]. Both female and male chicks are raised, further increasing diversity of the flock.

Regular relocation of the henhouse reduces the buildup of pathogens and parasites in the soil, lowering the risk of disease[6]. Access to fresh pastures and vegetable scraps provides chickens with a variety of natural food sources, improving their overall health. Due to the ample space and enrichment, there is significantly less feather pecking and injuries[7].

Consumers engage directly with the farm, raising awareness of sustainable and ethical farming while fostering appreciation for local food. Upfront payment ensures stable and predictable farm income.

This project is made possible through various stakeholders, including NGOs, national and local authorities, foundations, donators, volunteers, and customers.

Farm Focus	- Organic, regenerative, community-supported agriculture and animal husbandry - Native species and biodiversity preservation - Natural habitat restoration - Educational programs and events
Project Status	- The first flock moved to the farm in April 2024 - 40 out of 50 subscriptions have been sold - Roosters were slaughtered in August 2024 - No complications or diseases so far - Hens will start laying eggs in November 2024

The Chicken Egg Subscription

How does it work?

- Customers sponsor a hen and a rooster
- Resilient and extensive dual-purpose breed
- The subscription is paid in advance

What do customers receive in return?

- 4-6 eggs per week for 2 years
- Rooster meat after 20 weeks
- Soup hen meat after 2 years
- Ethically and locally produced animal products

Conclusion

While fostering genetic diversity, enhancing soil health, and promoting animal welfare and farm biodiversity, the Chicken Egg Subscription ensures a stable income for the farm while delivering high-quality, ethically and sustainably produced food to customers. This initiative exemplifies a holistic and resilient animal husbandry model setting a benchmark for sustainable farming practices.

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grüezi garte ERLEBNIS, GENUSS, NATUR.

References

1) *Grüezi Hühnerabo (2024)* https://gruezigarte.ch/gruezi-gackerei/
2) *Chicken and Rooster at Grüezigarte. Photograph by M.Jäggi (2024)*
3) *Windhorst, P. (2023). Remarkable dynamics of the global poultry industry.* https://www.poultryworld.net/the-industrymarkets/market-trends-analysis-the-industrymarkets-2/remarkable-dynamics-of-the-global-poultry-industry-2
4) *Baur & Krayer (2021). Schweizer Futtermittelimporte – Entwicklung, Hintergründe, Folgen.* https://digitalcollection.zhaw.ch/server/api/core/bitstreams/9425bfd3-455c-4fd8-bf7e-5e2169e799bb/content
5) *Ökologische Tierzucht (2023). ÖTZ Zweinutzungshühner.* https://www.oekotierzucht.de/wp-content/uploads/2023/02/230209_ÖTZ_Katalog_2023_Web.pdf
6) *Brenninkmeyer & Knierim (2014). Förderung der Tiergesundheit und des Tierwohls ökologischer Legehennen in Europa.* https://orgprints.org/id/eprint/29166/
7) *Pfeifer & Ossowski. (2021) Abschlussbericht EIP-Agri-Projekt Hühner werden Mobil.* https://www.oekolandbau.rlp.de/Internet/global/Themen.nsf/de93e0a3faaa9c06c1258170003050 78/4a2871f4ee5ecfe0c12587a700472950/$FILE/Abschlussbericht_EIP%20Hühner%20werden%20mobil_final.pdf

ZHAW Agrobiodiversity Summer School
Slovenia, 2024

Cluster Development Projects
Lessons from Montenegro's Olive Growers Cluster

Yanna Raykov

Background

Montenegro, like most of the Balkan region, still has relatively high agrobiodiversity[1], in part due to the absence of full industrialisation of agri-food systems in the region, with high levels of smallholder farming and extensive agriculture persisting.

Olive trees have been present in Montenegro for **over 2000 years**, with olive oil production becoming an established part of local culture by the 6th century[2]. The endemic Žutica olive tree variety dominates in Montenegro[3] (95-98% in Bar and Ulcinj, 65% on average elsewhere).

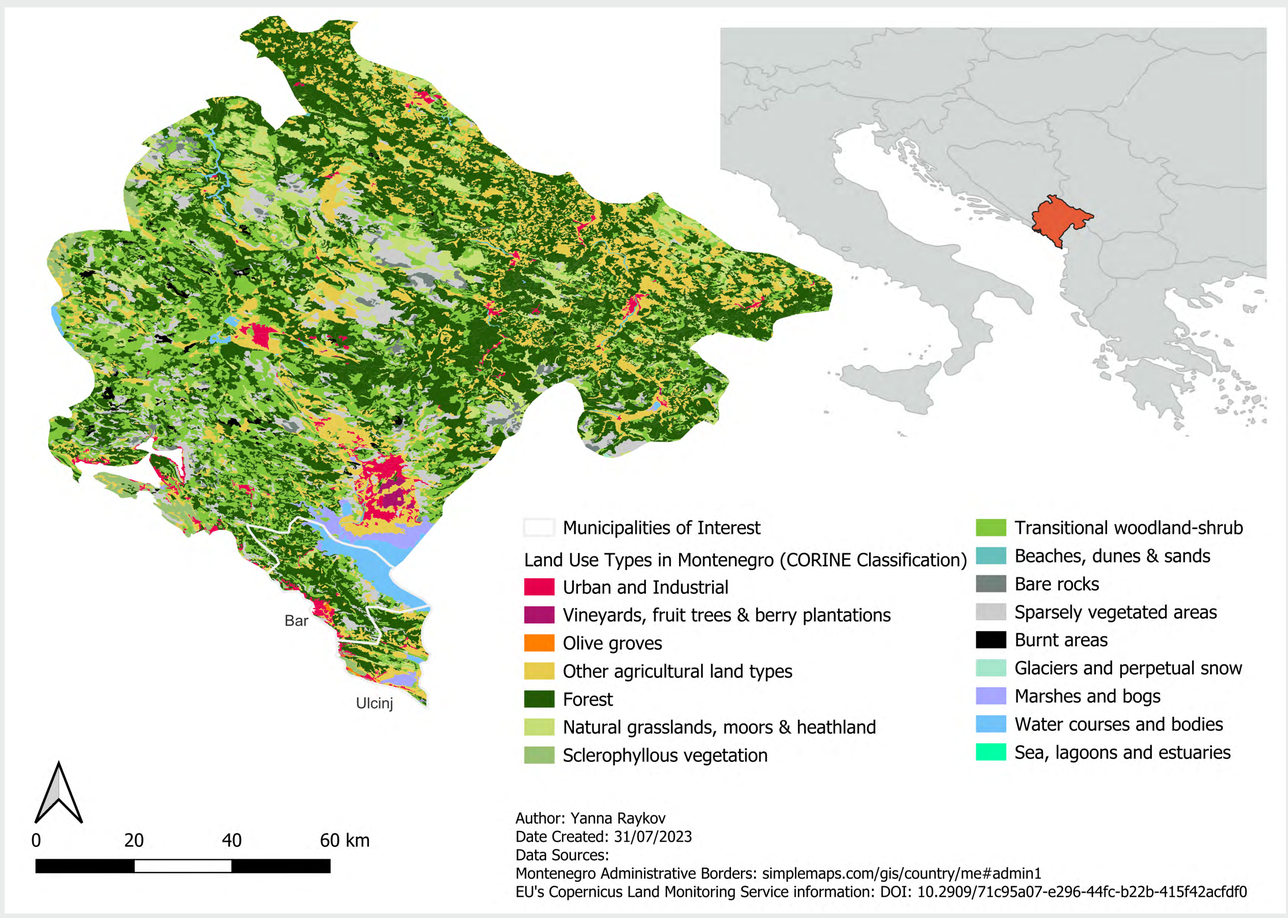

Fig.1 Land Use Types in Montenegro

Challenges faced by olive growers today include:

- Limited business acumen and understanding of foreign markets.[7]
- Lack of knowledge sharing between growers.[7]
- Property development for tourism.
- Rural population decline, due to ageing and migration.[1]
- Low awareness of / indifference to importance of agrobiodiversity.[1]
- High price of Montenegrin oil versus imports.[3,5,7]
- Neglected olive groves – although the half-decade to 2017 saw a positive trend in terms of number of trees restored and planted.[7]

Recommendations[7]

Producers

- **Training**: business development, marketing, primary production, quality management systems and standards…
- Expand and simplify access to **financial resources**
- Enable **knowledge sharing**

Product

Quantity

- Restore existing groves and identify potential sites for new ones
- Encourage **intensive** olive cultivation methods
  - → Introduce modern **technologies** for primary production e.g. irrigation
  - → Improve **processing** capabilities e.g. mills, storage

>> Reduced prices versus imports and increased competitiveness

Quality

- Introduce **protected geographical indications**
- Introduce **quality** management system e.g. ISO
- Preserve **organic** cultivation methods alongside more intensive ones

Marketing

- Develop a **wider range of end products** e.g. souvenirs, cosmetics
- **Promotional campaigns** at home and abroad
- Gain improved access to **international markets**

Project Objectives

In 2015, UNIDO, together with the UNDP and Montenegrin government, began the "***Enhancing the Competitiveness of Local SMEs in Montenegro through Cluster Development***", project in Bar and Ulcinj.[2,4,6]

Objective: to set up a cluster for traditional olive growers, as well as a luxury brand (42°N 19°E) → improve sales using marketing that highlighted the unique terroir of this region.

Potential benefits of revitalising small-scale olive growing:

- Preservation of multiple autochthonous olive (sub)species (e.g., Žutica, Crnica, Lumbardeška, Sitnica, Šarulja[3]).
- Preservation of diverse, naturally-valuable agricultural land[3], due to old olive groves' semi-natural understorey.
- Prevention of land use conversion e.g. to other types of more intensive farming or for property development.
- Preservation of diversity in olive and olive-derived products - otherwise even greater amounts must be imported to meet local demand.
- Reduced decline of rural populations - traditional methods can be passed on to younger generations where there are improved prospects.

>> long-term survival of this traditional food product and way of life, and protection of the endemic Žutica species.

Outcomes

The cluster ultimately **failed** to gather momentum after the initial project phase and is inactive today.[6] Ćazim Alković feels this is due to the failure to persuade olive growers of the medium-to-long-term benefits of such an organisation and generate interest.

However, the Olive Growers Association of Bar has recently joined another agricultural cluster, started in Nikšić, and which in 2023 became a member of the EU's COPA-COGECA group.[6,8]

Fig.2 Stara Maslina ("Old Olive"), Bar. It was harvested for several years for 42°N 19°E oil production, but recently its care was passed to the Municipality of Bar.[6] Despite warnings from Bar's Olive Growers Association, part of the tree sadly dried out.

References

1. Jovovic et al (2018). Agrobiodiversity in Southeast Europe - Assessment and Policy | Country Report - Montenegro.
2. Društvo Maslinara Bar: oliveoilmontenegro.me/pages/about/
3. Lazovic, B. (n.d.) www.efncp.org/download/OlivefarminginMontenegro.pdf
4. Zhong Xingfei. (n.d.). www.unido.org/news/montenegro-capitalizing-thousand-year-old-olive-trees
5. Lazovic et al (2014). IOBC-WPRS Bulletin, 108, 3–11.
6. Alković, Ć. (2024, July 12). Personal communication [Text messages]
7. Moric et al. (2017). Život Među Maslinama: Smjernice za razvoj održivog maslinarstva u Crnoj Gori.
8. Mandić, S. (2023). www.vijesti.me/vijesti/drustvo/684671/poljoprivrednici-iz-crne-gore-postali-vidljivi-i-u-evropskim-institucijama

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Vegetable production for farm diversification in mountain areas

Maurin Huonder

Summer School Agrobiodiversity 2024

Short description of the case

- Case of an innovative Farm in Mountain Region
- 1400 meters above sea level
- About **30 acres of agricultural land**
- Run by 3 people from different parts of Switzerland
- Diversification by **Vegetable cultivation** alongside traditional livestock farming
- **Enhancing direct marketing** by establishing a community-based agriculture
- Creating added Value by Generating new revenue streams
- Strengthen **ecological production** by extensive grassland management for sustainability

Stakeholders

Role of consumers in a CSA

- Consumers are key stakeholders in CSA farms
- Provision of stable financial support and market stability
- They support promotes sustainable farming practices
- They foster community and connection to their food

Aspects of agrobiodiversity covered by the case

Genetic diversity of crops and livestock

- Preservation and enhancement through collaboration with species conservation and organic breeding organizations
- Cultivation of rare vegetable varieties to maintain a diverse gene pool

Species diversity within crops and livestock

- Cultivation of a big variety of different types of vegetables, buckwheat, and other rare grains
- Keeping rare but well adapted livestock

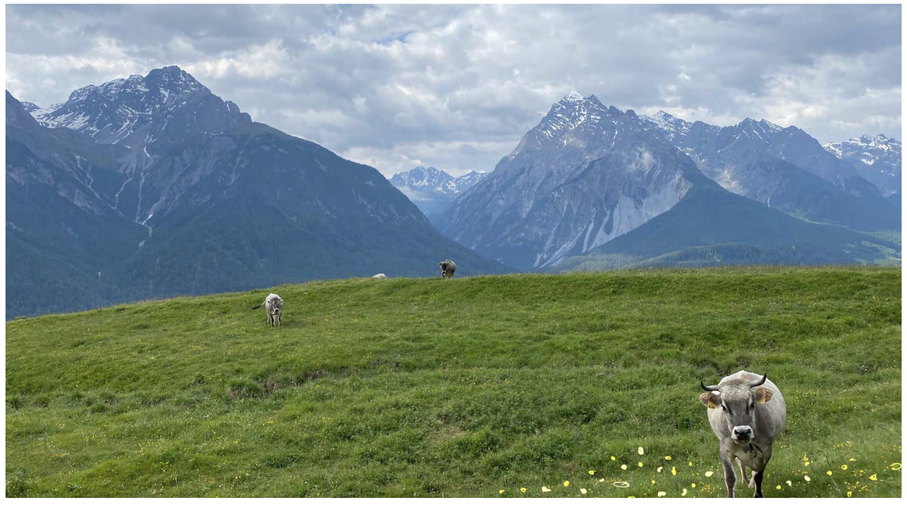
Diversity of production and food supply systems

- Growing vegetables in regions where it's uncommon, reducing the need for long-distance transportation

Diversifying local food supply and supporting local economies

Biodiversity of agricultural land

- Preservation of unique alpine species adapted to mountain environments



animal and plant species or varieties

- Cultivation of around 40 different types of vegetables, buckwheat, and other rare grains
- Keeping rare livestock breeds like Rhätisches Grauvieh and sheep
- Breeds optimally adapted to the natural conditions at the location

Benefits

- Diversify crops to adapt to climate change
- Warmer temperatures can benefit vegetable cultivation
- Reduce livestock farming intensity
- Increase plant-based food production, especially in mountainous regions
- Produce and consume locally
- Boost local economies and raise consumer awareness

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Challenges

Persistence

- New business with evolving local support and membership
- customer base has shifted towards more local support and membership growth by the second year

Agricultural sector

- High workload demands long-term dedication with little income
- Sustaining long-term commitment in agriculture requires considerable dedication

References

https://bio-chavalatsch.ch/
https://www.klimabauern.ch/
https://www.blw.admin.ch/blw/de/home/instrumente/direktzahlungen/biodiversitaetsbeitraege.html

LBV Lindenhof: Biodiversity, Agriculture, Research and Education

Introduction, Topic & Purpose

Lindenhof is located in Bayreuth, Germany and is a regional branch and a project of LBV (Landesbund für Vogel–und Naturschutz in Bayern e.V. (the State Union for the Protection of Birds and Nature of Bavaria).

Lindenhof has a large natural area (17 ha) with biotopes and plenty of agrobiodiversity practices. It is a unique educating and research centre with focus on biodiversity conservation on a farm site. It covers all the agrobiodiversity aspects and comprises a variety of sites, projects and stakeholders (Lindenhof–Bayreuth Jahresprogramm 2023, der Lindenhof in Bayreuth, 2023).

As Lindenhof is such a unique multipurpose centre related to both agriculture and biodiversity, I decided to investigate in detail how exactly this project functions, how it is related to biodiversity and species conservation, how it helps to promote sustainable agriculture, how it raises funds, how it unites so many stakeholders, and why it was organised this way. In addition, I was open to all interesting facts I could learn about.

Fig. 1 Lindenhof. The main building

Fig. 2 The natural site of Lindenhof

Results

In 1960s, this area used to be a farm. However, this area is very important for cold air circultation in Bayreuth. Water evaporates here from the natural water sources. This area is not suitable for settlements because of the natural waters, and it is not a priority for intensive agriculture due to heterogenious soils. Also, Lindenhof is an important corridor for migrating birds. Therefore, it was decided (at the city administration level) that this land is the best for natural protection (Thaßler, 2024).

Nowadays, Lindenhof has a pollinator garden, a teaching apiary, organic plant beds, an energy path, a hedgehog garden, and 150 fruit trees (apples, pears,..) with old varieties Lindenhof–Bayreuth Jahresprogramm 2023, der Lindenhof in Bayreuth, 2023).

Piles of dead wood, leaves, hedges, and stones provide biological pest control by hedgehogs, birds, common toads, and slow worms. The outside areas are habitats for rare bird species, insects, amphibians, and orchids. Some native herb species are planted for insects and birds (LBV Bayern, 2024).

Composting and closed cycles reduce waste, produce natural fertilizers, and increase yields. Soil fertility, and intact nature with an abundance of species are possible without peat, pesticides and herbicides and with less work. LBV works not against natural processes or cycles (LBV Bayern, 2024).

The local organic farmer brings his catttle to Lindenhof. Extensive grazing means that there should be enough land for every animal. While cows feed on grasses, goats prefer shrubs, and this way these animals sustain the necessary landscape. They also provide amphibians, wild bees and other creatures with the specific habitat by trampling with hooves(Thaßler, 2024).

There are many stakeholders including the Univerisity of Bayreuth, the horticultural association of Upper Franconia, the beekeeper's association, volunteers from "Bundesfreiwilligendienst", basic members, different individuals and companies which rent the facilities, etc. There are 3200 members of LBV just in Bayreuth. Members and organisations rent rooms and facilities and pay a yearly membership fee (Thaßler, 2024).

Money comes from the headquarters to Lindenhof for scientific reports. 2 different protection projects: peatland research book and black stork project . Protection and educational projects are co–financed by the Bavarian government. Most money comes from the research projects of the environmental government. Lindenhof does not produce any "physical" goods for sale (Thaßler, 2024).

Conclusions

Lindenhof unites a variety of stakeholders under scientific research projects and renting the facilities. Different events such as festivals, excursions, lectures and workshops invite many people. The natural area is uniquely suited for nature conservation. Lindenhof benefits from the organic farmer and his cattle, the horticultural organisation, the beekeepers, the basic members, etc. The most money comes from scientific research and basic members fees. To conclude, Lindenhof is a good example of preserving the natural environment and biodiversity, having an organic farm with cattle, uniting scientific research, education and leisure activities, and earning money from sustainable practices and events. It could be used as a prototype for scaling up in different regions.

Fig. 3 The vegetable garden

References:
- Der Lindenhof in Bayreuth (accessed 17.06.2024) LBV Lindenhof website https://bayreuth.lbv.de/lindenhof/
- LBV Bayern (accessed 21.06.2024) LBV Bayern YouTube channel https://www.youtube.com/@LBVBayern
- Lindenhof–Bayreuth Jahresprogramm (2023) Booklet by LBV
Bezirksgeschäftsstelle Oberfranken, LBV kreisgruppe Bayreuth, Swanti Bräsecke–Bartsch
- Thaßler O. (03.07.2024) An oral interview with the Lindenhof director Dr.–Ing. Oliver Thaßler

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Integrating Herbaceous Legumes for Pest and Disease Management in Smallholder Farming Systems in Kenya

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Introduction

- Integrating **herbaceous legumes** into smallholder farming systems helps **suppress pests and diseases** by enhancing soil health through **nitrogen fixation and organic matter** addition, releasing **allelochemicals** that inhibit pests, **providing habitats for beneficial insects**, increasing crop diversity to disrupt pest life cycles, and acting as trap crops to attract pests away from main crops; thereby contributing to the transition to sustainable agroecological food systems

Materials and Methods

Key Informant Interviews (KII) with agricultural extension officers, experienced farmers, and Kenya representatives from the Research Institute of Organic Agriculture (FiBL), Questionnaire Interviews with smallholder farmers, secondary sources and field observations were used to investigate role of herbaceous legumes (cowpeas, Mucuna, Desmodium and velvet bean) in pest and disease management within smallholder farming systems in Kenya

- Data Analysis:

- Qualitative Analysis: Responses from KIIs and open-ended questions in questionnaires were analyzed using thematic analysis to identify common themes, patterns, and insights.

- Quantitative Analysis: Data from closed-ended questionnaire responses were statistically analyzed to determine the impact of herbaceous legumes on pest suppression, crop yields, and soil health.

Intercropped maize and cowpeas

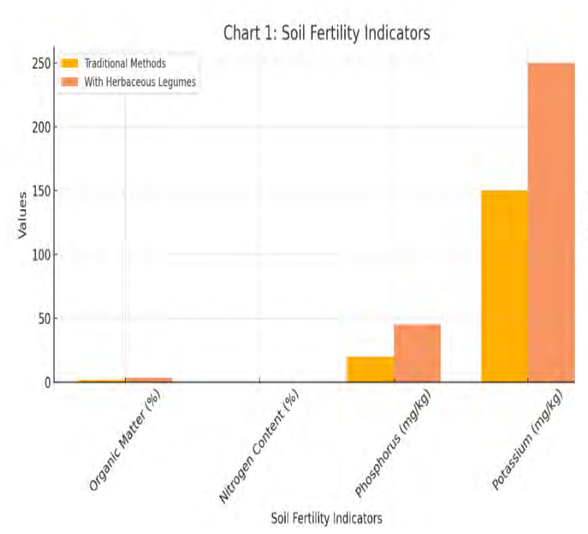
Conclusion

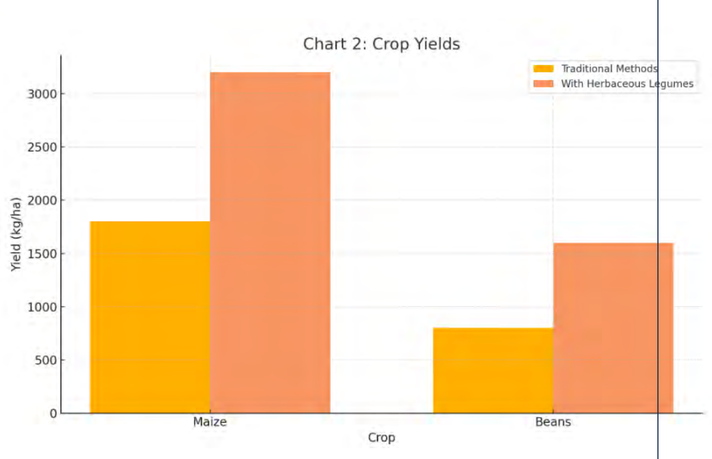
Integrating herbaceous legumes into smallholder farming systems in Kenya enhances soil health, agrobiodiversity, and crop yields while reducing reliance on chemical inputs, providing a sustainable solution to agricultural challenges. To ensure long-term success and promote food security, policies should support widespread adoption through incentives, training, and alignment with global sustainability goals.

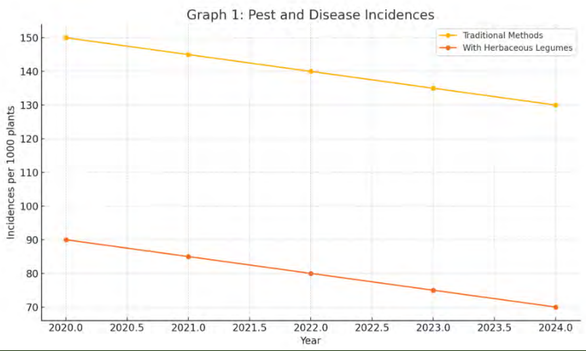
Agrobiodiversity aspects

- Integrating herbaceous legumes into smallholder farming systems enhances agrobiodiversity by increasing **plant species diversity**, **providing habitats for a variety of beneficial organisms,** and promoting a balanced ecosystem that supports **natural pest control and soil health**.

Results

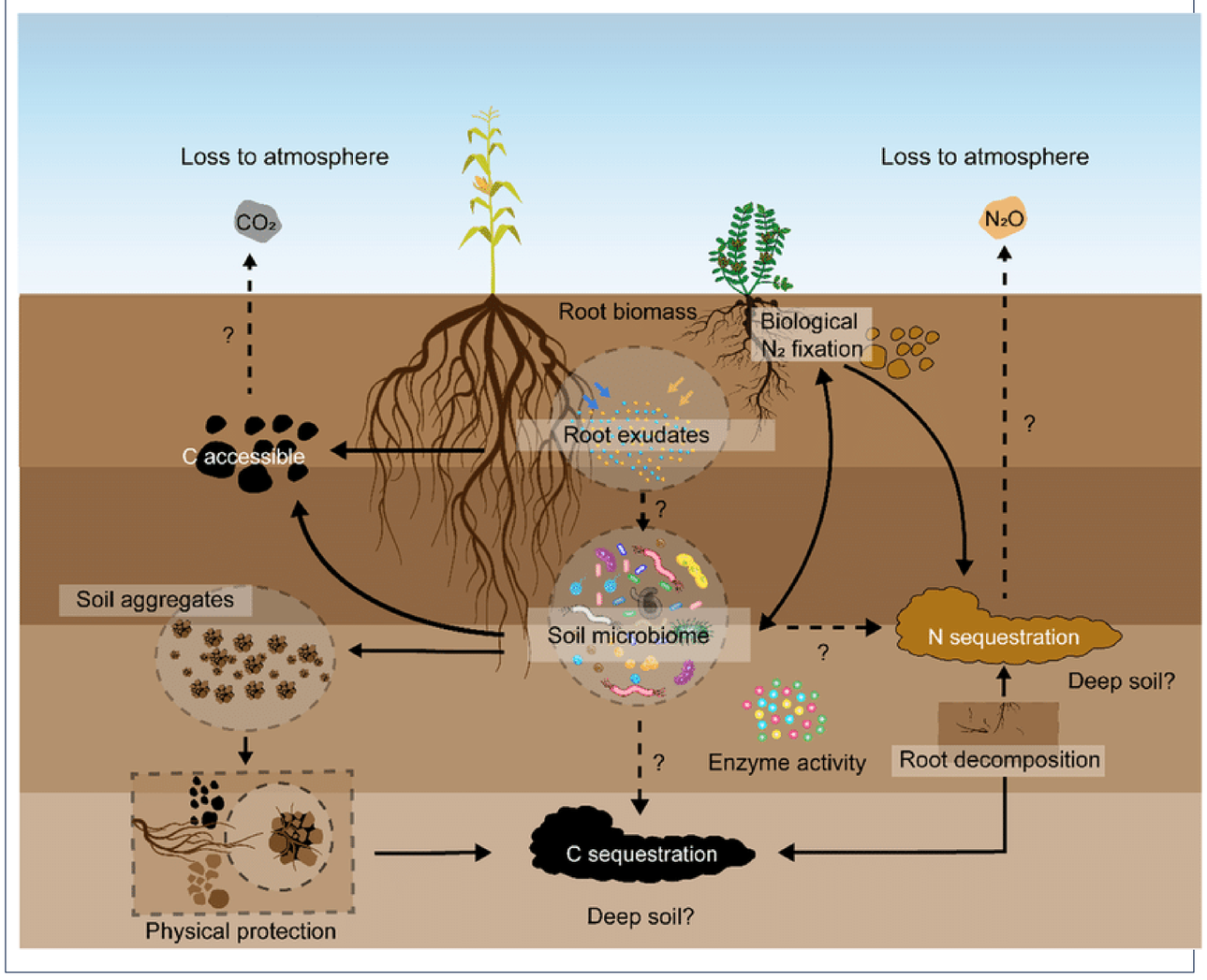






Discussion

Integrating cowpeas, Mucuna, and Desmodium into smallholder farms improves soil fertility, soil structure, and pest management, resulting in higher crop yields, better food security, and growing adoption rates among farmers.



Key References

Kariuki, M. W., Mwangi, H. M., & Otieno, J. O. (2023). "Evaluating the Impact of Herbaceous Legumes on Pest Suppression and Crop Yield in Smallholder Farms in Kenya." Agricultural Research, 12(1), 45-56.

Kiboi, M. N., Macharia, J. K., & Njagi, E. M. (2024). "Sustainable Farming Practices: The Role of Herbaceous Legumes in Enhancing Biodiversity and Soil Fertility." Sustainability, 16(2), 1123.

Maina, M. M., Gitari, H. I., & Gachene, C. K. (2021). "Impact of Legume Cover Crops on Soil Health and Maize Yields in Smallholder Farming Systems of Kenya." Journal of Soil and Water Conservation, 76(2), 153-161.

Mutua, L. M., Kimani, P. M., & Mugo, R. W. (2023). "Adoption of Agroecological Practices in Smallholder Farms: The Case of Legume Integration in Kenya." Agroecology and Sustainable Food Systems, 48(1), 101-114.

Innovation and curiosity - the way to resilience

Based on the farm “Le Safran du Jorat”

Juliette Aymon - aymonjul@students.zhaw.ch

Resilience has been identified as key measure that helps farms adapt to external environmental changes and shocks, especially related to climate and diseases, but also to economic and social factors such as inflation and consumer behavior. Agrobiodiversity represents one way towards resilience. This poster shows concrete examples of **how a farm can build up resilience against external environmental and economic shocks**, based on the farm Le Safran du Jorat, which shows a very broad agrobiodiversity.

Diversity of practices

Agroforestry
Benefits of the keyline design are: shade, organic matter for hummus and animals, prevents damaging surface water flows & provides habitats.

No-till farming
No-till farming increases **soil fertility** (by preserving stable aggregates and soil biota, high biological activity, good nutrient and water uptake capacity and nutrient availability for plants). Additionally, it **prevents** considerably **soil compaction and soil erosion**.

Mechanical & biological pest/weed control
Thanks to diverse non-chemical practices to prevent pests and weeds, such as “Flasches Saatbett”, crop rotation, green manure and **interactions of crops with animals**, the farm ensures **fertile soils** and is **independent from industrial excipients**.

Diversity of stakeholders

Business cooperation
The Safran du Jorat works together with many local and national actors (e.g. neighbouring mill, butchery and national breeder advocate).

+

Friendly cooperation & facility sharing
Interactions characterized by skills sharing and exchange, not monetary (e.g. bee-keeper profits from crops in exchange of honey, farmer processes a neighbour’s crop and uses the rest for his animals)

Multi-level network
Network of local actors resulting from diverse interactions between the farm and stakeholders. This leads to more independence (i.e. price setting, production planning) and empowers local economy.

Highly diverse product range

The Safran du Jorat commercializes over **20 products,** is specialized in **niche products** and builds on the **multifunctionality** of its cultures: trees provide simultaneously fruits for juices and shade for animals; hemp results in eatable seeds and oil, and ground straw layers for cows. **On-farm activities,** such as flat rental and visits, also contribute to the farm resilience.

Niche products
- safran
- sechuan pepper
- birch sap
- walnut oil
- aronia berries

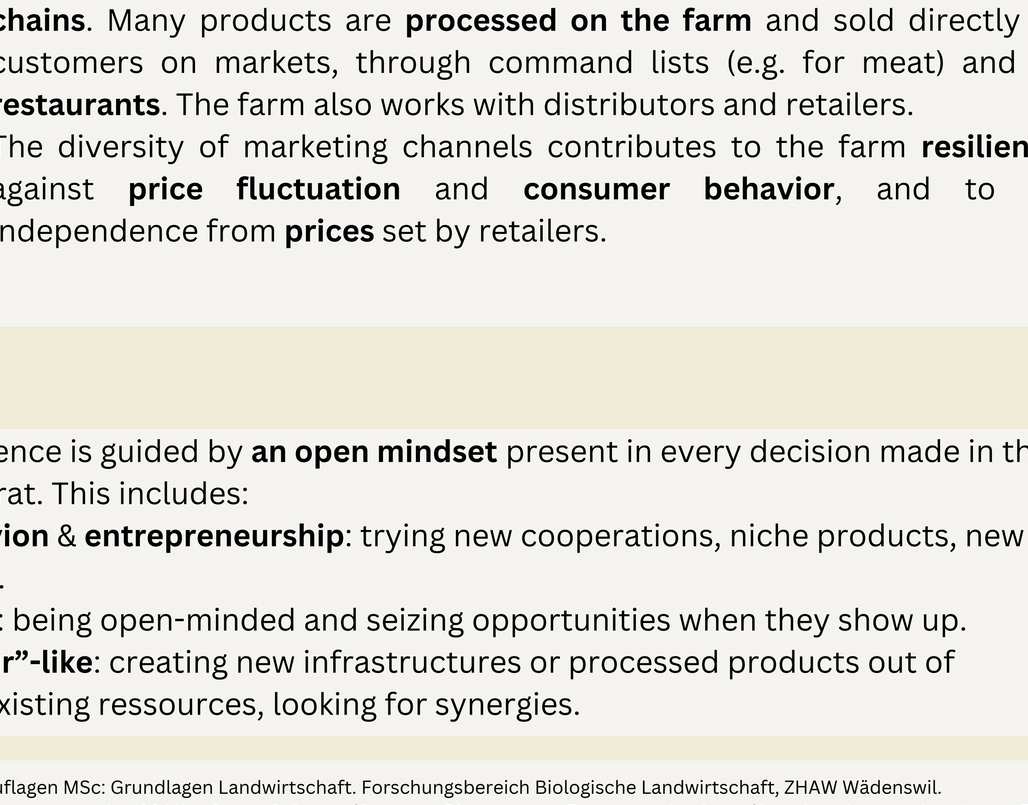
+ on-farm activities

Genetic diversity

> 10 animals species
> 15 plant species

Herds and fields on the farm are more **resistent against pests and diseases**. Some species, being ProSpecieRara ones, are also more resistent against external shocks.

Diversity of supply chains



The marketing on the farm mostly occurs via **short or direct supply chains**. Many products are **processed on the farm** and sold directly to customers on markets, through command lists (e.g. for meat) and to **restaurants**. The farm also works with distributors and retailers.
The diversity of marketing channels contributes to the farm **resilience** against **price fluctuation** and **consumer behavior**, and to its independence from **prices** set by retailers.

Conclusion

Resilience towards environmental and social/economic shocks results from agrobiodiversity on many levels. The Safran du Jorat shows a broad agrobiodiversity by:

- commercializing a **wide product range**, including niche products as well as on-farm activities.
- creating **various products out of one** raw ressource, which diversifies its line of products, maximizes its ressources and thus, reduces its use of external inputs necessary for other on-farm activities.
- creating a **network of (local) stakeholders,** based on commercial interactions, exchange of services, knowledge and experiences and on facility sharing.
- selling its products through **diverse marketing channels**, especially along short/direct supply chains, including restaurants.
- diversifying its **practices**, including agroforestry and synergies between/within animals and crops.

Finally, resilience is guided by **an open mindset** present in every decision made in the Safran du Jorat. This includes:

- **Innovativion** & **entrepreneurship**: trying new cooperations, niche products, new practices.
- **Curiosity**: being open-minded and seizing opportunities when they show up.
- **“Bricoleur”-like**: creating new infrastructures or processed products out of already existing ressources, looking for synergies.

- Boos, J. (2023). Auflagen MSc: Grundlagen Landwirtschaft. Forschungsbereich Biologische Landwirtschaft, ZHAW Wädenswil.
- Clerc, M. & Taramarcaz, J. (2011). Gute Gründe für den Biolandbau. Forschungsinstitut für biologischen Landbau, Frick. https://www.fibl.org/fileadmin/documents/shop/1553-gute-gruende.pdf
- Darnhofer, I. (2010). Strategies of Family Farms to Strengthen their Resilience. Env. Pol. Gov. 20, 212–222. Wiley InterScience. DOI: 10.1002/eet.547.
- Mäder, P., Dubois, D., Oehen, B., Schmid, O. & Felder, T. (2021). Einführung in biologische Landbau-Systeme. Forschungsinstitut für biologischen Landbau, Frick.
- ProSpecieRara. (n.d.). Warum alte Rassen erhalten? Schweizerische Stiftung für die kulturhistorische und genetische Vielfalt von Pflanzen und Tieren. https://www.prospecierara.ch/de/tiere/wissen/wissen-details/news/warum-alte-rassen-erhalten.html
- Prosperi, P., Galli, F., Moreno-Pérez, O.M., Chiffoleau, Y.,Grando, S., Karanikolas, P. et al. (2023). Disentangling the diversity of small farm businessmodels in Euro-Mediterranean contexts: A resilience perspective. Sociologia Ruralis, 63,89–116. https://doi.org/10.1111/soru.12407
- Jaisli, I., Mariani, E., Meier, R., Rieger, L., & Daniel, B. (2018). Designing sustainable food systems : an open E-learning course. Institut für Umwelt und Natürliche Ressourcen (IUNR), ZHAW Wädenswil.

ALLOTMENT GARDENS IN LYON - HOTSPOTS OF AGROBIODIVERSITY

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Home gardens in agrobiodiversity research

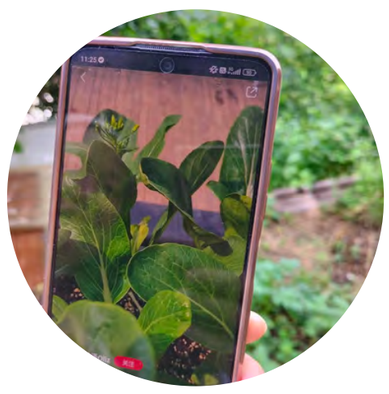
Although agrobiodiversity research on homegardens is limited, several scientists acknowledge that home gardens are integral to biodiversity conservation (Galluzzi 2010). They are often characterized by a high density of species, combining cultivated varieties with wild plants and ornamental flowers (Mattalia et al. 2018). These gardens serve as reservoirs for local plant varieties and endangered wild species, playing a crucial role in preserving plant genetic resources (Galluzzi et al. 2010). Homegardens are also central for conserving home garden knowledge that is often locally adapted (local ecological knowledge) and passed down over generations (Calvet-Mir et al. 2016).
This case study explores the dimensions of agrobiodiversity in allotment gardens in Lyon (France).

Habitat for wild animals

The small garden plots are surrounded by trees and hedgerows. The area also contains some meadows and forest patches, thereby creating a highly diverse landscape and a habitat for wild animals in the middle of the city.

High species diversity on a small scale

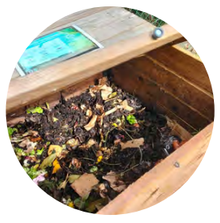
The gardeners obtain their seedlings and seeds from various sources, creating a high genetic diversity across all garden plots. Some even bring plant varieties from other countries to grow vegetables that they can't find in Lyon.



Conservation of landraces and wild plant species

The gardens play a role in conserving both old vegetable varieties and wild plants species. The cardoon, for instance, is considered a regional speciality and grows well in several of the garden plots. An endangered orchid species grows on one of the meadows.

Transmission and conservation of home garden knowledge



The Églantiers gardens also present a platform for sharing knowledge on agricultural practices or learn about sustainable gardening practices in workshops. The interviewed gardeners have learned gardening from their parents or grandparents and preserve their knowledge within the association. In addition, an area of the Églantiers gardens is used by school children of four schools for educational purposes.

History of Lyon's allotment gardens

Allotment gardens were created in Lyon (France) during or after the first world war in order to increase the food security of the inhabitants (Régis 2016). Many of them are used until today. The primary focus of the gardeners has, however, shifted a little bit; while in the past they cultivated the plots primarily to nourish themselves, today many create the gardens rather for personal pleasure. The remaining eight allotment garden complexes in Lyon are organized in the allotment garden association of Lyon.

Organization of the Jardin des Églantiers

The association of the *Jardins des Églantiers* offers around 100 garden plots situated on the slope of a small mountain. Nine people work for the association on a voluntary basis. The city of Lyon provides the land for the allomen gardens, but the association doesn't have to pay rent to the city.
In order to cultivate on one of the garden plots one has to

- become part of the association
- pay a yearly fee
- participate in two workshops per year where the association collectively takes care of the common spaces
- follow some rules (e.g., at least 60% of the plot has to be used for vegetable production and the use of herbicide is forbidden)

Allotment gardens as hotspots of agrobiodiversity

The Églantiers gardens provide a social meeting point for the gardeners from different cultural backgrounds, who all bring their personal knowledge and own vegetable varieties to create a hotspot of agrobiodiversity embedded in a big city.

References

- Calvet-Mir, L., Riu-Bosoms, C., González-Puente, M., Ruiz-Mallén, I., Reyes-García, V., Molina, J.L., 2016. The Transmission of Home Garden Knowledge: Safeguarding Biocultural Diversity and Enhancing Social–Ecological Resilience. Society & Natural Resources 29, 556–571. https://doi.org/10.1080/08941920.2015.1094711
- Galluzzi, G., Eyzaguirre, P., Negri, V., 2010. Home gardens: neglected hotspots of agro-biodiversity and cultural diversity. Biodivers Conserv 19, 3635–3654. https://doi.org/10.1007/s10531-010-9919-5
- Mattalia, G., Calvo, A., Migliorini, P., 2018. Alpine home gardens in the Western Italian Alps: the role of gender on the local agro-biodiversity and its management. Biodiversity 19, 179–187. https://doi.org/10.1080/14888386.2018.1504692
- Régis, M., 2016. Lyon : 100 ans de jardins ouvriers [WWW Document]. Lyon Capitale. URL https://www.lyoncapitale.fr/actualite/lyon-100-ans-de-jardins-ouvriers (accessed 7.14.24).

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AGROBIODIVERSITY THRIVES AT MARKET GARDENING FARM “ESSBLATT”

INTRODUCTION

The Market Gardening farm Essblatt, established in 2016, is around 15km away from Berne, the capital of Switzerland. Essblatt is trying to improve Agrobiodiversity through genetic diversity of crops, species diversity, biodiversity of agricultural land and diversity of agricultural management practices. Its goal is to produce and sell food locally in an agroecological and sustainable way. Barbara, the manager of the farm, has an holistic approach and focuses on climate adaption, erosion and closing the nutritient cycle.

GENETIC DIVERSITY ON CROPS AND LIVESTOCK

- **Seed Sourcing**: Barbara buys seeds from various organic suppliers
- **Genetic Diversity**: She uses heirloom and open-pollinated varieties, ensuring broad genetic diversity
- **Breeding**: Barbara breeds among others 50 different tomato varieties on her farm
- **Chicken Management**: She raises hybrid laying hens which are sourced from a local breeder in her region

SPECIES DIVERSITY WITHIN CROPS AND LIVESTOCK

- **Crop Diversity**: Essblatt Farm cultivates a wide range of crops, including multiple varieties within individual species (e.g., 50 tomato varieties).

BIODIVERSITY OF AGRICULTURAL LAND

- **High Biodiversity**: Essblatt Farm maintains high biodiversity across its 1.7 hectares of land.
- **Vegetable Cultivation**: 24 ares are dedicated to diverse vegetable species.
- **Agroforestry and Habitat Diversity**: The remaining land includes old apple species, hedges, edible and non-edible native shrubs, wild meadows, and deadwood piles.

Fig. 1: variety of vegetables on the market

DIVERSITY OF AGRICULTURAL MANAGEMENT PRACTICES

- **Crop Rotation and Intercropping**: Practices are implemented to enhance soil health and optimize resource use.
- **Permaculture and Regenerative Agriculture**: Principles of permaculture and regenerative agriculture promoted sustainable farming practices.
- **Erosion Control**: Fields are covered during winter e.g. with hay or a mulch foundation which is later integrated into the soil as fertilizer, using lightweight machines to preserve soil structure.
- **Soil Management**: Depth loosening is done manually with a digging fork, reflecting the high level of manual labor on the farm.
- **Plant Density and Mulching**: High plant density and consistent mulch cover prevent erosion.
- **Water Management:** A drip irrigation system is used for sustainable and efficient water use.
- **Fertilization**: Chicken manure is mixed with organic compost and used as fertilizer after one year.
- **Planting Technique**: The Paperpot machine, a lightweight and versatile tool, is used for planting seedlings.

Fig. 2: The Essblatt Farm

DIVERSTIY OF STAKEHOLDERS

- **Barbara**: Owner and manager of Essblatt.
- **Workers**: Individuals involved in daily operations on the farm.
- **Consumers**: Including market customers and subscription (Abo) members.
- **Society**: Broader community benefiting from sustainable practices.
- **Neighbours**: Local residents around the farm.
- **Stakeholder Engagement**: Events, Consumer Input and Market Interaction

Fig. 3: Barbara with the digging fork

DIVERSITY OF PRODUCTION AND FOOD SUPPLY SYSTEMS

- Weekly basket
- Market stand
- fresh vegetables
- wheat-grass spritzer

CHALLENGES & CONCLUSION

The agrodiversity at Essblatt farm offers numerous benefits, both ecological and socio-economic. By cultivating a wide variety of crops tailored to local climate conditions, Essblatt enhances soil health and resilience, making the farm better adapted to extreme weather events such as drought and heavy rainfall (Khoury et al., 2022). The diverse crop cultivation reduces dependency on single crops, ensuring economic stability while promoting local employment and educational opportunities in agroecology. Moreover, the farm strengthens the local economy by prioritizing regional sales and fostering a close producer-consumer relationship.

However, several challenges persist. The Swiss agricultural policy provides limited financial support for small-scale farms like Essblatt, despite the availability of the Code Permaculture (BLW, 2023) subsidies. These subsidies, though beneficial, are financially modest and involve complex application requirements. Additionally, finding motivated and skilled long-term labor is difficult due to the physically demanding nature of the work, dynamic weather conditions, and comparatively low financial rewards. The high cost of labor in Switzerland further exacerbates this challenge. Furthermore, the increasing frequency of extreme weather events poses a significant risk to crop yield and farm sustainability, with no insurance available to cover such damages.

In conclusion, while the high genetic and species diversity at Essblatt contributes to enhanced productivity, resilience, and climate adaptation, the farm faces ongoing challenges related to labor, financial support, and climate variability (Khoury et al., 2022). Addressing these challenges is crucial for sustaining the ecological and economic benefits that Essblatt's agrodiverse system provides.

REFERENCES

Bundesamt für Landwirtschaft BLW. (2023). Vollzugshilfe Merkblatt 6.2.
Khoury, C. K. et al. (2022). Crop genetic erosion: Understanding and responding to loss of crop diversity. New Phytologist, 233(1), 84-118.
Schmid, B. Essblatt Mikrofarm - Ökologischer und kleinstrukturierter Gemüsebau. Abgerufen am 7. Juni 2024, von https://www.essblatt.ch/
Schmid, B. (2024) Agrobiodiversity in Market Gardening. Interview with D. Schwarz.
Figures 1-3: Schmid, B. Essblatt Mikrofarm - Ökologischer und kleinstrukturierter Gemüsebau. Abgerufen am 7. Juni 2024, von https://www.essblatt.ch/

Summer School Agrobiodiversity

Diversity of agricultural management practices

The dawn of regenerative farming in Slovenia

how a second glance at ones plate transformed a young family into revolutionary farmers

Climate change mitigation techniques are currently one of the burning questions in today's society. Farming has been one of the key industries where many scientist, intellectuals and farmers are trying to find new and creative ways to try to reduce the carbon emissions and turn food productions from one of the biggest polluters to one of the biggest solutions to rising carbon emissions. One of this techniques is regenerative farming, known and used already across the world and slowly also coming to Slovenian soils.

So what is regenerative agricultre and why so special?

Regenerative agriculture is a system of farming principles that rehabilitates the entire ecosystem and enhances natural resources, rather than depleting them (Rodale Institute, 2020). It takes a systems-based, holistic look at the land being stewarded and applies various principles with the goal of making the land more productive and biodiverse over time. In most situations, improving soil health and function is the key to improving productivity and biodiversity (Smith D., 2024).

Implementing regenerative pracrices to land managment can:

Decrease GHG emissions
The current industrial food system is responsible for 44 to 57% of all global greenhouse gas emissions.

Improve yields
In cases of extreme weather and climate change, yields on organic farms are significantly higher than conventional farms

Create drought-resistant soil
The addition of organic matter to the soil increases the water holding capacity of the soil.

Revitalize local economies
Family farming represents an opportunity to boost local economies.

Nurture biodiversity
Nature friendly practices support variety of wild species.

Restore grasslands
using holistic managment grazing practices.

Regenerative agricultural practices include various land management practices, including:

- no or minimal tillage
- cover cropping and establish living roots
- holistic planned grazing
- integrating animals into fields
- enhancing biodiversity

(like planting diverse multi-species cover crop, implementing hedgerows, pols for birds of prey etc.)

(Kiss the ground, n.d.)

Dežman M. (2023). Kristina from kmetija Monera watering the market garden [photograph] Kmetija Monera. kmetijamonera.com)

The conditions in Slovenian agricultural scene:
- 68.331 farms (including 68.027 family farms)
- 474.633 ha of agricultural land in use

FARMING PRACTICES
- 51.640 farms (142.814 ha) use convencional farming practices (tillage), 19.274 ha are managed with minimal tillage
- 40.667 ha of farm land has bare soils during winter season, 80.787 ha have winter cover crops
- 3.430 registered ecological farms (42.181 ha)
- only 10 farms with regenerative agricultural implementations

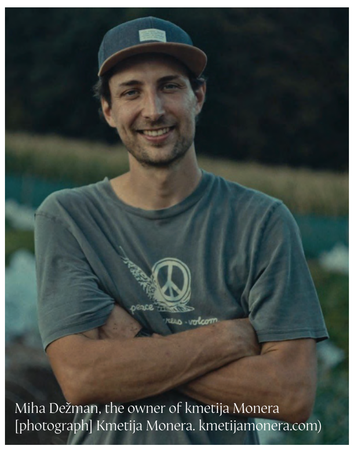
POLICIES REGARDING FARMING PRACTICES IN SLOVENIA
- policies for agricultural practices currently encompass integrated and ecological farming
- 4 organizations issue integrated and ecological certification: Inštitut KON-CERT Maribor, IKC UM, Bureau veritas and TÜD SÜD Sava
- it is also posible to obtain a certificat for biodynamic farming (via the organization KON-CERT)

(Ministrstvo za kmetijstvo, gozdarstvo in prehrano, 2024)

Kmetija Monera's logo. kmetijamonera.com

KMETIJA MONERA (FARM MONERA)

Established in 2020, the 15 ha farm in Šmarješke Toplice is the fir st of it's kind in the slovenian farming scene. Inspired by foreign regenerative advocates, like Allan Savory and Richard Perkins, the young couple, Miha and Kristina, found their calling, to produce healthy, nutrient-dense food for the local community.



Miha Dežman, the owner of kmetija Monera [photograph] Kmetija Monera. kmetijamonera.com)

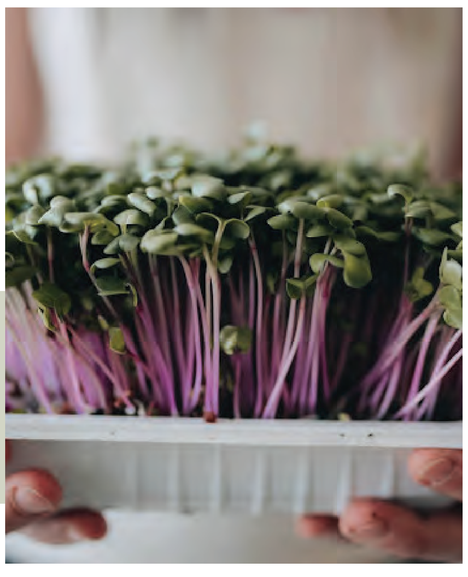
The main principle thus regenerative farm follows is holistic management (integrated from the swedish regenerative farmer Richard Perkins). This includes:

Free range broiler chickens
They are managed using holistic grazing practices, which includes daily movement of the animals, insuring the proper use of their ecological services, which consequently enhances soil fertility.

Pasture raised egg laying chickens
Through encoruaging chickens natural behavior to forage, the chickens are living in a low stress, stiulating enviroment. The eggs produce are chemical free and nutrient dense.

CSA market garden
Includes around 30 different species of vegetables, the produce is sold weekly via home-delivered veggie boxes.

Production of microgreens
Though not directly connected to the land, microgreens give the farm an extra level of diversity for their customers, giving them fresh produce all year long.



References
Reference 1: M. Dežman, personal communication, July 3, 2024.
Reference 2: Savory Institute. (2024, April 19). Holistic Management, Savory Institute. https://savory.global/holistic-management/
Reference 3: SURS. (2024, July 10). Število ekoloških kmetijskih gospodarstev in kmetijskih gospodarstev v preusmeritvi. https://stat.si
Reference 4: Kmetija Monera. (n.d.). Kmetija Monera. https://www.kmetijamonera.com/
Reference 5: Perkins R. (n.d.). Holistic management, Richard Perkins. https://www.richardperkins.co/holistic-management/
Reference 6: Ministrstvo za kmetijstvo, gozdarstvo in prehrano (n.d.). Ekološka pridelava, Portal GOV.SI. https://www.gov.si/teme/ekoloska-pridelava/
Reference 7: Kiss the ground (n.d.). Regenerative agriculture, Kiss the ground. https://kisstheground.com/education/resources/regenerative-agriculture/
Reference 8: Germanos, A. (2020, September 28). 'Regenerative Agriculture and the Soil Carbon Solution': New paper outlines vision for climate action. Regeneration International. https://regenerationinternational.org/
Reference 9: Rodale Institute. (2020, October 29). Regenerative Organic Agriculture - Rodale Institute. https://rodaleinstitute.org/

Photo references:
Title photo: Vladislavovich E. (2024). Vertical banner with green leaves. Freepik. https://www.freepik.com/free-photo/vertical-banner-with-green-leaves-wall-space-decoration-cafe-office-idea-screen.htm
Circular photos from left to right:
1: Modugo T. (2024). Kiss the ground. https://kisstheground.com/education/resources/regenerative-agriculture/
2: Rodale Institute (n.d.). FST 40-year report. https://rodaleinstitute.org/science/farming-systems-trial/
3: Miller A. (2021). Allan Savory Institure. https://savory.global/holistic-management/
4: Dežman M. (2023). Ogledi na regenerativni kmetiji Monera. https://kmetijamonera.com
5: Kramos G. (2010). Tallgrass Habitat with Wildflowers in Bloom. https://www.flickr.com/photos/51986662@N05/5180171154
6: Mann B. (n.d.). Holistic management. https://savory.global/holistic-management/
Square photos: Dežman M. (2023). Kmetija Monera. https://kmetijamonera.com

Author of this poster: Nina Trdan in collaboration with Kmetija Monera (August, 2024). Contact information: nina.trdan@gmail.com

Payment for Environmental Services in Pantanal

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Introduction

With more than 84% of its native vegetation preserved, the Pantanal is the most preserved biome in the world, in addition to being the largest floodplain on our planet, containing one of the largest known biodiversity reserves.
Among the main challenges are deforestation and the conversion of natural grasslands (Guerra et al., 2020). This practices has led to significant habitat fragmentation, with a 58% increase in deforestation between 2000 and 2018, resulting in an annual loss rate of 1.12% of native vegetation (MMA, 2020). This causes increased soil erosion and sedimentation of waterways, as well as reducing biodiversity and altering hydrological cycles. In addition, fires, both natural and man-made, pose a serious threat to the biome. These fires have devastating effects on flora and fauna and contribute significantly to greenhouse gas emissions, with estimated CO2 emissions of 140 million tons in 2020 alone (WWF, 2021). Pantanal farmers often face economic difficulties and lack of incentives for conservation.

PES In the Context of Pantanal

Payments for Environmental Services (PES) emerge as an innovative and promising approach to address these threats in the Pantanal (Tomas et al., 2019). PES provide economic incentives for landowners, rural producers, and local communities to be remunerated for the environmental services provided to society (Wunder, 2005). It is estimated that the Pantanal provides environmental services to humanity are US$ 100 billion (Bolzan et al., 2022).
With the approval of the new Pantanal law and its ongoing regulation, a new set of restrictions was created, protecting unique environments and limiting the conversion of areas within private properties, which correspond to 97% of the Biome's area in the state of Mato Grosso do Sul.
The Law creates the Pantanal Climate Fund, which must invest 90% of its resources in PES within the Biome, seeking to compensate farmers who preserve beyond what is determined by law, riverside and indigenous communities, as well as stakeholders who work in conservation.

The Study Case

The study case follows the process of creating the programs that will be applied in the Pantanal. Through a co-design methodology, dozens of actors were heard and interacted with the process of proposing public policy, which aimed to:

- Establish eligibility criteria, continuity criteria, and guidelines for participation in PES programs.
- Develop performance indicators to monitor the effectiveness of PES programs.
- Propose mechanisms to promote the financial and operational sustainability of PES.

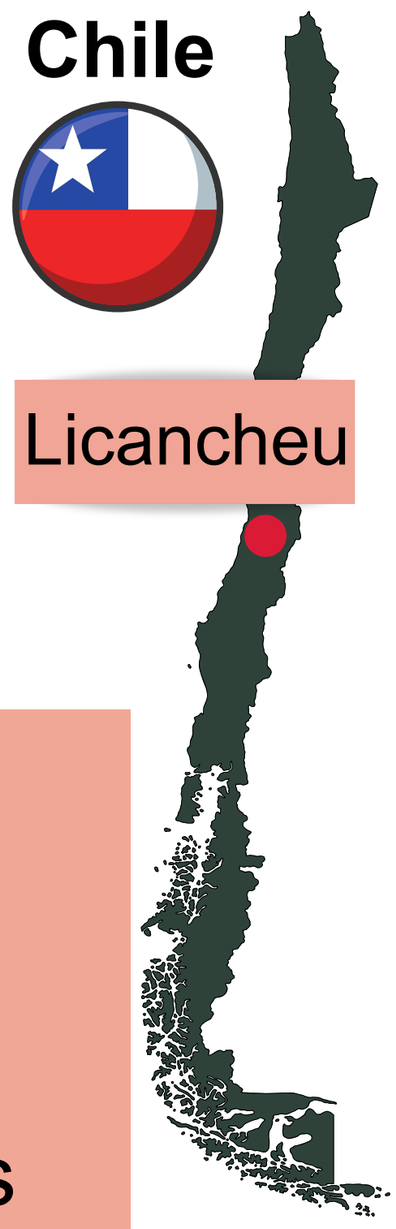
Through the discussions conducted two programs are being launched in the first wave of policy development. One aimed at the surplus of preservation areas on rural properties and the other for preventing and combating fires by different stakeholders.

Reinventing Farming: Building a Resilient & Sustainable Future for Licancheu *

Summer School Agrobiodiversity

CONTEXT

- Water Scarcity
- Climate Change
- Youth Migration
- Loss of Traditions



WHERE?

GOALS

- Build Resilient Practices to face Climate Challenges
- Attract Young People to Farming
- Preserve Agricultural & Culinary Traditions

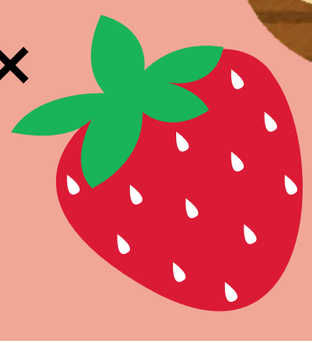
WHAT?

- *Panicum miliaceum* (Millet)

2023, International Year of Millet

- *Chenopodium quinoa* (Quinoa)

- *Fragaria* × *ananassa*



HOW?

- Integrate Hydroponic Farming with Strawberry
- Integrate 2 Crops in Traditional Farming: Quinoa & Millet
- Harvest Water with Fog Collectors
- Create a Book: Sustainable Agriculture Tips & Traditional Cooking Recipes

METHODS

- Workshops and Training Sessions
- Engagement with local institutions & Community
- Interview with Farmers
- Monitoring and Evaluation

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21.08.24

How to reintroduce biodiversity to a monocultural landscape?

Vineyards in southwest Germany

Mini case study by
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Study program:
Global Change Ecology M. Sc.

University of Bayreuth,
Germany

August 2024

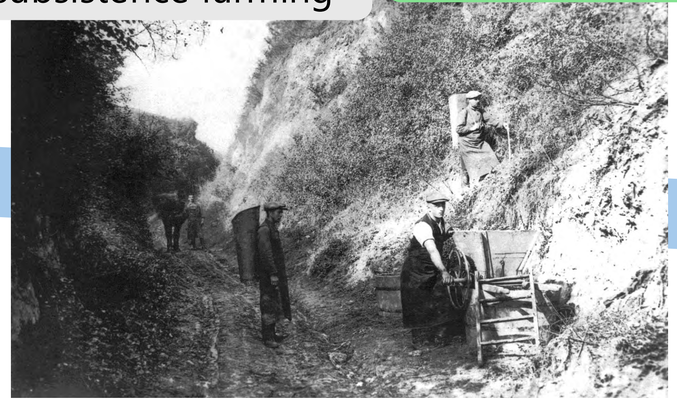
Introduction

- Viticulture as a special case of agriculture (4)
- Tourism (1,6)
- Cultivated on sun-exposed slopes (4)
- Climate change first improved, now threatens production (1,4)

Why have vineyards lost their diversity?

until 20th century: small-scale viticulture
(2,4,7)

Partitive inheritance
Small, scattered parcels of land
Loess slopes
Many small pathways
Walls, hedges, trees, …
Erosion, mudflows
Hard manual labour
Highly diverse cultural landscape
Wine as an addition to subsistence farming



Grape pickers in a holloway near Guntersblum, 1931.
Source: Konrad Koll, Kulturverein Guntersblum (2).

since mid-20th century: land consolidation
(2,4,7,8)

Land reform
Leveling and terracing
Concrete pathways and ditches
Large vineyards suitable for heavy machinery
Erosion protection
Full-time commercial vine production
Monocultural landscape

Land consolidation near Nierstein, 1970s.
Source: VRM, Allgemeine Zeitung Mainz-Rheinhessen, 7.9.2022.

today: high-intensity viticulture
(3,4,5)

Vineyards near Bodenheim. *Source: Verband Deutscher Prädikatsweingüter e.V., https://www.vdp.de/de/die-weine/weinbergonline/lage/8082-burgweg (access 14.8.24).*

What can winegrowers do to enhance biodiversity in their vineyards?

(Potential) benefits
Challenges

Case 1: Inter-row greening (1,3,6)

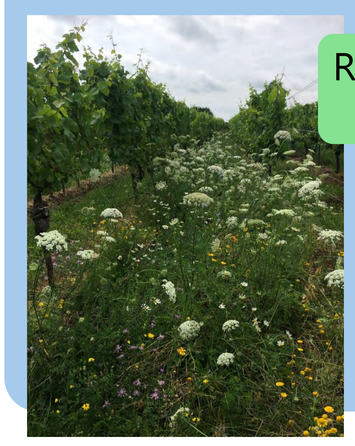
AmBiTo ("Application of a modular biodiversity toolkit for winegrowing in Germany")

Research project by Fair and Green e.V. and Hochschule Geisenheim University in cooperation with local producers

2020 to 2025

- Aim: regionally and individually adapted measures to enhance biodiversity
- Ten experimental vineyards to test the effect of different seed mixtures, driving intensities, and double row width

Recreation, tourism
Financing
Erosion protection



Greened row (rolling, no driving) in an experimental vineyard near Mainz-Laubenheim.

Case 2: Agroforestry (4)

PIRI Naturel (Weingut Weinheimer Hof)

Winery in Rümmelsheim (Burg Layen)

Transition to organic viticulture since 2018

- Forest systems as a model
- Small newly planted vineyard (since 2022) with two rows of trees and shrubs

Bureaucracy, false incentives
Cooling
Protection from frost
Less vineyard area
Water uplift

Young chestnut tree *(Castanea sativa)* in the new vineyard.

Case 3: Composting (5)

Weingut Forster

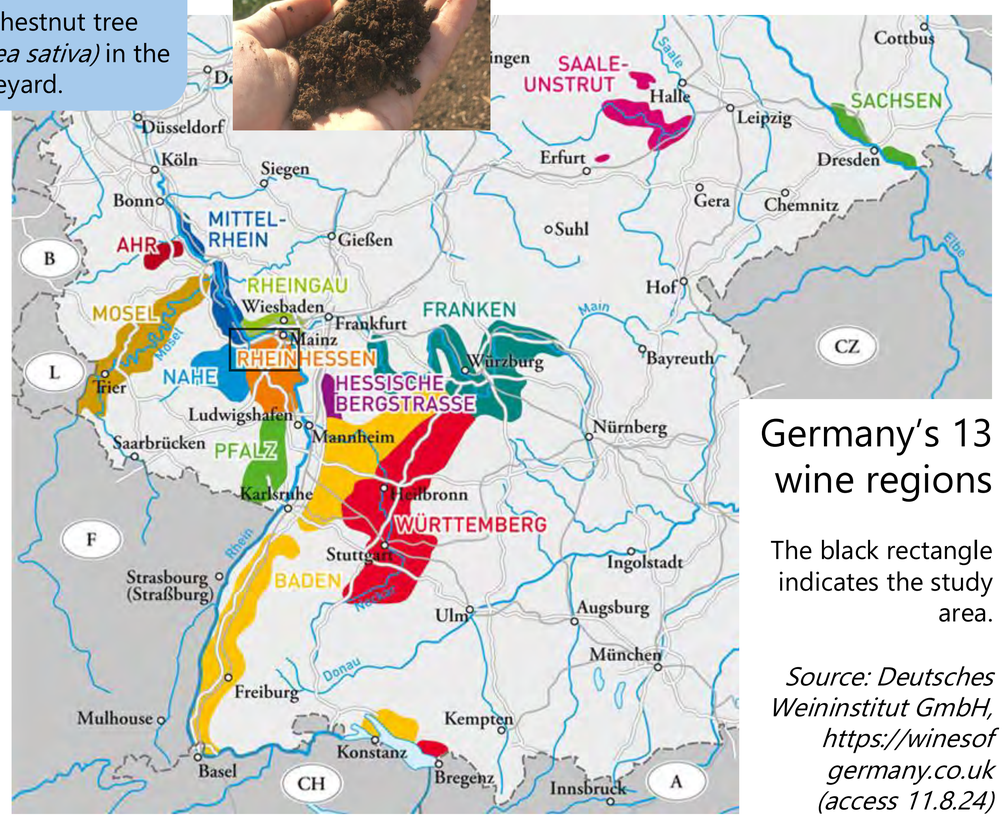
Winery in Rümmelsheim

Organic viticulture since 1994

- Fundamental role of soil, root systems and microorganisms for plant health
- Soils in vineyards often very depleted
- Aerobic compost (from horse manure, grass, pomace, …) as fertiliser → humus

Saving resources
Lobbyism, inertia
Carbon storage

Fresh compost (pile in the background).



Germany's 13 wine regions

The black rectangle indicates the study area.

Source: Deutsches Weininstitut GmbH, https://winesofgermany.co.uk (access 11.8.24)

Conclusions

Hesitation or resistance to change practices

Soil protection and improvement

Climate resilience

References

(1) Fair and Green e.V. & Hochschule Geisenheim University (2024). AmBiTo. https://www.ambito.eco/ (access 14.8.24).
(2) Guthier, S. (2022). Flurbereinigung. In: Weingeschichte in Rheinhessen, https://weingeschichte-rheinhessen.de/d04-flurbereinigung (access 14.8.24).
(3) Interview with ecologist Dr. Karsten Mody, 9.7.24.
(4) Interview with winegrower Christine Pieroth, 9.8.24.
(5) Interview with winegrower Georg Forster, 9.8.24.
(6) Interview with winegrower Julian Kitzer, 17.6.24.
(7) Jungbluth, M. (2003). Weinbau in Bodenheim seit 1946. In: 1250 Jahre Albansgemeinde Bodenheim, pp. 263-274.
(8) Sturm, M. (2010). Die Entwicklung der Mesofauna eines Weinberges im nord-östlichen Rheinhessen im Vergleich zum Lennebergwald und weiteren Agrarflächen. Diss.

MINGA VO MEILEN - COMMUNITY SUPPORTED AGROFORESTRY GARDEN (CH)

DESCRIPTION

The Minga in Meilen is a community supported agriculture in Meilen at the Lake of Zurich (CH) with 0.15 ha annual vegetable crops, two Agroforestry systems of 0.6 and 1.6 ha, 0.25 ha grapevines and a tiny herbal garden. "Minga" stands for "Min Garte", swiss german for "my garden", but is at the same time a term in the Inca language for a work that is done in community which could not be achieved by only one person.

At Minga, two Agroforestry Systems were established. One combines fruit trees with horticultural practices and was established in 2018. The other Agroforestry system is close to the forest, with different nut tree species, shrubs for habitat creation and a water retention ditch system and was created in 2022.

system with fruit trees and horticultural practices

system with nut trees, timber trees, arable crops and water retention ditch

PRINCIPLES

1) Economy for the common good
The project wants to promote an to the corporate-dominated food market, serving as a learning and experimentation place with a holistic social mission.

2) Mindfulness towards natural systems
The cooperative prioritizes ecological farming methods that avoid soil degradation and overproduction. It supports ecological diversity and natural habitats in soil and landscapes, offering only seasonally adapted products. The cooperative aims to minimize ecosystem destruction by reducing dependence on oil, imported products, and external resources. This approach addresses issues like the phosphorus peak and nitrate crisis, nurturing independent soil and plant life processes with minimal human intervention.

3) Learning from each other
The project promotes socio-cultural integration and supports disadvantaged people affected by the migration crisis. Direct involvement in food production offers members a chance to contribute concretely to the future and oppose overconsumption and exploitation. It operates on democratic decision-making principles, emphasizing justice, transparency, and consensus. The cooperative encourages social responsibility among members, cultivating open exchange and creating new relationship networks through collaborative fieldwork.

Species diversity within crops and livestock

Biodiversity of agricultural land

diversity of agricultural management practices

diversity of production and food supply systems

INTERCROPPING

Intercropping of Kiwi and Alder tree

Intercropping is said to have a benefitial effect on the varieties planted together, as they can serve as support, protection, repellent or nutrient release agent.
At minga, companion trees are planted together with climbing species e.g. Kiwi or grapevine and Alder tree.
The alder tree is known to fix Nitrogen by establishing Aktinoyrhiza at their roots.
Also, Strawberries + Onions (perennial), Peas + Lettuce and turnip +red cabbage are planted together.

Intercropping of lettuce and peas, strawverries and onions.

CSA & SELF HARVESTING

Minga calculates with shares for 40 members.These pay their share for the harvest in advance in order to distribute the risk that the farmers are taking. From April - December, every two weeks the members get emails with the crops that can be harvested.
Then, people can come 24/24 to harvest during these two weeks. A list on site explains the variety, amount and where the vegetable can be harvested. At every vegetable bed, there is an explanation on how to harvest the crop. This way, Jeannine and Lucas can save a lot of time and resources and their members get an insight into the harvesting process and the seasonality of the products.

WATER MANAGEMENT

recently established water ditch (together with Philipp Gerhard)

Water Ditches were built in both agroforestry systems to retain/drain water & create a habitat that attracts animals & plant species that need to be close to the water.
Furthermore, it helps with irrigation in the dry season and channels the overflowing water stopping nutrient leaching from the area

BIOCONTROL & PREDATORS

Piles of branches were installed in both systems, in order to attract weasles and hedgehogs to predate on the voles. Furthermore, ducks are introduced to the vegetable beds from time to time to prevent slug damage. Experience shows that the vegetables need to be big enough so the ducks do not prefer them over the slugs.

SPECIES DIVERSITY

At Minga, two Agroforestry Systems were established. One combines fruit trees and berry shrubs with horticulture and was established in 2018. The other Agroforestry system is close to the forest, with different nut tree species, shrubs for habitat creation and a water retention ditch system, created in 2022 .

Species listed in the agroforestry system with fruit trees

There are more than 18 fruit tree species, around 10 berry species and 30 different vegetable species, and all of this without greenhouse cultures. Furthermore, 15 different funghi resistent grapevine varieties were chosen for the production of natural wine.

RWC & GREEN MANURE MULCHING

Willows are placed at the edges of the fruit tree area to protect them from winds and to retain the water. Furthermore, these willows supply important biomass material for Ramial Wood Chips (used for mulching) or other functions like making hedges/structures etc. Sand oat (Avena strigosa) is applied as green manure to the vegetable fields.

CHALLENGES

Curl Disease (Kräuselkrankheit)
The curl disease is a disesase affecting the leaves of the peach trees, very common especially to the white fleshed peaches. They have no effective treatment against it yet, but are plantin more yellow fleshed peaches.

Deer damage (Fegeschäden)
Damages caused to the trees by deer are especially a problem in the AFS that is close to the forest. This is one of the biggest problems, especially when trees are young. Tree protection systems are used but are costly and not always effective. Also, hedges with thorns were planted close to the tree to prevent deers from rubbing against the trees, which did not help.

Drought
Hot springs and summers have taken away young trees, especially in the recently established AF system (2022), where many of the almond trees died because of irrigation problems.

Water floods
In winter, water used to flood the fields and ruin the seeds. A Water retention basin and water ditches in both agroforestry systems were established to counteract the problem.

Slugs and voles
As no tillage is applied, a lot of voles are in the grounds feeding on tree roots.A weasle was sighted some years ago, but the problem is not solved yet. Slugs are tackeled with ducks.

SOURCES

Interview with Lucas from Minga vo Meile taken on May 24th 2024
https://minga.ch
https://www.woz.ch/2414/wie-wir-leben-werden-1/mit-enten-und-hermelinen-als-helfer/!VNNGP9TD9ZJJ
https://www.youtube.com/watch?v=M4UfBCZL5Fw&lc=Ugw_0VIt0jIfRSpcX0F4AaABAg
https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20003710
https://www.sbv-usp.ch/de/agroforst-vorteilhaft-fuer-die-naturnahe-kulturlandschaft-und-die-produzierende-landwirtschaft
https://themes.agripedia.ch/flaechencode-725-permakultur/

Fotos:
Laura Vetter, Minga von Meilen Website/video

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ENHANCING SUSTAINABILITY IN OLIVE FARMING: A CASE STUDY FROM ORVIETO, ITALY

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About Olives and Aim of Study:

Olives are crucial in the Mediterranean for oil and table use, requiring specific climates and facing disease challenges. Aim of the study was to explore sustainable farming practices to improve productivity and resilience.

Abstract:

In Orvieto, Italy, a farm has been growing Frantolo olives since 1876, facing challenges from humidity-induced diseases like peacock eye and rags. To address these, the organic farm uses traditional copper treatments and introduced the humidity-tolerant Leuccino variety to boost yield. The olives are cultivated on steep 60-degree slopes, demonstrating an adaptation of traditional farming methods to current environmental challenges. These practices enhance local adaptation, resilience, and sustainability, providing ecological, social, and economic benefits.

Stakeholder Interview Summary

- **Challenges Identified:**
  - Disease Management: Issues with peacock eye and rags diseases
  - Environmental Factors: High humidity from proximity to a river
- **Adaptation Strategies:**
  - Disease Control: Use of copper treatments
  - Variety Selection: Introduction of humidity-tolerant Leuccino olives
- **Sustainability Focus:**
  - Objective: Ensuring long-term ecological and economic sustainability

Benefits:

- **Local Adaptation**: Leuccino variety thrives despite humidity.
- **Environmental Sustainability:** Less chemical use with copper treatments and disease-resistant varieties.
- **Economic Stability:** Consistent olive yields support farm resilience.

Peacock disease affecting olive leaves

Aspect of AgroBiodiversity: Genetic Diversity of Crops:

The introduction of the Leuccino olive variety boosts genetic diversity, enhancing disease management and adaptation to humidity, while broadening the genetic base of the olive crops for greater resilience.

Interviewing local olive farmer.

One-year-old organic olive.

Value Chains:

- **Olive Oil:** High-quality oil sold locally and exported.
- **Table Olives**: Direct consumption, diverse revenue stream.
- **Olive Cake for Animal Feed:** Nutritious by-product, reduces waste.

Conclusions:

The organic farm in Orvieto showcases how blending time-honored techniques with innovative solutions can overcome environmental challenges. By using copper treatments and the resilient Leuccino variety, the farm not only ensures consistent olive yields but also champions sustainability. This approach proves that respecting tradition while embracing adaptation can lead to a thriving, eco-friendly future..

References.

Palazzo, A.L. and Aristone, O., 2017. Peri-urban matters. Changing olive growing patterns in central Italy. Sustainability, 9(4), p.638.
Interview with Frederico at Orvieto Italy.

MINI CASE STUDY
THE 3-ZONE-GARDEN
(or the renaissance of traditonal agriculture)

Summer School Agrobiodiversity 18th – 28th of august

Clara Körner

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HORTUS NETZWERK VIELFALT . SCHÖNHEIT . NUTZEN

Summer School Agrobiodiversity

Introduction

In recent decades, intensive monoculture agriculture has reduced agrobiodiversity. Traditional agricultural practices are therefore regaining importance as climate-smart approaches. Therefore, the Food and Agriculture Organization (FAO) has developed climate-smart agriculture (CSA) to manage agriculture in the face of global warming and ensure food security. These methods are based on old local practices and are characterised by high productivity, biodiversity conservation, low energy use and climate protection. The concept of the 3-zone garden is based on traditional agricultural methods. Markus Gastl, the creator of this concept, founded his "Hortus Insectorum" and "Hortus Felix" with the aim of combining benefit (yield) and diversity (biodiversity). These two gardens, which together cover around 10,000 square metres, are located in the Bavarian Forest and Herrieden (Bavaria, Germany). This idea gave rise to a network of interested parties who organise their gardens according to the 3-zone model. This network extends across several countries in Europe as well as Canada and the USA and was recognised as a UN Decade Project for Biodiversity in 2019. In 2018, Markus Gastl received the Bavarian State Medal for outstanding services to the environment.

> "Permaculture is still too anthropocentric. Insect diversity must be promoted more in our gardens!"

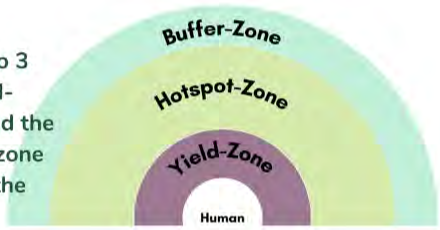
The Inventor of the 3-Zone-Garden: Markus Gastl

Objectives

The aim of this case study is to show how the 3-zone garden can influence various aspects of agrobiodiversity. A comparison with the similar concept of permaculture is also sought. In addition, the extent to which the 3-zone garden can be transferred to agriculture will be investigated.

3-Zone-Garden

The garden is divided into 3 different zones: The Yield-Zone, the Buffer-Zone and the Hotspot-Zone (the yield zone is normally smaller than the Hotspot-Zone):



Yield Zone:
- Vegetables grow on humus-rich soil
- Soil quality improved with organic material from Zone B

Buffer-Zone:
- Diverse native shrubs hedge surrounds and protects the hortus
- stores surplus energy without harming diversity

B Hotspot-Zone:
- Poor soils support diverse native flowers and herbs
- Habitat for native insects, providing food for other animals

Permaculture

The garden is divided into different zones based on the frequency of use and maintenance. The zones range from zone 0 (the house) to zone 5 (wilderness area):

- **Zone 1:** Areas that are frequently visited, such as kitchen herbs and vegetable beds.
- **Zone 2:** Less frequented areas with perennial plants and small fruit trees.
- **Zone 3:** Fields for larger areas and more extensive crops.
- **Zone 4:** Less utilised areas for wood production and pasture.
- **Zone 5:** Natural wilderness to promote biodiversity and recreation

	3-Zone-Garden	Permaculture
Hotspot-Zone	+++	+
Buffer-Zone	+++	+++
Focus on Yield/Productivity	+	+++
Degree of circularity	+++	+
Natural modules	+++	+

References

https://www.hortus-insectorum.de

Matson, P. A., Parton, W. J., Power, A. G., & Swift, M. J. (1997). Agricultural Intensification and Ecosystem Properties. Science, 277(5325), 504–509. https://doi.org/10.1126/science.277.5325.504

FAO, Food and Agricultural Organization. (2010). Climate smart agriculture: policies, practices and financing for food security. Adaptation and Mitigation, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy

Singh, R., & Singh, G. S. (2017). Traditional agriculture: A climate-smart approach for sustainable food production. Energy, Ecology and Environment, 2(5), 296–316. https://doi.org/10.1007/s40974-017-0074-7

Pulido, J. S., & Bocco, G. (2003). The traditional farming system of a Mexican indigenous community: The case of Nuevo San Juan Parangaricutiro, Michoacán, Mexico. Geoderma, 111(3–4), 249–265. https://doi.org/10.1016/S0016-7061(02)00267-7

Srivastava, P., Singh, R., Tripathi, S., & Raghubanshi, A. S. (2016). An urgent need for sustainable thinking in agriculture – An Indian scenario. Ecological Indicators, 67, 611–622. https://doi.org/10.1016/j.ecolind.2016.03.015

The role and potential of small scale organic seed producers in supporting agrobiodiversity in Québec, Canada

Katharina Paul-Mercier, Univesität Hohenheim

August 2024

The resilience of our global food system is at risk due to various factors, including loss of crop and seed diversity. While 60% of the global seed market is owned by 3 multinationals, small scale seed producers work to preserve and produce seeds as a common resource [1]. In the province of Québec, Canada, there are about 30 smaller scale organic seed producers doing direct sales, mostly directed to home gardeners. The seeds produced by these farms are mostly done through open pollination, which means seeds can be saved and selected to grow crops the next year. This project uses the specific case of one of these farms to investigate the roles and potential of these seed producers in regards to agrobiodiversity in Québec, Canada.

Background

Farm : Le Noyau Organic Seeds
Area: approx. 2 hectares
Location: Standbridge East, in the Montérégie Region, Québec, Canada
Stakeholder interviewed: Teprine Baldo, founder
Information on the region: Agricultural land in the Montérégie region accounts for 86% of the area, and covers 953 000 ha. The main agricultural activities are conventional cereal and oil crops, porc and milk production [2].

Objectives

- Identify aspects of agrobiodiversity involved in open-pollinated seed production through a stakeholder interview.
- Discuss the potential of small scale seed producers in contributing to agrobiodiversity in the province of Québec by identifying benefits and challenges.

Agrobiodiversity Aspects

Genetic diversity

Open pollination leads to a **higher genetic variability** and preservation of patrimonial varieties helps maintain genetic diversity [1]. The farm also produces varieties of crops from different countries, which adds on to the genetic pool of certain species.

On-farm species diversity

The farm is producing a **range of different crops**, including fruits, vegetables, herbs, medicinal plants and tree saplings.

Landscape and on-farm biodiversity

The **diversity of crops** and the **avoidance of chemical inputs** also favours beneficial insects, as well as soil microorganisms. Cultivating under organic principles also contrasts with the agricultural practices at observed at a landscape level.

Diversity of stakeholders

The farmer is collaborating with **indigenous stakeholders**. Exchanges of seeds and knowledge contributes to building **of a stronger network among small scale seed producers.**

Diverse management practices

Producing seeds requires that the plants are cultivated over their full cycle, which sometimes takes more than a year. This implies that **spatial organisation and the crop rotation can be complex**.

Key Findings

Environmental and social benefits

- Production of locally adapted plants.
- Preservation of indigenous and ancestral varieties as well as cultural heritage.
- Contributing to a common good and food sovereignty.

Challenges

- Lack of financial support and governmental policies.
- Seeds produced by open-pollination are more unstable.
- Small scale of production makes it difficult to produce enough seeds for larger vegetable farms.
- Ethical questions regarding commons and cultural appropriation.

Conclusion

- Small scale seed producers contribute to agrobiodiversity through different practices.
- Seed production not only tackles environmental issues and aspects, but also presents an important social dimension.
- The extent to which these farms can contribute to agrobiodiversity at the provincial scale is difficult to measure and would need to be further investigated

References

1. Kliem, L., & Sievers-Glotzbach, S. (2022). Seeds of resilience: The contribution of commons-based plant breeding and seed production to the social-ecological resilience of the agricultural sector. International Journal of Agricultural Sustainability, 20(4), 595–614. https://doi.org/10.1080/14735903.2021.1963598
2. Gouvernement du Québec, 2023. Retrieved from https://www.quebec.ca/agriculture-environnement-et-ressources-naturelles/agriculture/industrie-agricole-au-quebec/portraits-regionaux-agriculture

Images

1. [Untitled image from beans seeds in a hand]. Le Noyau Organic Seeds. https://www.lenoyau.com/new-page-1
2. Untitled image from the farm Le Noyau Organic Seeds]. Le Noyau Organic Seeds. https://www.lenoyau.com/
3. Untitled image of a map of Standbridge East]. Imagerie du Gouvernement du Québec. https://vgo.portailcartographique.gouv.qc.ca/mobile.aspx?gpz_point=-7537596.1 5762227,%20%206974970.413289411&echelle=15699089&epsg=3857&gpz_nomMap=-%20Imagerie%20du%20gouv.%20du%20Qu%C3%A9bec
4. Untitled image of map of Canada and Québec]. Royal Bank of Canada. https://arrivein.com/fr/immigration/introduction-au-quebec/

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Summer School Agrobiodiversity, Ljubljana 18-28 of August 2024

CAN A COMMUNITY SAVE THE GRAINS?

Student: Chiara Gasperini, Wageningen University and Research, ISARA, Lyon
with the precious support of the **Grano Alto Slow Food Community**

Figure 1. Slow Food Community Grano Alto (link https://www.comunitagranoalto.it/)

INTRODUCTION

- The **Grano Alto** Slow Food community (Fig. 1) was founded in **2019**, it is located in Monghidoro (Fig. 2), a small village in the province of Bologna.
- The **community** aims to cultivate grains. This initiative enables:
- local residents and city dwellers to enjoy fresh and local products,
- support to small farmer's economies and the promotion of healthy and local eating habits (Fig. 3).

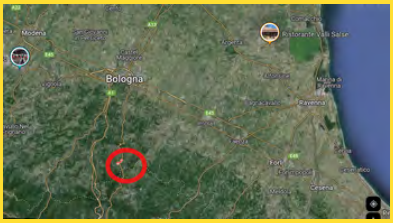

Figure 2. Monghidoro map (link https://www.google.it/maps/place/40063+Monghidoro+BO/@44.3614576,11.0776438,108131m/data=!3m1!1e3!4m6!3m5!1s0x132ad8b9b430c3b5:0xa424825326f28fb7!8m2!3d44.2195065!4d11.3182849!16zL20vMGdraHA3?entry=ttu)

Figure 3. Grano Alto Community (link https://www.comunitagranoalto.it/)

AIM OF THE RESEARCH

- **Understand** the reason for the community's initiation of local grain cultivation.
- **Comprehend** how the community produces affordable wheat products

METHODS

- A **literature review was conducted** on locally cultivated grains.
- A field trip to the Monghidoro area in early May allowed observation of current wheat-growing conditions.
- Interviews were conducted with a farmer and a baker. The activities were split between **Mercato Ritrovato**, a farmer's market in Bologna's city centre, and the fields in **Monghidoro**.

Figure 5. Mercato Ritrovato Bologna link https://corrieredibologna.corriere.it/bologna/cultura-spettacoli/18_ottobre_22/bologna-docufilm-dedicato-mercato-ritrovato-efe7765c-d5ea-11e8-8fdf-8e9426287826.shtml

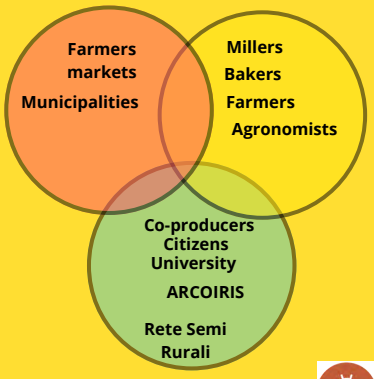

Figure 4. Stakeholders (own)

RESULTS & DISCUSSION

1. The Grano Alto community works on different aspects to support the local agrobiodiversity and the community.
2. It offers farmers a stable purchase price of 75 euros per quintal. 70 euros are paid to the farmers, with 5 euros supporting the Grano Alto Community.
3. **Mercato Ritrovato** encourages direct engagement between **producers and citizens**, promoting community bonds and the idea of co-producers (Muchnik and Sainte Marie 2010; Petrini 2016; Monticone et al. 2024) (Fig. 5).
4. The ancient grain varieties (Tellarini 2017) grown include **Abbondanza**, **Ardito**, **Autonomia B**, **Mentana**, **Virgilio**, and **Gentilrosso** classified through a partnership with **ARCOIRIS**, an organic breeding company (Fig. 4).

Figure 6. Key aspects of the Monghidoro community (own)

CONCLUSION

- The case study demonstrates the successful preservation of local biodiversity from industry dominance and the **oligopoly of seed markets** (Prieler 2022).
- It emphasizes a productive partnership among farmers, research institutes, and agronomists dedicated to seed selection, and it supports food affordability.
- Events like "Veglie" foster community dialogue on local grain varieties and yearly activities (Fig. 6), with the contribution towards many different SDGs.

REFERENCES

- Monticone, Francesca, Antonella Samoggia, Kathrin Specht, Barbara Schröter, Giulia Rossi, Anna Wissman, and Aldo Bertazzoli. 2024. 'Harvesting Connections: The Role of Stakeholders' Network Structure, Dynamics and Actors' Influence in Shaping Farmers' Markets'. Agriculture and Human Values, March. https://doi.org/10.1007/s10460-024-10563-6.
- Muchnik, J., and Sainte Marie, C. D. 2010. Localized Food Systems-Their Hour Has Come: Techniques, Foodstufs and Territories. https://doi.org/ 10.3917/quae.muchn.2010.01.0013.
- Petrini, Carlo. 2016. Buono, Pulito e Giusto. Bra: Slow Food.
- Prieler, Magdalena. 2022. 'EU Reform of Seeds Marketing Rules Which Seeds for a Just Transition to Agroecological and Sustainable Food Systems?' Brussels.
- Tellarini, Stefano. 2017. Grani e Gente. Tutto Quello Che Avreste Voluto Sapere Sui Vecchi Grani e Sui Loro Uomini. Stilgraf.

Swiss Alpine Lachs AG: an example of the application of the Recirculating Aquaculture System in Switzerland

Strengths and weaknesses

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18.08.2024

Introduction

In 2020, 7.6 kg of fish will be consumed per capita in Switzerland (1) and only about 3,109 tonnes of fish meat will be produced in the country each year, covering about 6-7% of total Swiss consumption (3). The remaining 93-94% is imported, which is a major problem due to the issue of overfishing in the oceans (Fig.1 remaining protected wild populations). In addition, imported products may come from widely used aquaculture systems, such as net cages, which seriously pollute water and the environment (4). These reasons, together with the growing consumer awareness of sustainable consumption and the increasing demand for locally produced products, were the main reasons why the co-founder of Swiss Alpine Lachs AG, Roland Herculeijns, decided to set up an Atlantic salmon farm in Lostallo (Demoly Ghislan, personal communication, 2.7.24).

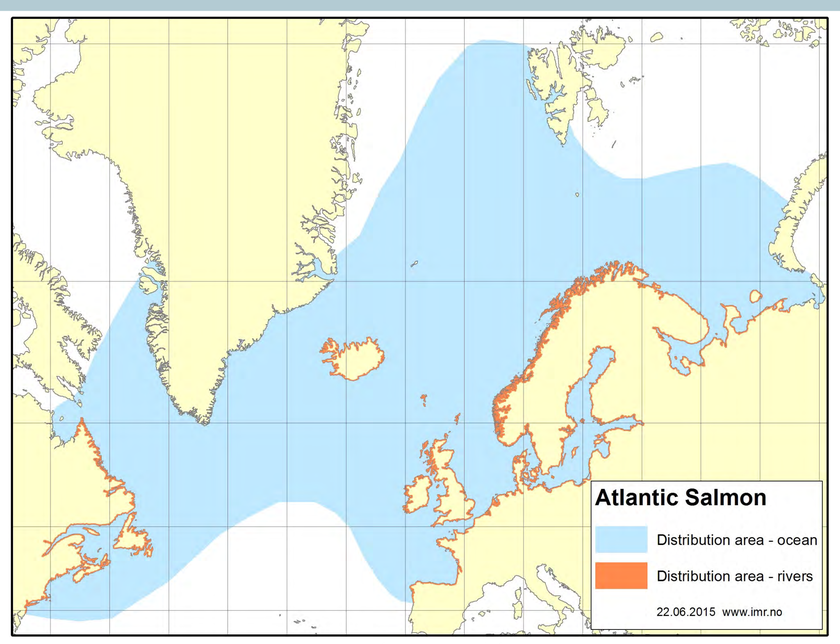

Fig.1: Distribution of wild Atlantic Salmon (Salmo Salar) (Institute of Marine Research 2020)

Swiss Alpine Lachs AG

Swiss Alpine Lachs is a company dedicated to farming the Atlantic salmon using the innovative Recirculating Aquaculture System (RAS). In RAS, water is continuously filtered through mechanical and biological filtration, and is continuously recirculated within the system, allowing fish to be reared in a controlled environment and in a sustainable manner. In fact, only 2% of the water is wasted, and fish faeces are used to produce biogas instead of being released into the river's water, thus further reducing waste. Swiss Alpine Lachs prides itself on maintaining high product quality and 100% local production, ensuring that its farming practices are in line with its core values of sustainability and excellence.

Research Question

Aim of this project is to identify and analyze the strengths and weaknesses of the application of RAS in Switzerland on an environmental, social and economic level. An interview with the deputy manager of Swiss Alpine Lachs AG will provide some of the necessary information.

Recirculating Aquaculture System

Key processes in the RAS:

- **Solids filtration:** removal of solids such as fish faeces or feed residues using the drum filter;
- **Biofiltration**: helps break down and transform metabolites harmful to fish. The main processes are nitrification (breakdown of ammonium to nitrite to nitrate) and denitrification (anaerobic breakdown of nitrate to N2);
- **Degassing**: CO2 and N2 produced by denitrification are removed from the water;
- **Disinfection** (killing pathogens and reducing bacterial pressure): at Lostallo, UV light is used, which reduces germs by destroying their DNA, and ozone, which destroys non-specific organic material (can be dangerous for fish, so dosage is very important);
- **Oxygenation**: the process of adding oxygen to the water. Saturation should always be around 100% (2);

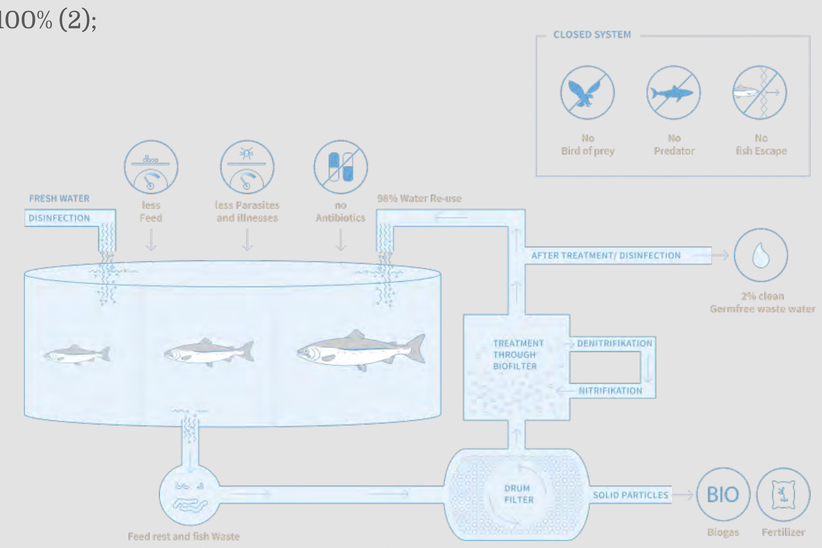

Fig.2: RAS scheme (Swiss Lachs AG 2017)

Fig.3: Atlantic Salmon (Salmo Salar) (free3d.com)

Agrobiodiversity Aspects:

- Genetic diversity of crops and livestock
- Species diversity within crops and livestock
- Biodiversity of agricultural Land
- Diversity of production and food supply systems
- Diversity of Stakeholders

Results

Strengths

- Low water demand (98% H_2O recycled) and not water dependent like river flow through systems;
- Controlled environment: water quality is controlled and so are diseases and parasites. This provides optimal conditions for fish growth and health and reduces the need for antibiotics and other chemicals;
- More environmentally friendly: no release of water containing antibiotics or faeces (rich in phosphorus and nitrogen), reduced water consumption, no escape of farmed fish into rivers.
- High product quality
- Benefits to consumer health
- Benefit for marine ecosystems and biodiversity
- Fish welfare: no risk of predation, better control and prevention of diseases
- Year-round production with high productivity

Weaknesses

- High investment in infrastructures and technology
- High operational costs (mainly electricity)
- High operational risks due to high degree of automation
- Market risks: high quality means high prices, reduced market segment
- Fish welfare: still intensive, fish can't move freely as in nature
- Operational difficulties: need for highly skilled labour
- Many regulations

Conclusion

Assuming that fish consumption remains stable, the preservation of the environment and biodiversity, both locally and globally, requires the adoption of more sustainable technologies. Recirculating aquaculture systems (RAS) offer a significant opportunity to improve sustainability. This technology allows fish to be reared in land-based facilities, reducing environmental impact, preventing fish escapes and eliminating the need for chemicals or antibiotics.

As noted in the analysis, the main challenge is the high cost associated with this type of farming. At present, RAS is not a widespread method of fish farming in Switzerland. However, I see great potential for its application as interest in sustainable agriculture grows, driven by increasing environmental pressures and public awareness. According to Demoly Ghislan, assistant manager at Swiss Alpine Lachs AG, Swiss consumers are increasingly demanding locally produced, high-quality products. Despite the high costs, the benefits of RAS for human health, ecosystems and biodiversity should outweigh the economic challenges. Future government incentives could significantly increase the uptake of this technology.

Acknowledgements

1. *Bundesamt für Statistik (2022). Evolution de la consommation de denrées alimentaires en Suisse. Par habitant et par année - 1980-2020.*
2. *Tschudi F (2024). Aquaculture production systems. Teaching documents, not published.*
3. *Van Rijn Jaap (2013). Waste Treatment in Recirculating Aquaculture Systems. Aquacultural Engineering, 53, 49–56.*
4. *Wang Min, Abolfazl Masoudi, Can Wang, Changhao Wu, Ze Zhang, Xin Zhao, Yuanjie Liu, Zhijun Yu, and Jingze Liu (2024). Impacts of Net Cages on Pollutant Accumulation and Its Consequence on Antibiotic Resistance Genes. Environment International, 183 .*

Pictures:

Institute of Marine Research (2020). Topic: Salmon – Atlantic. URL: https://www.hi.no/en/hi/temasider/species/salmon--atlantic
Swiss Lachs AG (2017). First salmon farm of Switzerland - Recirculating aquaculture technology.
https://free3d.com/de/3d-model/atlantic-salmon-jump-pose-2653.html

CHUDERBODEN FOOD FOREST - A MODEL FOR COMBINING AGRICULTURE & BIODIVERSITY?

Summer School Agrobiodiversity

THE CASE

Chuderboden is a **small organic permaculture farm** located in central Switzerland. Founded **2012**, the farm uses the system of food forest on their steep farm land. By **imitating a forest system**, it creates habitats for various insects, birds and plants while producing food. The current focus is on the **production of fruits** such as quinces, cornelian cherries, medlars and chokeberries, which are mainly made into jam and sold at local farmers' markets

BACKGROUND

Loss of fertile soil

- 1% of the fertile soil is lost in Switzeralnd each year

-> Food forests **stabilise the soil** by providing deep-rooting plants that cover the soil all year round

Decline in self-suffiency

- The degree of self-sufficiency in Switzerland has been declining at a worrying rate for some time

-> Food forests can also be **established on unused land** (e.g. steep slopes or private gardens) and can help to **increase the productivity** on existing agricultural land

AIM OF THE FARM

After many years of teaching high school and giving permaculture courses, Beat Rölli set out to **apply and test the principles** he had taught. His aim is to **provide a model** for other farmers by demonstrating that one farm can **successfully combine agriculture and biodiversity**

FOOD FORESTS

"Food forests are an agricultural system that is **organised vertically like a forest**: there is a **herb layer, small and large bushes and trees**. Everything can be harvested. I expect the ratio of effort to yield to be much better in this system than in conventional cultures"
- Beat Rölli, Founder Chuderboden Farm

CHALLENGES

- **Establishing** a productive food forest requires a **long timeframe**
- And further involves a **high complexity**, especially planning based on the land's hydrological and geological conditions
- Additionally, current **Swiss agricultural policy** is not designed for small-scale, multi-cropping farms

CONCLUSION

- Food forests offer an **promisisng system** for integrating biodiversity into agricultural practices
- However, food forest are yet rare in Switzerland and mostly **not yet profitable** due to many challenges
- Therefore, farms like Chuderboden are doing important **pioneering work** in advancing and refining these practices

Case Study by Marco Güntert, ZHAW
19.08.24, marco.guentert@yahoo.de

References

P. Wieduwilt. 2024. Waldgärten in der Schweiz - Eine Übersichtsanalyse, Masterarbeit UZH. Unveröff. Gespräch mit Beat Rölli

Bundesamt für Umwelt. 2017. Boden in der Schweiz.

Bundesamt für Statistik. 2023. Selbstversorgungsgrad bei Nahrungsmitteln.

Chuderboden.ch. 2024. Unsere Produkte

Luzerner Zeitung. 2018. Bauer Rölli mag es wild

Agrobiodiversity Summer School 2024

“Once it’s lost, it’s lost forever” – values of agrobiodiversity conservation on an Austrian family farm

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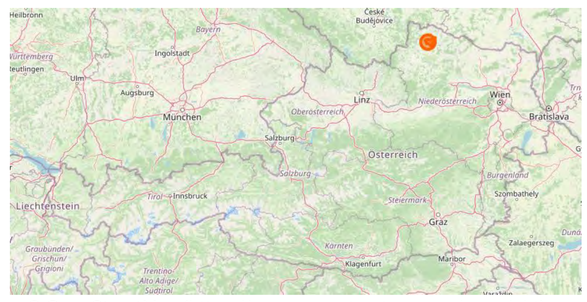
Introduction

As is the case for biodiversity overall, diversity of plant varieties is also in decline, despite genetic diversity being a contributor to the resilience of agriculture[1]. Especially in the face of climate change, systems rich in agrobiodiversity and hence resilience are needed[2]. The FAO recognises a supporting role of family farms for agrobiodiversity[3].

RQ: How does an Austrian family farm support agrobiodiversity and simultaneously live from it?

The case: Loidolt farm

- Four-headed family
- 18,5 ha
- Certified organic
- Northern Austria (barren lands)
- Arable farming, horticulture, beekeeping, food processing[4]



Results

An immense intra- and interspecific crop diversity is cultivated and sold directly at three different farmers’ markets in Vienna, the capital of Austria, every Saturday. From these products, the 350 potato varieties that are grown every year are most impoortant. Most consumers are attracted by them and end up buying other products. Crops are also processed into jams, rice, or oats and offered at the market. Additionally, value-driven and sustainability-focused efforts to maintain biodiversity are partly remunerated by subsidies, like extensive grassland management, but would be done either way[4].

Conclusion

The Loidolt family thrives from the agrobiodiversity it supports. Especially the vast variety of potatoes brings the most revenue, but also ensures yields due to different adaptations, being crucial in the face of climatic fluctuations. Additionally, the farm contributes to the preservation of these potato varieties.

Diversification and direct marketing are laborious. The latter is an important source of income[5], especially for diversified farms[6]. Farming is not the primary occupation of the family members[4], therefore not drawing their total income from it, as is usual in Austria[7]. In the end, contributing to the preservation of agrobiodiversity and living with it is the reward strived for.

References

[1]*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.*
[2]*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*
[3]*FAO (2014). Family Farmers: Feeding the world, caring for the earth.*
[4]*Loidolt, J. (2024, July 13). Personal communication.*
[5]*Republik Österreich, Bundesministerium für Land- und Forstwirtschaft, Regionen und Wasserwirtschaft. Zahlen und Fakten 2022.*
[6]*Kirner, L. (2018). Land- und forstwirtschaftliche Diversifizierung in Österreich: Begriff, wirtschaftliche Relevanz, Erfolgsfaktoren und Ansätze für die Weiterbildung und Beratung. Hochschule Für Agrar- Und Umweltpädagogik Wien.*
[7] *Statistik Austria (2022). Agrarstrukturerhebung 2020: Land- und forstwirtschaftliche Betriebe und deren Strukturdaten - Endgültige Ergebnisse.*

All photos belong to Loidolt Farm (www.biohof-loidolt.at) and were kindly permitted to be used for this poster.

Heterogenous Material - a step towards an agrobiodiverse European seed system

Poster Presentation, 21.08.2024, Agrobiodiversity SummerSchool 2024 by University of Ljubljana, ZHAW and FiBL
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Introduction, Topic and Purpose

Legal framework for variety registration shapes the seed system	• In the current European seed system there is a huge barrier before varieties can enter the official seed market. There is an obligation for Distinctiveness, Uniformity and Stability (DUS), additionally for arable crops the Value for Cultivation and Use (VCU) has to be proven.[6]
Impact of the seed system on agrobiodiversity	• It marginalizes small breeding and maintenance initiatives, hampering intra- and inter-genetic diversity which is needed for a resilient agriculture of the future.[6]
Relevance of the case	• Heterogenous Material (hm) can be understood as a political project for seed system transformation which has resulted in the integration into the European Regulation for Organic Agriculture. Currently, it is under legal revision. This could result in deeper implementation, but also eradication. **What is at stake?**
Research question	• How is the case of hm embedded in the issue of in-field and on-field genetic diversity? • What impact hm could have on agrobiodiversity?

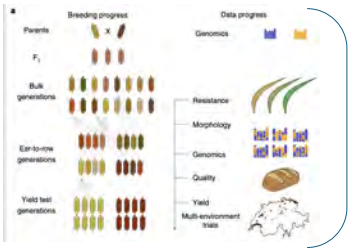


Figure1: Classical breeding Scheme. Section from Box 1 (Wuest et al., 2021, p. 1070): **„Breeding generates vast resources in the search for a desired genotype. a,** Scheme of a typical breeding programme "[9]

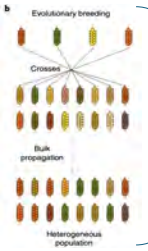


Figure 2: Developing heterogenous material. Section from Fig.1 (Wuest et al., 2021, p. 1069): **„Effective ways to assemble variety mixtures.** {...} (Co-)evolutionary breeding. The method utilizes heterogeneous populations derived from multiway crosses between a number of founder lines followed by bulk propagation of the populations in situ, that is, in the target environment. Natural selection operating on allele frequencies is often relatively unrestricted, but directed selection may be applied by a breeder or farmer."[9]

Results

Impact

Genetic diversity of crops and livestock

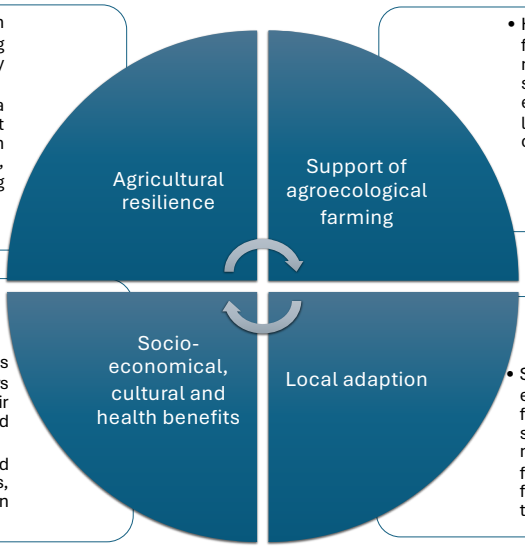
Increasing intra-genetic diversity is especially valuable for cash crops such as maize and wheat which are cultivated on vast areas of arable land, usually based on a small set of high-performing cultivars. This is risking long-term food security despite high yields in the short term.[3,9]

Species diversity within crops and livestock

Crops which have been neglected by most seed system actors due to their low return of investment could be brought to the seed market easier, allowing for a crop choice adjusted to the local circumstances and cultivation systems and an overall increase of on-farm diversity through the integration of minor crops and widening of crop rotations.[6]

- Reliability of crop production is reached through a buffering effect for yield and quality stability over the years.[1,3,9]
- High genetic diversity offers a pool for resilience-relevant traits, needed to cope with future challenges like drought, heavy rains and changing pathogens.[3,8]

- Hm is suitable to deliever seeds for various heterogenous and marginalized environments. This serves the needs of environmentally sustainable low-input farming systems, e.g. organic or agroecological.[3]



- Since the registration of hm is cost-effective, smaller actors have a legal way to bring their material into the official seed market.[8]
- The genetic diversity allowed by hm covers niche varieties, offering special taste, nutrition and heritage values.[7]

- Since hm is not stable but still evolving, it is especially suited for the development of site-specific farm cultivars through natural adaption and eventually farmer selection, enabeling farmers to develop and maintain their own adapted seeds.[8]

Key actors[8]

- Arche Noah, AT
- European Consortium for Organic Plant Breeding (ECO-PB)
- IFOAM Organics Europe
- Research Institute for Organic Agriculture (FiBL), CH
- The Organic Research Center, GB
- Dachverband Ökologische Pflanzenzüchtung, DE
- Forschung & Züchtung Dottenfelderhof, DE

Drivers

- Policies: EU-Regulation for Organic farming[4,5] and EU seed law[6]
- Awareness and capacity building: Value chain development[2]

Challenges

- Political opposition by the conventional farming industry lobby.[8]
- Multiplication over several years can increase problems with seed-borne diseases, so safety measures have to be installed.[8]

Conclusion

- ➢ Hm is a major chance for reforming the seed system towards a more agrobiodiverse future.
- ➢ To make use of its several positive impacts there is a need for unconventional thinking and capacity building along the value chain.
- ➢ Hm is only part of the solution. It will not solve all problematic seed issues. Other efforts are needed, e.g. investement into breeding by setting incentives to develop varieties for organic and low-input farming systems, including a huge range of species and intra-genetic diversity.

Sources:
[1] Baresel, J. P., Bülow, L., Finckh, M. R., Frese, L., Knapp, S., Schmidhalter, U., & Weedon, O. (2022). Performance and evolutionary adaptation of heterogeneous wheat populations. Euphytica, 218(10), 137. https://doi.org/10.1007/s10681-022-03072-2
[2] Bundesprogramm Ökologischer Landbau. (2023, Juni 23). Populationsweizen überzeugt in der Praxis. https://www.bundesprogramm-oekolandbau.de/DE/Service/Aktuelles/2023/230623_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5Bnews%5D=4244&cHash=31b5d11b3d9f9ec86c84749c43537ae4
[3] Ceccarelli, S., & Grando, S. (2020). Evolutionary Plant Breeding as a Response to the Complexity of Climate Change. iScience, 23(12), 101815. https://doi.org/10.1016/j.isci.2020.101815
[4] European Parliament and European Council. (2023, Februar 21). Consolidated text: Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007. https://eur-lex.europa.eu/eli/reg/2018/848/2023-02-21
[5] European Parliament, European Council. (2018, Mai 30). Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007. Official Journal of the European Union. https://eur-lex.europa.eu/eli/reg/2018/848/oj
[6] Prieler, Magdalena. (2022). EU-Reform der Vermarktungsregeln für Saatgut. Welches Saatgut für einen gerechten Übergang zu agrarökologischen und nachhaltigen Lebensmittelsystemen? Politische Studie im Auftrag von Martin Häusling, MEP und Sarah Wiener, MEP
[7] Raigón, M. D., García-Martínez, M. D., & Chiriac, O. P. (2022). Nutritional Characterization of a Traditional Cultivar of Tomato Grown Under Organic Conditions—Cv. "Malacara". Frontiers in Nutrition, 8, 810812. https://doi.org/10.3389/fnut.2021.810812
[8] Vollenweider, Carl, Geschäftsführer Forschung & Züchtung Dottenfelderhof in der Landbauschule Dottenfelderhof eV. (2024, Juli 8). Personal commmunication [Persönliche Kommunikation].
[9] Wuest, S. E., Peter, R., & Niklaus, P. A. (2021). Ecological and evolutionary approaches to improving crop variety mixtures. Nature Ecology & Evolution, 5(8), 1068–1077. https://doi.org/10.1038/s41559-021-01497-x

CSA - SCALING IT UP!

HOW DOES UP-SCALING EFFECT THE AGROBIODIVERSITY IN THESE SYSTEMS?

THIS CASE STUDY

In this case study, I will ask how scaling up CSA in Germany can be done and how up-scaling can affect the promotion of different aspects of agrobiodiversity in CSA. I will draw from the experiences of KoLa Leipzig, one of the largest CSAs in Germany, and from studies on CSA in the USA.

CSA AND AGROBIODIVERSITY

Community Supported Agriculture (CSA) is a framework that incentiizes agrobio-diversity [3]. As customers direct involve-ment in the farm business increases their will to internalize the socio-ecological costs of production, higher degrees of agrobiodiversity becaome feasible and plausible for farms [1,2]. Besides greater crop diversity and general biodiversity on the farmland, CSA also fosters the diversity of agricultural practices (every CSA in Germany runs differently), adds to the conventional food supply system and increases the number and variety of people involved in agriculture. Most CSAs are small-scale producers [3,6,8].

KOLA LEIPZIG

Founded in 2019, after being offered 35ha of land from the local Church, KoLa Leipzig has declared it their goal to get CSA out of its niche. 2 years later, the newly founded CSA had 1000 members already and was planning to at least double that number [8].

HOW TO SCALE UP CSA?

- **LARGER FARMS** allow for more mechanization, which increases turnover, resulting in a greater capacity to invest. It also decreases the price of the membership and the need for members to work on the farm.
- **MAKING MEMBERSHIP MAINSTREAM READY** by offering supermarket-quality to acceptable price options, by demanding less work from members, by making the products easily available (number and accessibility of distribution stations) [1].

CHALLENGES

- **ASSEMBLING A TEAM**, setting up the teamstructure (has rarely been done before in Germany) [1]
- **INVESTMENT COSTS** are greater [1]
- **SOCIETAL CHANGE** required to **INCREASE DEMAND** (Public interest (education & marketing), financial ability to internalize socio-ecological costs (reorganization of subsidies and policy framework) [1]
- **BALANCING** max. number of members and max. possible involvement of members [4]

EFFECTS ON AGROBIODIVERSITY

SPECIES AND VARIETY DIVERSITY.

- Members prefer greater product variety [1,3]
- KoLa cultivates ca. 50 different vegetable crops with more than 100 different varieties [1]

∴ *Does not decrease with size*

BIODIVERSITY IN CULTIVATED LAND.

- Farmers in CSA often committed to sustainable agricultural practices [1,6]
- For customers, implications of agri-cultural practices become immediately visible in the CSA context → easier to consciously internalize socio-ecological costs [1,2]
- KoLa maintains 3,2 ha of flower strips, hedges and meadows under protection + 4,6 ha of orcharding [8]
- Members have founded a butterfly monitoring workgroup [1]

∴ *Unlikely to decrease with size*

DIVERSITY OF AGRICULTURAL PRACTICES.

- Outdoor cultivation of vegetables is relatively uncommon in Germany → no standardized or off-the-shelf solutions for many technical problems
- Many farmers in CSAs are lateral entrants. Thus, agricultural practices are often being worked out in the process.
- Large CSAs will likely professionalize, mechanize and standardize more [1].

∴ *May decrease for large CSAs*

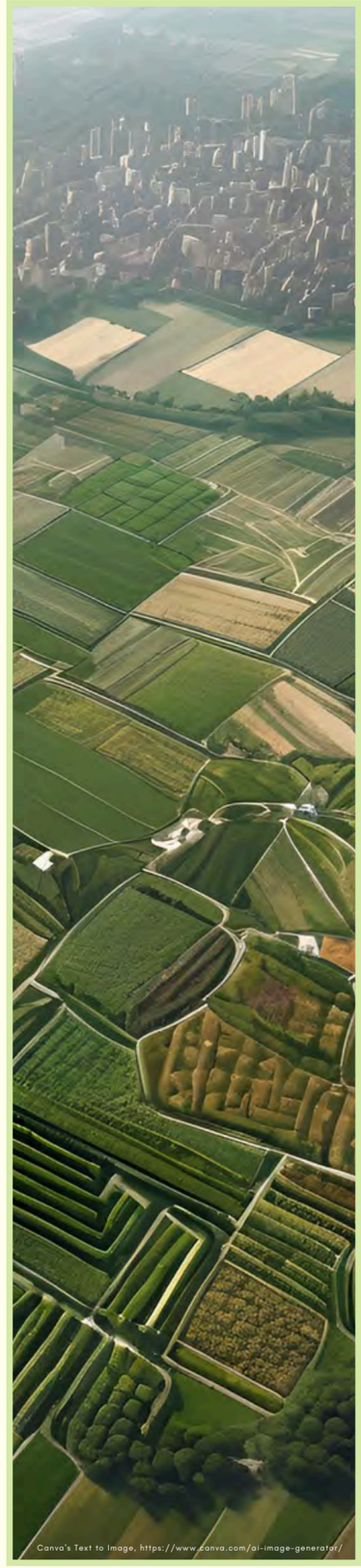
DIVERSITY OF FOOD SUPPLY CHAIN.

- CSA adds a new component to the conventional food system
- KoLa uses the local supermarket cooperative "Konsum" as distribution stations for their products

DIVERSITY OF STAKEHOLDERS.

- All members are shareholders and can participate in the farm business.
- A greater number of members leads to a less close relationship to and within the member community. A mainstream membership cannot require members to work on the farm [1,4].

∴ *Number of members limited, since a balance between the number and the closeness of the integration of members needs to be found*



CONCLUSION

Although more large size CSAs are technically possible, we still see only few in Germany, since the system is still young and developing. Additionally, a societal change is required for CSA to become more mainstream. However, the agricultural landscape could benefit greatly from more large scale CSAs due to the great agrobiodiversity this system is abled to maintain.

REFERENCES

[1] Grüner, Jakob. How does up-scaling effect the agrobiodiversity in CSA? Drawing from the experience of KoLa Leipzig. Online Call, 3. Juli 2024.
[2] AG Solawi-Genossenschaften. „Vielfalt und Solawi-Typen“. Homepage. AG Solawi-Genossenschaften (blog), 3. Juli 2024. https://solawi-genossenschaften.net/solidarische-landwirtschaft/#Typen
[3] Galt, Ryan E., Libby O'Sullivan, Jessica Beckett, und Colleen C. Hiner. „Community Supported Agriculture Is Thriving in the Central Valley“. California Agriculture 66, Nr. 1 (Januar 2012): 8–14. https://doi.org/10.3733/ca.v066n01p8
[4] Hood, Grace. „Community Supported Agriculture: How Big Is Too Big?“ npr, The Salt, 16. Juli 2013. https://www.npr.org/sections/thesalt/2013/07/16/202624149/community-supported-agriculture-how-big-is-too-big
[6] Tegtmeier, Erin M., und Michael Duffy. „Community Supported Agriculture (CSA) in the Midwest United States: A regional characterization“. Leopold Center Pubs and Papers, Nr. Paper 151 (2005). https://base.socioeco.org/docs/community_supported_agriculture_csa_in_the_midwest_united_state.pdf
[8] AG Solawi-Genossenschaften. „Portraits - KoLa Leipzig eG“. Homepage. AG Solawi-Genossenschaften (blog), 5. Juli 2024. https://solawi-genossenschaften.net/kola-leipzig-eg/

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