Summer School Agrobiodiversity

zhaw

FiBL

CISPAC
Centro de Investigación Interuniversitario das Paisaxes Atlánticas Culturais

Mini Case Studies

2026



Agrobiodiversity Summer School
Santiago de Compostela
September 2nd to 12th 2026

Summer School Agrobiodiversity

UNIVERSITÄT BAYREUTH

Dreschflegel – Community Seed Conservation in Practice

FRANZISKA ROSENBAUER, M.Sc. Global Change Ecology
Franziska.Rosenbauer@uni-bayreuth.de

Agrobiodiversity & Community Seed Systems

Conserving **plant genetic resources** (**PGR**), like heritage crop species and varieties, is essential for resilient agroecological systems because they provide the **genetic, species, and functional diversity** needed to adapt to shifting environmental conditions[3,4]. German national strategies emphasize that safeguarding PGR requires both **ex situ and in situ/on-farm conservation**, with a particular need for **decentralized actors** who maintain varieties in **active cultivation**[3]. **Community seed systems** fulfill this role by keeping landraces and traditional varieties in dynamic use, enabling **ongoing adaptation** under real farming conditions[5]. They often operate as **seed commons**, where seeds, knowledge, and responsibilities are **collectively governed**[6,7]. Through farmer-led selection, local breeding, and horizontal exchange networks, these systems enhance genetic diversity, sustain rare and neglected species, and diversify management practices.
In doing so, they **complement national conservation frameworks** and **strengthen agrobiodiversity**.

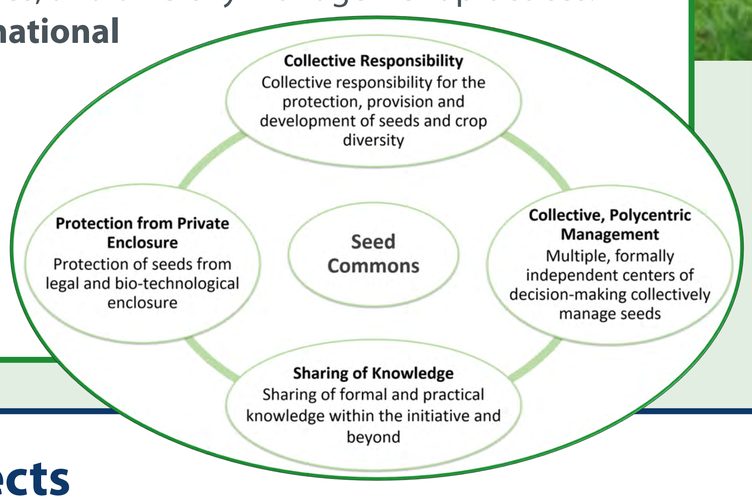


Fig.1: *Core Criteria of Seed Commons. From Sievers-Glotzbach et al. (2021)[6]*

Dreschflegel – Structure & Organisation

Dreschflegel is a **nationwide network of gardeners** who have been working since **1990** to **maintain and develop** a wide range of traditional varieties. Across 19 farms, they cultivate **open-pollinated, GMO-free varieties**, thereby preserving agrobiodiversity, strengthening farmer autonomy, and reducing dependence on large seed corporations. The initiative combines **practical seed production** with **expertise in ecological plant breeding** and offers **educational activities** to share this knowledge. Dreschflegel also operates its **own value chain** for seed distribution and **engages politically** for diverse and accessible seed systems[1,2,8].

Three pillars[8]:

- **Dreschflegel Farms** – Individual gardeners and farmers focused on seed production
- **Dreschflegel GbR** – civil-law partnership responsible for the economic and logistic part of seed distribution
- **Dreschflegel e.V.** – nonprofit association founded in 2000 for financing breeding, education, seed activism and political advocacy

Dreschflegel understands itself as a collective, guided by the **principle of consensus** and the **equal standing of all members**.

Biodiversity Aspects

Species diversity within crops

The gardeners of Dreschflegel maintain over 800 varieties of different species of old and often neglected cultural crops, hereby contributing to the conservation of valuable plant genetic resources.

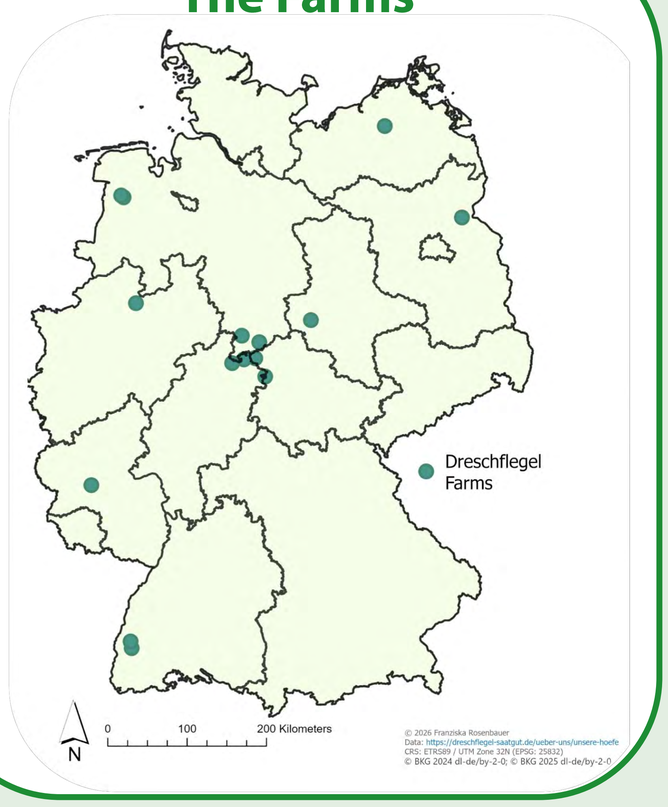
Genetic diversity of crops

By cultivating varieties across multiple farms in Germany and focusing the breeding on robustness, taste, pest tolerance, and climate adaptation, Dreschflegel keeps and develops locally adapted, genetically diverse populations. Their exclusive focus on open-pollinated, GMO-free, and partly not officially recognized varieties further broadens genetic diversity.

Diversity of agricultural management practices & of production and food supply systems

Dreschflegel's work is characterized by decentralized cultivation across many farms with diverse management styles, often using ecological and traditional practices. The organization is based on equal participation without hierarchies. Through workshops and educational activities, Dreschflegel e.V. promotes alternative food cultures, strengthens home gardening, and supports independence from large seed corporations, thereby reinforcing local, decentralized seed systems.

The Farms



Challenges

- **High seasonal workload peaks** create risks of overextension and self-exploitation
- **Consensus-based decision-making** can be **slow** and emotionally **demanding**
- Dreschflegel e.V. **depends on donations**, creating financial vulnerability
- Seasonal workers have **limited decision- making power**
- **Seed legislation** and **GMO deregulation** threaten crop diversity and autonomy
- Heterogeneous varieties have **limited suitability for commercial horticulture**, reinforcing a focus on home gardeners



Results and Conclusion

The work of Dreschflegel shows that community-based seed work can effectively conserve and contribute to plant- and agrobiodiversity. By maintaining hundreds of heritage varieties, cultivating and breeding them across diverse farms, and producing locally adapted seeds, they maintain species and genetic diversity.

Their decentralized, collective structure allows for diverse management practices and is an example for a hierarchy-free way of working. Overall, Dreschflegel demonstrates how community seed systems can safeguard plant genetic resources.

References: **[1]** Dreschflegel e. V. (n.d.). *Aufgaben und Ziele*. Retrieved July 30, 2026, from https://dreschflegel-verein.de/aufgaben-ziele/ **[2]** Dreschflegel GbR. (n.d.). *Wir stellen uns vor*. Retrieved July 30, 2026, from https://dreschflegel-saatgut.de/ueber-uns/wir-stellen-uns-vor **[3]** Bundesministerium für Ernährung und Landwirtschaft. (2024). *Pflanzengenetische Ressourcen: Nationales Fachprogramm für pflanzengenetische Ressourcen für Ernährung und Landwirtschaft*. Bonn: BMEL. https://www.genres.de/fileadmin/SITE_MASTER/content/Publikationen/BMEL_R522_Nationales_Fachprogramm_pflanzengenetische_Resso_M7_gesamt_bf.pdf **[4]** Salgotra, R. K., & Chauhan, B. S. (2023). *Genetic diversity, conservation, and utilization of plant genetic resources*. Genes, 14(174). https://doi.org/10.3390/genes14010174 **[5]** Pautasso, M., Aistara, G., Barnaud, A., Caillon, S., Clouvel, P., Coomes, O. T., … Tramontini, S. (2013). *Seed exchange networks for agrobiodiversity conservation: A review.* Agronomy for Sustainable Development, 33, 151–175. https://doi.org/10.1007/s13593-012-0089-6 **[6]** Sievers-Glotzbach, S., Tschersich, J., Gmeiner, N., Kliem, L., & Ficiciyan, A. (2021). *Diverse seeds – shared practices: Conceptualizing seed commons*. International Journal of the Commons, 14(1), 418–438. https://doi.org/10.5334/ijc.1043 **[7]** Sandström, E., Ortman, T., Watson, C. A., Bengtsson, J., Gustafsson, C., & Bergkvist, G. (2024). *Saving, sharing and shaping landrace seeds in commons: Unravelling seed commoning norms for furthering agrobiodiversity*. Agriculture and Human Values, 41, 1825–1840. https://doi.org/10.1007/s10460-024-10581-4 **[8]** Interview with Anke Wortmann of Dreschflegel e.V., 30/07/2026

Weidewelt Frankenwald

Preserving Biodiversity Through Extensive Grazing in the Frankenwald

Hannah Stössel – Agrobiodiversity Summer School 02.09. – 10.09.26

Nutrient-poor, **species-rich grasslands (*Magerwiesen*) are among Central Europe's most threatened habitats.**

But: they have become increasingly abandoned! Why?
- extensive grazing became **economically unattractive**
- agricultural intensification reduced habitat quality on more productive land

Can a project supporting extensive grazing help preserve them?

Why is extensive grazing so good for biodiversity?

Extensive grazing creates **a mosaic of vegetation heights**, **prevents** shrub encroachment, and maintains nutrient-poor **grasslands** that **support** many **specialized plant and animal species**.

Grazing animals also **disperse seeds and create microhabitats** through trampling, benefiting insects, birds, and diverse plant communities.

WEIDERIND FRANKENWALD

Conservation

regional food production

Premium beef label rewarding biodiversity-friendly management:

Diversity food supply system

- **Extensive** pasture **grazing**
- **≥50% land** under **conservation** programmes
- Feed from the farm or neighbouring farms
- Maximum **transport** distance: **90 km**

Farmers meeting these criteria received a **premium** through participating **regional butchers.**

Species diversity within livestock

Diversity of management practices

Quick facts

- **14 cattle breeds**
- Extensive **mother-cow grazing** system
- Initiated by **Bund Naturschutz** and **local extensive farmers**
- **Pasture farms doubled** during the project period
- Location: **Frankenwald Nature Park**, Bavaria, Germany
- Project duration: **2011-2017** (association continues today)

Impacts

Economic

- Approximately **€200 additional income per bull**
- Participating pasture farms doubled during the project
- Previously abandoned grazing was **reintroduced** on some farms
- Farmers gained access to additional conservation land

Environmental

Documented increases over five years of scientific monitoring in:
- Butterflies
- Grasshoppers
- Breeding birds
- Species-rich meadow vegetation

Biodiversity of agricultural land

Economic

- **Partnership** between farmers, conservation organisations, regional butchers, and tourism stakeholders.
- Demonstrated that **conservation** and **agriculture** can **collaborate** when environmental objectives are linked to tangible economic benefits.

"The gap between agriculture and nature conservation is much smaller than commonly portrayed."
- Wolfgang Degelmann

Remaining challenges

Organizational Continuity
- **Activity declined** after project funding ended
- **Organisational conflicts** weakened long-term cooperation

Politics & Tourism
- **Little** active **political involvement**
- Yet, tourism partners promoted the project from the beginning
- Potential for **stronger destination branding** around extensive grazing and biodiversity

Regional Market
- **Restaurants** were **unwilling** to **charge higher prices** for premium products
- Continued **consumer willingness** to support regional products remains **essential**

Takeaways

- **Aligning ecological** and **economic goals** can support biodiversity conservation
- **Collaboration** between agriculture and nature conservation **facilitated** project **implementation**
- The model may be **adaptable to other regions** with suitable local conditions

hannah.stoessel@gmail.com

UNIVERSITÄT BAYREUTH

Special Thanks

The author gratefully acknowledges **Wolfgang Degelmann** for his time, insights, and valuable contribution to the stakeholder interview that informed this case study.

References

Filazzola, A., Brown, C., Dettlaff, M. A., Batbaatar, A., Grenke, J., Bao, T., Peetoom Heida, I., & Cahill, J. F. (2020). The effects of livestock grazing on biodiversity are multi-trophic: a meta-analysis. *Ecology Letters*, *23*(8), 1298–1309. https://doi.org/10.1111/ele.13527.

Poschlod, P., & WallisDeVries, M. F. (2002). The historical and socioeconomic perspective of calcareous grasslands—lessons from the distant and recent past. *Biological Conservation*, *104*(3), 361–376. https://doi.org/10.1016/s0006-3207(01)00201-4.

Weidewelt Frankenwald e.V. (2020). Weidewelt-Frankenwald.de. http://www.weidewelt-frankenwald.de.

Weidewelt – Vieh(l)falt im Frankenwald. (2026). Bund-Naturschutz.de. https://www.bund-naturschutz.de/landwirtschaft/artgerechte-tierhaltung/weidewelt-frankenwald.

Agrobiodiversity Summer School 2026
Anna Lindermeier
lindean1@students.zhaw.ch
MSc ENR AFS, ZHAW



Meh als Gmües: Does it keep its promise of being more than just veggies?

WHAT IS MAG?

Meh als Gmües is a vegetable cooperative with 220 members and 4 employed gardeners, producing vegetables on 3 hectares of land on the outskirts of Zurich.

This mini case study examines how biodiversity of agricultural land, diversity of production systems and genetic diversity of crops play a part in a resilient, effective and agrobiodiverse urban food system.



ASPECTS OF AGROBIODIVERSITY

Biodiversity of agricultural land

Constant flowering strips, green pathways, partnership with landscape gardeners for biodiversity areas.

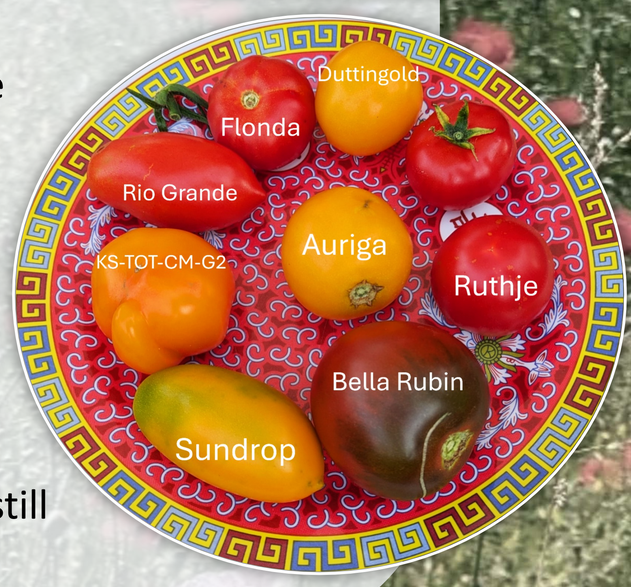


Diversity of production systems

Conmunity-supported vegetable gardening, honeybees, landscape gardening, berry, fruit and spice gardens.

Genetic diversity of crops

Heterogeneous populations containing landraces, standard biological varieties and cultivars still in development.



BENEFITS

- **Local adaptation**
Using old landraces like Zürcher Original tomatoes makes use of the adaptations of these varieties to the local climate.

- **Resilience**
Memberships as an economic basis and a high diversity of cultivars aid the farm in being more resilient towards varying market or weather conditions.

- **Sustainability (ecological, social, economic)**
MAG is extensive, small-scale agriculture with large biodiversity enhancement areas. Inclusion of the members in the production leads to less alienation of food sources and raises awareness for challenges agriculture faces with climate change.

CHALLENGES

- **Number of memberships**
In the urban area of Zurich, many initiatives in the same niche as MAG have grown over the past years. This creates competition between the farms over members.

- **Many different roles**
The expectations to be an agricultural project as well as a social project and an ecological pioneer are sometimes hard to fulfil.

- **Direct payments by the government**
As a cooperative, MAG is only eligible for payments for the biodiversity enhancement areas and landscape quality. The other subsidies are reserved to farms with a legal entity.

CONCLUSIONS

Meh als Gmües contributes to agrobiodiversity at the landscape, production-system and genetic levels by combining diverse habitats, farming practices and crop varieties. This diversity supports a multifunctional and potentially more resilient urban food system. However, there remains room for improvement regarding access to subsidies and support from the public.

BIBLIOGRAPHY

Von Arb, C. (2026). Personal interview and farm visit.
Ducottet C., Parot J. (2020). Study of the potential of community-supported agriculture (CSA) for the dynamic on-farm management of agrobiodiversity. OWC 2020.

From Local Heritage to Brand Value:

Place-Based Identity and Good Practices

Background and research objectives

Ouro de Quiroga is a producer and bottler of extra virgin olive oil based in Quiroga (Galicia, Spain). This case study aims to explore the role of recovering native crops, combining traditional knowledge with new techniques, and cooperating with stakeholders in promoting agrobiodiversity. The analysis is based on a review of the literature and news articles, as well as an interview with Julio Quiroga, one of the business partners.



Agrobiodiversity aspects

Genetic diversity of crops and livestock

Identification, recovery and conservation of native Galician olive varieties in collaboration with the Spanish National Research Council (CSIC).

Restoration of old olive groves and planting of new ones.

Species diversity within crops and livestock

Plots combine different olive varieties, both native and non-native, with other crops, including vineyards.

Natural ground vegetation is maintained rather than removed.

Diversity of agricultural management practices

Olives are harvested manually by beating the branches with poles, relatively early, to prioritise oil quality over extraction yield.

Oil is obtained through an exclusively mechanical milling and centrifugation process.

Diversity of stakeholders

Close collaboration with a range of institutions, including CSIC and the Association of Olive Oil and Olive Producers of Galicia.

Two projects stand out:

- AGRI-ROVENAT: tests alternative methods for managing vegetation cover in olive groves and vineyards.
- Oliveiras de Galicia: aims to achieve large-scale propagation of native Galician olive varieties.



agrirovenat

oliveiras
oliveiras de Galicia

MEMBRO DA ASOCIACIÓN DE PRODUTORES DE ACEITE EMBOTELLADA
APAG.GAL

Results: benefits in terms of local adaptation, resilience and sustainability

Local embeddedness helps to retain wealth in the local economy and reducing transport distances.

Progress in scientific knowledge and development of native varieties. Contributed to the identification of previously unknown native varieties (13 to date) and to their propagation.

Preservation and restoration of the traditional landscape.

- Maintaining locally adapted genetic resources enhances the resilience of the local production system.
- Brought long-established agricultural landscapes back into production rather than replacing them with intensive plantations.

Preservation of traditional knowledge and local historical identity

The project builds on knowledge transmitted by previous generations of local growers, combined with modern techniques.

Conclusions

Ouro de Quiroga contributes not only to preserving a crop and an activity, but also to maintaining the identity and knowledge associated with olive oil production.

The benefits identified translate into business value, as they strengthen its identity, authenticity and distinctiveness by linking the product to local traditions and good practices.

"*Place shapes the brand*" («*O territorio fai marca*») – Julio Quiroga



References

(1) Interview with Julio Quiroga, partner at Ouro de Quiroga S.L., conducted in August 2026.
(2) Xunta de Galicia (2021) Da oliveira á mesa: Historia da produción de aceite en Galicia.
(3) Gago, P.; Boso, S.; Santiago, J.-L.; Martínez, M.-C. (2024) Identification and Characterization of Relict Olive Varieties (Olea europaea L.) in the Northwest of the Iberian Peninsula. Horticulturae, 10, 175. https:// doi.org/10.3390/horticulturae10020
(4) Friol, C. (05/10/2020) Ouro de Quiroga, un proyecto para recuperar la producción autóctona de aceite gallego. Campo Galego. Available at this link.
(5) Alfonso, M. (26/05/2026) El aceite gallego hace historia: dos premios para Ouro de Quiroga en un concurso internacional. La Voz de Galicia. Available at this link.

Acknowledgments

My sincere thanks to Julio Quiroga for his kindness and generosity.

Ana Méndez-Campillo
anamendezcampillo@gmail.com
Universidade de Santiago de Compostela

USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA

Summer school Agrobiodiversity

Santiago de Compostela, September 2026

Living Allies:
Perennial Plants that Protect and Produce

Jael Moser

Introduction

The farm “Biogarten Lieli” is located in Oberwil-Lieli (AG, Switzerland). In order to promote biodiversity and landscape resilience a plot of 1.5 ha is set up as forest garden. Planned according to the principles of key-line design and permaculture, perennial plants are introduced as protection and producer.

As the garden is situated on a gentle slope, the vegetable beds are laid out along the contour lines. Rows of trees, bushes and flowers are planted in between and on the west side of the garden. Additionally, a blueberry patch was planted on the foot on the slope.

Layout of the forest garden



Section of an aerial photograph of the forest garden

Results:

Landscape resilience

The layout along the contour lines distributes the water more evenly. Perennial plant roots facilitate infiltration and keep water for plants available.

The tree strip on the west side shields the garden from wind, stopping cooling and drying out of soil.



Salad harvest early in the morning.

Agrobiodiversity aspects

The strips with trees, bushes and flowers attract pollinators, create hiding and living spaces and species as blueberreis and goumi-berries promote microbial diversity.

Fruit trees, berry bushes and flowers are added to the vegetable cultures.

Through wild fruit varieties such as the vineyard peach the genetic diversity is promoted.

The product range is expanded through fruits, berries and flowers

Strips with trees and bushes are more extensively managed.

Challenges

Maintaining the complex system needs a lot of time and knowledge. Trees and bushes need to be pruned and cared for and the harvest of the berries and fruit takes a lot of time.

Lack of national subsidies makes it difficult to secure funding.

Conclusion

The perennials fulfil their dual role as producers and protectors.

Effects are visible through high abundance of pollinators, reduced erosion in flood events and long-lasting retention of soil moisture.

Specifically trained workers are missing.



A view of the vegetable beds with rows of trees and bushes in between.

References

1. Visio Permacultura Stiftung (2024). Biogarten Lieli.
2. Toensmeier E. (2022). Paradise Lot: A Temperate-Climate Urban Agroforestry Biodiversity Island.
3. Gautam V. (2023). Advances in Land and Water Resources Management Concept and Application.
4. Gašic K. (2001). Characterisation of vineyard peach biodiversity.
5. Agroscope (2025). Mikrobiologische Vielfalt im Substrat und ihre Beziehung zur agronomischen Leistung bei Heidelbeeren (Vaccinium corymbosum L.).
6. Bieniek A. (2023). Variation in Fruit and Seed Morphology of Selected Biotypes and Cultivars of Elaeagnus multiflora Thunb. in North-Eastern Europe.

Tree Strips to Promote Biodiversity

Barriers and Drivers for the Adoption of Agroforestry Systems in the Swiss Plateau.

Jonas Amacher · ZHAW · Mini Case Study · Agrobiodiversity Summer School 2026

Zurich University of Applied Sciences
Life Sciences and Facility Management
Institute of Natural Resource Sciences

1 Introduction

Biodiversity on agricultural land in Switzerland has declined in recent decades (BAFU, 2017), and climate change, with its dry and hot summers, is also taking a toll on crops and animals (BLW & BAFU, 2013). One possible response to these challenges is the targeted creation of small-scale structures such as tree strips planted with native species such as Juglans regia, Sambucus nigra and Acer campestre (Kaeser et al., 2010, May).

This case study examines why farmers have so far been rather hesitant to use tree strips to promote biodiversity and what courses of action could be taken as a response?

Agrobiodiversity benefits of tree strips

- Species diversity within crops: Cropland is supplemented by native tree species.
- Biodiversity of agricultural land: Habitat for beneficial insects, wild bees and birds.
- Diversity of agricultural management practices: Specific maintenance and pruning regime.
- Diversity of production and food supply systems: Some trees produce additional fruit or wild berries.

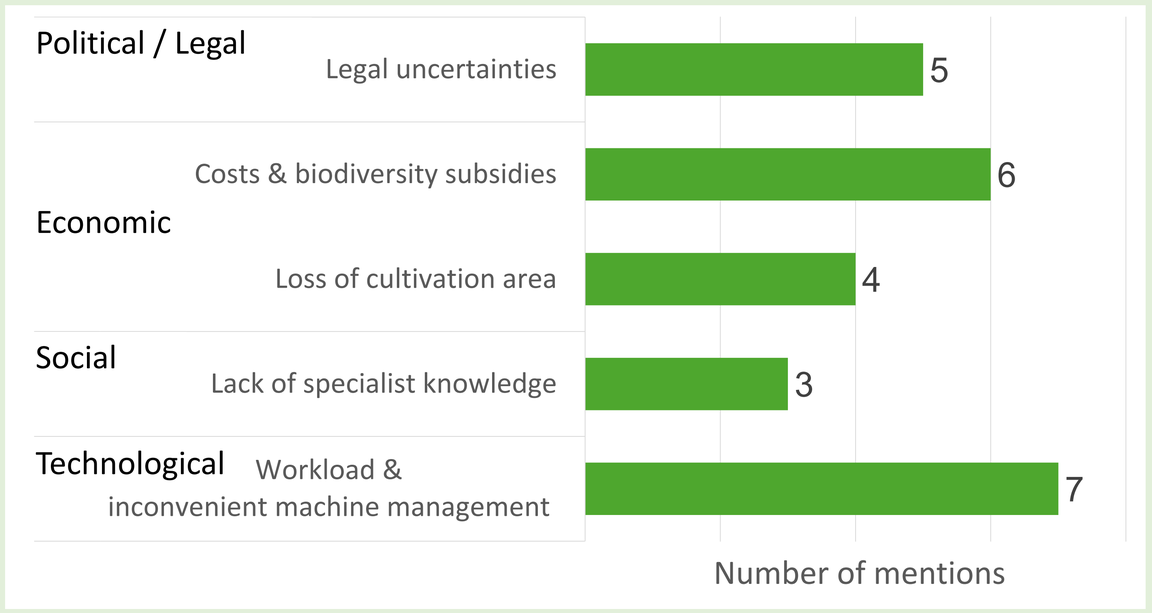
2 Methods

The study combines a literature review with a written survey of seven farmers and one expert. The questionnaire follows the PESTEL framework, a structured analysis of the political, economic, social, technological, environmental and legal factors affecting a farm (Sammut-Bonnici & Galea, 2015).

PESTEL dimension	Topic in the questionnaire
Political / Legal	How do you assess the current political and legal situation regarding agroforestry?
Economic	What role do the costs (planting, maintenance) and biodiversity promotion area payments play in the decision?
Social	What knowledge and advice do farmers still need in order to successfully implement agroforestry systems?
Technological	In your experience, what are the biggest obstacles preventing farmers from establishing tree strips on their farms?
Environmental	Where do tree strips provide the greatest environmental benefit on arable land, and where on pastureland?
General	What would need to change for agroforestry to become more widespread?

3 Results

Tree strips deliver several benefits. Ecologically, they create habitat for beneficial insects, wild bees and birds, and, where combined with rock piles, also for amphibians. On pastures they additionally provide shade and cooling for grazing animals in summer. Hedges are effective against soil erosion, as they buffer strong winds on flat terrain, and rows planted along contour lines retain rainwater and slow its drainage, reducing soil loss (Kaeser et al., 2010). One farm gains a supplementary income by marketing fruit juices (Farmer, Canton of Aargau) and a permaculture farm sees potential in using the harvest as a feed supplement in dry years (Female farmer, Canton of Bern). The policy framework, however, remains a barrier, funding as a biodiversity promotion area is possible in principle, but the rules are unclear in practice. Furthermore, the costs of planting and the labour involved in maintenance are causing farmers to hesitant about creating tree strips. (Bergauer, Röthlisberger).



Hurdles for tree strips mentioned, by category, content analysis of all 8 interviewees.

Dimension	Hurdles	Leverage points
Economic	Total costs ≈ CHF 1,850 per tree per 10 years, subsidies too low.	Subsidies calculated on the basis of actual full costs.
Social / Work	Few workers per farm, little time for reproductive labour.	Start-up funding for planting and maintenance, community-based agriculture projects.
Legal	Unclear recognition as an area promoting biodiversity, risk of being reclassified as woodland.	Clear demarcation of tree strips, hedges, woodland.
Social / Knowledge	Advisory services are not free everywhere, contact persons change frequently and the information given can be sparse.	Adding this topic to basic training, farm-to-farm exchanges, and networking within the Agroforestry association.

4 Discussion

The hesitant use of tree strips to promote biodiversity is mainly due to economic factors and a structural labour shortage, similar to the decline in reproductive labour described by Guzmán et al. (2022). Legal uncertainty over recognition as a biodiversity-promoting area and a conflict of objectives between today's efficiency-driven approach and agroecological multifunctionality add to this (Wezel et al., 2020). Limited technical knowledge is of little relevance.

5 Conclusions

Recommended measures to promote tree strips:

- A separate federal biodiversity support category for tree strips, calculated on the basis of actual full costs.
- Clarify the legal distinction between tree strips, hedges and woodland, establish clear rules to provide greater planning certainty.
- State-funded ongoing advisory support with a dedicated contact person.

References:

Amacher, J. (2026). Questionnaire "Tree Strips in Agroforestry Systems" – Raw Data (n = 8). Short written survey, unpublished.

Bundesamt für Landwirtschaft (BLW) & Bundesamt für Umwelt (BAFU). (2013, April). Anpassung an den Klimawandel: Sektor Landwirtschaft [Faktenblatt zur Strategie des Bundesrates «Anpassung an den Klimawandel in der Schweiz»]. Bern: BLW/BAFU.

Bundesamt für Umwelt (BAFU). (2017). Biodiversität in der Schweiz: Zustand und Entwicklung (Umwelt-Zustand Nr. 1630). Bern: BAFU.

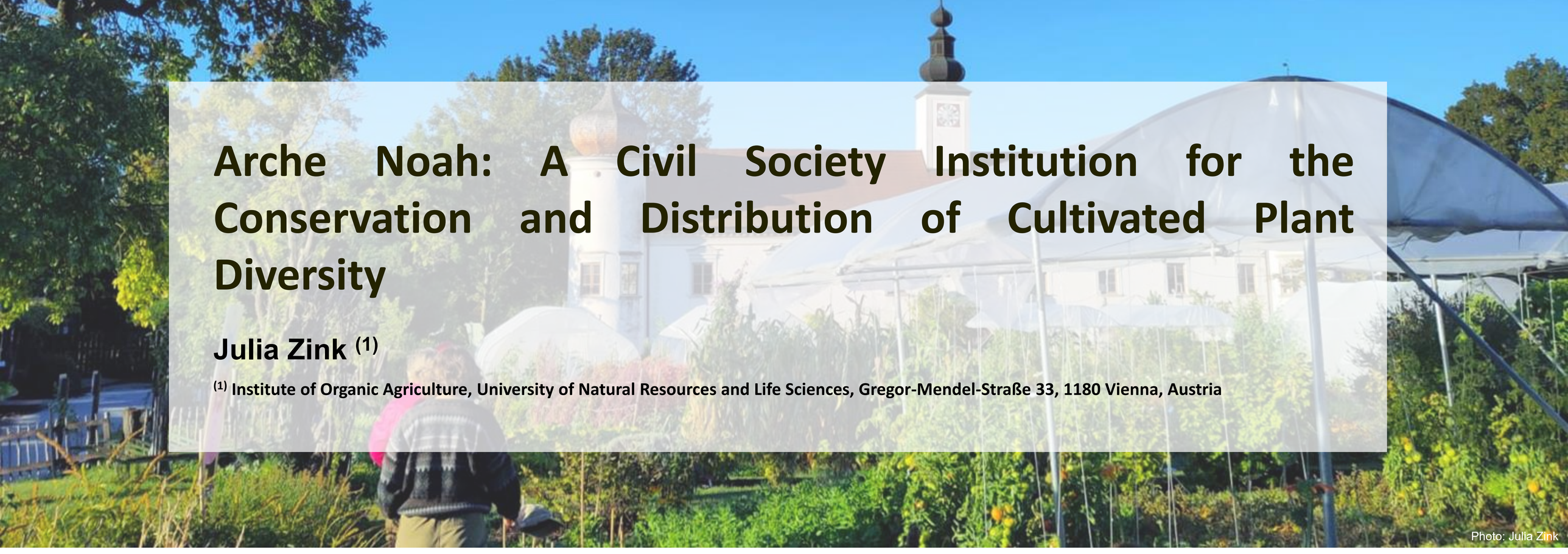
Guzmán, G. I., Soto Fernández, D., Aguilera, E., Infante-Amate, J., & González de Molina, M. (2022). The close relationship between biophysical degradation, ecosystem services and family farms decline in Spanish agriculture (1992–2017). Ecosystem Services, 56, Article 101456.

Kaeser, A., Sereke, F., Dux, D., & Herzog, F. (2010, May). Moderne Agroforstwirtschaft in der Schweiz. Innovative Baumgärten: Produktivität und Wirtschaftlichkeit (ART-Bericht 725). Ettenhausen: Forschungsanstalt Agroscope Reckenholz-Tänikon (ART).

Kaeser, A., Palma, J., Sereke, F., & Herzog, F. (2010, November). Umweltleistungen von Agroforstwirtschaft. Die Bedeutung von Bäumen in der Landwirtschaft für Gewässer- und Bodenschutz, Klima, Biodiversität und Landschaftsbild (ART-Bericht 736). Ettenhausen: Forschungsanstalt Agroscope Reckenholz-Tänikon (ART).

Sammut-Bonnici, T., & Galea, D. (2015). PEST analysis. In C. L. Cooper, J. McGee, & T. Sammut-Bonnici (Hrsg.), Wiley Encyclopedia of Management (Bd. 12: Strategic Management). Chichester: Wiley.

Wezel, A., Herren, B. G., Bezner Kerr, R., Barrios, E., Rodrigues Gonçalves, A. L., & Sinclair, F. (2020). Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review. Agronomy for Sustainable Development, 40(6), Article 40.



Arche Noah: A Civil Society Institution for the Conservation and Distribution of Cultivated Plant Diversity

Julia Zink [(1)]

[(1)] Institute of Organic Agriculture, University of Natural Resources and Life Sciences, Gregor-Mendel-Straße 33, 1180 Vienna, Austria

Introduction

According to estimations of the FAO, **more than 75% of global crop diversity vanished** irrevocably during the 20th century (Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ], 2015). Today, only around 30 crop species (out of approximately 7,000 known cultivated plant species) provide the majority of the world's plant-based food supply (Arche Noah, n.d.).

In many regions, locally adapted varieties were replaced by genetically uniform, high-yielding modern varieties (GIZ, 2015). This shift is especially caused by the **Green Revolution** in the second half of the twentieth century: **Mechanization, intensification and the use of agrochemicals** replaced traditional landraces with a few “miracle” varieties (von Verschuer, 2025). This development resulted in **"genetic erosion"**, narrowing the genetic base and making **food systems vulnerable** to pests and climate change (GIZ, 2015; von Verschuer, 2025). Furthermore, this “genetic erosion” is also strengthening **dependencies** for farmers, since today, the global seed market is dominated by ten agrochemical cooperations, what **endangers food sovereignty** (Arche Noah, n.d.).

Location and Historical Background



Fig. 1: Location of Arche Noah

Arche Noah is **located in Schiltern**, Austria (Fig. 1). The association was **founded in 1990**, a fusion of two former separate associations in Austria (Arche Noah, n.d.). It happened in response to the accelerating loss of crop genetic diversity caused by agricultural intensification and the consolidation of the commercial seed market during the 1980s (Arche Noah, n.d.). The founders - primarily **home gardeners**, as well as **organic farmers** - were concerned that traditional and locally adapted varieties were disappearing from both markets and gardens (Arche Noah, n.d.).

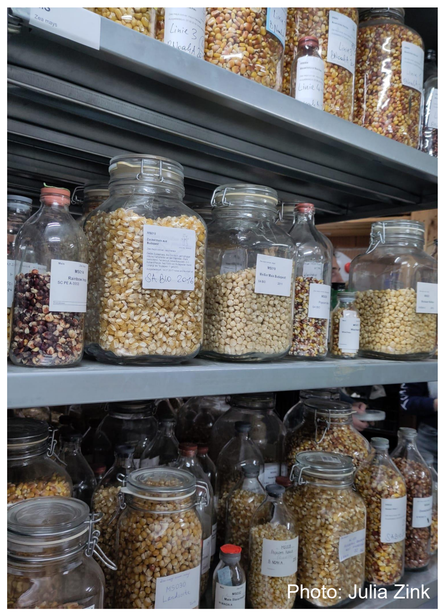


Fig. 2: Arche Noah Seed Archive

From the beginning, Arche Noah aimed not only to **conserve endangered crop varieties** through **community-based conservation**, but also to **advocate for farmers' rights** and more supportive **seed policies** (Arche Noah, n.d.).

Research Question:

What potential does a civil society institution have for managing genetic diversity, and what are its limits?

Methods and Materials

Main source of information was the Arche Noah webpage and the annual report of Arche Noah of 2024. Furthermore, some interviews with experts from Arche Noah were conducted to get more insights into different tasks of Arche Noah. Additionally, some literature research was done to give the elaboration a theoretical background.

Organizational Structure

The Arche Noah Association is an NGO that coordinates the overall conservation strategy, including the seed archive (Fig. 2), demonstration gardens, breeding programs, selling of seeds, vegetable seedlings and fruit trees, education, and political advocacy (Arche Noah, n.d.). Its main interest is the **long-term conservation and sustainable use of cultivated plant genetic diversity** (Arche Noah, n.d.).

Around **17,000 members** support Arche Noah financially and through active conservation. **Variety custodians** regenerate seeds and maintain traditional varieties in private gardens and on farms, contributing to **decentralized (in situ) conservation** (Arche Noah, n.d.).

Organic Farmers produce seeds and cultivate rare varieties for commercial use. They help **scale up conservation** by bringing heritage varieties back into agricultural production and local food systems while creating market opportunities (Arche Noah, n.d.).

Financing

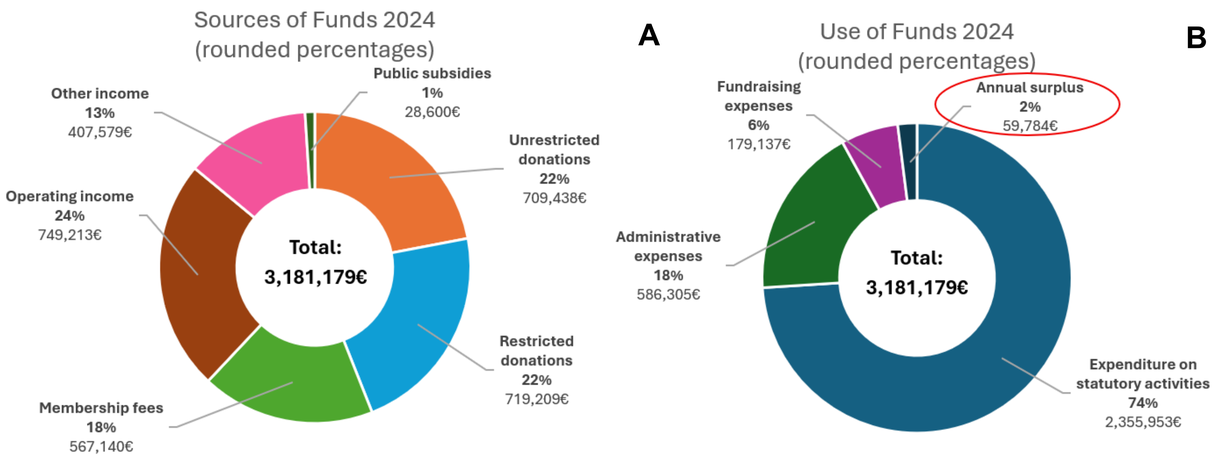


Fig. 3: Sources of Funds 2024 (**A**) and Use of Funds 2024 (**B**) (Arche Noah, 2024).

Benefits

- **Conservation of crop genetic diversity (ex situ and in situ)**
- **Knowledge transfer & community engagement**
- **Political advocacy**
- **Climate adaption and resilience**

Challenges

- **Long-term funding (Fig. 3)**
- **Climate change**
- **Limited adaption in commercial agriculture**
- **Regulatory barriers**
- **Long-term political commitment**

Conclusion

Arche Noah demonstrates the **strong potential** of civil society organisations to **conserve agrobiodiversity** by combining ex situ conservation, community-based in situ conservation and political advocacy.

Through its Seed Archive, breeding programmes and nationwide network of members, it **safeguards crop genetic diversity**, promotes a **wide range of cultivated species and varieties**, and **engages diverse stakeholders** in conservation.

However, limitations like long-term funding, climate change or regulatory barriers continue to constrain the scaling-up of its impact.

The case shows that civil society plays an indispensable role in building **resilient and diverse agroecological food systems**.

References

Arche Noah. (2024). *Annual report 2024*. https://www.arche-noah.at/media/an_2024_jahresbericht_12_final.pdf
Arche Noah (n.d.). Arche Noah. https://www.arche-noah.at/
Martins, C. (2015). *Agrobiodiversity: The key to food security, climate adaptation and resilience*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
Verschuer, F. von. (2025). *Collecting Seeds, Assembling Worlds : : An Inquiry into Agrobiodiversity Conservation Through the Svalbard Global Seed Vault*. (1st ed.., Issue 1st ed.). transcript Verlag.

The Case of Sipadu 551 Angsoka in Bali, Indonesia

SIPADU Evaluation from Political and Governance Perspective

Omega Feodora Elisabeth, Department of Agronomy, Magyar Agrár- és Élettudományi Egyetem (MATE University), Hungary

"Agroecology is ideal in theory but often falls short in implementation, what governance and policy measures can help overcome these challenges?"



Introduction and Objective

SIPADU government integrated farming initiative supporting Bali regional development through diversification and integration. The program initiated thorugh livestock-farm integration to achieve zero waste agriculture by producing 4F (food, feed, fertilizer and fuel) as a continuous system within one farming community. Despite its potential to promote agrobiodiversity, after 10 years, of its implementation has faced stagnation and inefficiencies.

This case study will focus on policy and governance evaluation as it can bring interesting perscpective to **identify key institutional challenges, decision consideration** and highlight the importance of effective governance, policy coherence, and coordination in achieving agroecological outcomes.



Key policy

Governor of Bali Regulation No. 29 of 2010 : Implementation and Sustainability of the SIMANTRI Program → Regulate objectives, implementation mechanisms, institutional arrangements, funding, monitoring, and sustainability of the SIMANTRI program.

**SIMANTRI was the earlier integrated farming program, while SIPADU represents its subsequent development/continuation in Bali.*

Benefits



- Local adaptation & empowerment
- Building economic and social resilience
- Promote agrobiodiversity & circular resource use

Evaluation

Research question : To what extent does the implementation of Governor of Bali Regulation No. 29 of 2010 in SIPADU 551 Angsoka reflect the principles of green politics and effective governance?

DISTRIBUTIVE JUSTICE

- **Equal access:** Collective assets, training, and opportunities are equally distributed.
- **Unequal outcomes:** Individual income varies with participation and activeness, resulting in differences in engagement and earnings.

DEMOCRATIZATION

- **Participatory autonomy:** Clear management and open stakeholder access enable member participation.
- **Limited independence:** Dependence on the program head restricts creativity and self-reliance.
- **Political vulnerability:** Political changes disrupt training, monitoring, and evaluation.

ECOLOGICAL SUSTAINABILITY

- **Agrobiodiversity support:** The circular system, agrotourism, and educational center promote integration and maximize resource use.
- **Knowledge gap:** Continuous knowledge transfer is needed to sustain agrobiodiversity.







Challenges

- Technical dependence
- Market and economic constraints
- Institutional and governance issues
- Knowledge and innovation gaps
- Operational constraints

Proposed Improvement

Based on the evaluation, *several recommendations can be considered:*

- **Implement periodic, phased monitoring:** Tailored, accountability, oversight, performance management.
- **Develop a structured guidebook:** Institutional capacity, standardization, policy implementation.
- **Strengthen stakeholder mapping:** Coordination, participation, and relationships between government and non-government actors.
- **Ensure policy continuity:** Establish stable institutional mechanisms and long-term commitments beyond political cycles.

Contact details :
Elisabeth.Omega.Feodora@stud.uni-mate.hu

Acknowledgement :
Thanks to Dr. I Gede Setiawan Adi Putra, S.P., M.Si.as the source of inspiration for this case

References :

Saskara, I. A. N., Setyari, N. P. W., Dewani, I. D. A. M. N., Dewi, D. M. M., & Lestari, D. P. D. M. (2024). Prospective analysis of Simantri sustainability: A probability approach. Jurnal Ekonomi dan Bisnis, 27(1), 21–42.
Sahri, M., Pramana, G. I., & Noak, P. A. (2024). Implementasi kebijakan Simantri dan Sipadu dalam kajian green politics: Studi kasus Gabungan Kelompok Tani 356 Sari Buana Desa Antapan, Kecamatan Baturiti, Bali. Jurnal Transformasi Global, 10(2), 157–172. https://doi.org/10.21776/ub.jtg.010.02.5
Dewi, D. M. M., Saskara, I. A. N., & Setyari, N. P. W. (2023). Does Simantri matter in economic sustainability? A study from agricultural sector in Bali, Indonesia. JPEK (Jurnal Pendidikan Ekonomi dan Kewirausahaan), 7(1), 93–103. https://doi.org/10.29408/jpek.v7i1.11952

Weltacker Zürich - 2000 m² per person

What an urban education program can teach about agrobiodiversity

Matteo Loosli ZHAW Zurich University of Applied Sciences, Institute of Natural Resource Sciences,
MSc Environment and Natural Resources — Agroecology and Food Systems, Wädenswil (CH)

Agrobiodiversity Summer School 2026, Santiago de Compostela · September 2026 · matteo.loosli@gmail.com

1 Introduction, topic and purpose

If the world's **1.6 billion hectares** of cropland were **shared equally**, every person would have about **2000 m²** per year. The Weltacker movement make that share walkable: on exactly this area they grow the roughly 45 most common arable crops in proportion to the land each occupies globally (Figure 2 below).

Since May 2026 one of them lies in Zürich-Schwamendingen on a former school football pitch (Figure 1) lent for three years, run by the non-profit association “Weltacker Zürich” founded in 2024 and farmed together with the neighbouring community supported agriculture Huebhof.



Figure 1: Weltacker Zürich in Schwammendingen in May 2025 (left) and in May 2026 (right) Photo: Matéo Dier

Purpose of Weltacker

- Education is the main output of the project
- Raise awareness for complex interrelations between agriculture, environmet and nutrition

Objectives of the Mini Case Study

- Identify which aspects of agrobiodiversity the site makes visible
- Trace how the case is farmed, financed, governed and politically anchored
- Assess critically where the projects impact model reaches its limits

Research question

How does the Weltacker Zürich make agrobiodiversity visible and understandable and how far does it put agrobiodiversity into practice in its own cultivation and organisation?

2 Aspects of agrobiodiversity covered

Genetic diversity of crops and livestock

Variety choice is an explicit management question: many varieties are bought from the Swiss organic and biodynamic breeders Getreidezüchtung Peter Kunz and Sativa Rheinau, implementing genetic diversity on the field.

Species diversity within crops

Around 45 arable crops side by side on 2000 m², each scaled to its share of global cropland. Crops normally grown in large monocultures and separated by continents appear on one field.

Biodiversity in cultivated land

Soil life fills half the school programme: soil window, organisms under the microscope, soil microphones and a buried cotton sock decomposing underground. Above-ground biodiversity is enhanced with flowering areas

Agricultural management practices

A small-scale, largely hand-worked mosaic farmed on organic and regenerative principles, with machinery, infrastructure and know-how from the neighbouring Huebhof farm.

Production and food supply systems

No commercial value chain. Tasting straight from the field is part of the tours, grain is milled and baked, vegetables are fermented, and at the September harvest festival these products are served and passed on for a donation.

Diversity of stakeholders

Association, farm, school, city departments, WWF Zürich, Soil to Soul, several foundations, many volunteers and trained field guides make up the very large variety of stakeholders involved in the project.

3 Results

On the field

- On **2000 m²** the main crops stand side by side, each on the area it occupies globally, with boards explaining what grows where and why. Feed crops make the land cost of animal products visible without a single animal on site.
- **Organic guidelines and carefully sourced seed** from organic breeders including ProSpecieRara varieties, though conserving them is not the field's purpose.
- **Farmed more carefully than it is narrated.** Cultivation is not part of the school programmes, yet it matters: many crops on small parcels, much hand work, machinery and know-how from the neighbouring farm.
- **Soil as a subject in its own right.** Visitors open a soil profile, examine organisms under a microscope and listen to the ground through soil microphones.

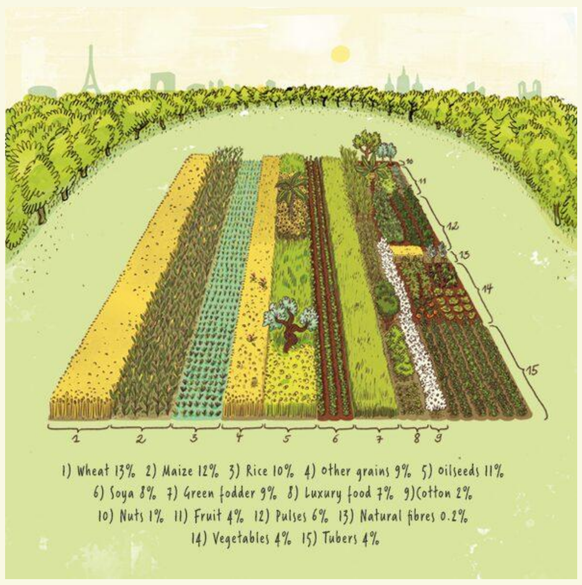


Figure 2: Global distribution of cops on arable land
Illustration: Annika Huskamp / Weltacker Broschüre 2024

Around the field

- **Education is the output,** and its strength lies in range of audiences and of topics alike. The same field works for kindergarten groups up to university students and can be filled with anything from a first sensory encounter with crops and soil to a discussion of variety choice or feed conversion.
- **Free for the city's school classes** through a service agreement with Zurich; companies come through corporate volunteering.
- **The harvest is not marketed, but neither is it wasted.** Tasting from the field is part of every tour in season; grain becomes flour and sourdough bread, vegetables are pickled or fermented and served at the September harvest festival or passed on for a donation.
- **A beginning, not a destination.** The association sees itself as a stage, a meeting place and a node in a network of more than 30 Weltacker worldwide, carried financially by foundations, donations and the umbrella association Weltacker Schweiz.

4 Discussion

A place where change starts

The movement’s goal is to **initiate change** towards a more **sustainable food system**. Informed consumers are meant to buy more sustainable foods, supporting an agroecological transformation. Results from environmental education research show that there is only a **weak link between knowledge and behavioral change** (van de Wetering et al. 2022; Kollmuss & Agyeman 2002). The extent of the contribution to this goal remains an open question I am examining in my master thesis.

Education against agronomy

Holding the **global area shares constant** every season leaves little room for a genuine **crop rotation**. And growing 45 crops on 2000 m² is a teaching model, not a farming system anyone would recommend. On fields that have been running for several years the problem has become pressing enough that the Weltacker Attiswil relocated its entire field. Finding that **balance** between being an **educational site** as well as an **agronomic field** that works over many years is a **big challenge**, yet to be solved.

Teaching Agrobiodiversity without naming it

The interview showed that the Weltacker works with agroecological ideas, yet **agrobiodiversity is not anchored in its concept as a term or as a frame**. The individual aspects are all present in the project, but they are not brought together under one heading. The term itself may be too abstract for a broad audience, and the **field arguably works better by showing diversity than by naming it**.

References and credits

Verein Weltacker Zürich (2026). Website; Jahresberichte 2024 & 2025; Statuten; Ackertour-Konzept Zyklus II.
Weltacker Schweiz (n.D.). Weltacker Wirkungsziele (IOOI-Wirkungsmodell).
2000m² Initiative (2026). Weltacker-Idee; Schweiz. www.2000m2.eu
Anthropic. (2026). Claude (Opus 5). https://claude.ai
Stadt Zürich, Umwelt- und Gesundheitsschutz (2024). Strategie nachhaltige Ernährung — Weiterentwicklung.
van de Wetering, J. et al. (2022). Journal of Environmental Psychology 81, 101782.
Kollmuss, A. & Agyeman, J. (2002). Environmental Education Research 8(3), 239–260.
Interviews with Barbara Holzer, co-president of Weltacker Zürich and Stéphanie Würth, managing director of Weltacker Schweiz.



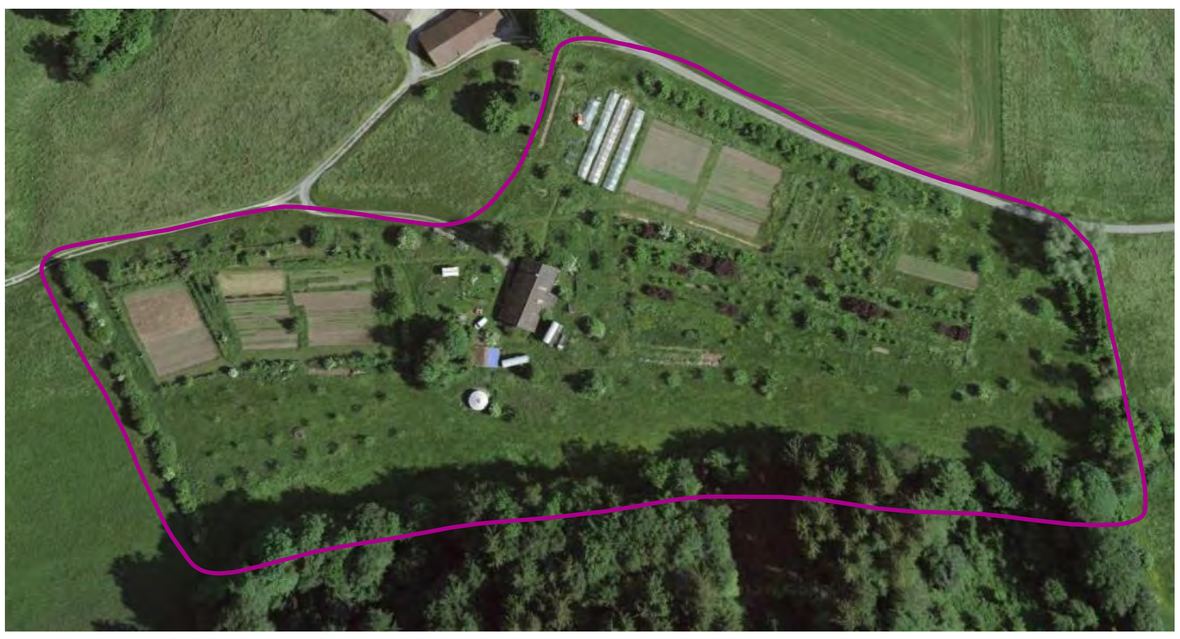
BIOHOF TANNACKER

Farming Without Animals — Opportunities and Challenges of Vegan Agriculture

Stefanie Krebs
ZHAW Zurich University of Applied Sciences
Agrobiodiversity Summer School 2026 · September 2026
krebs.stefanie@sunrise.ch · 079 832 25 43

INTRODUCTION

Biohof Tannacker is a **livestock-free, organic-vegan smallholding** in the hilly village of Rechthalten, Fribourg, Switzerland. Located at 850 m above sea level, right at the edge of the forest, Nadia and Jann have been farming three hectares of land together with a small collective since 2010. They keep no animals and rely mainly on **hand labour and minimal machinery**. Their farming practices are guided by ecological principles and inspired by **permaculture**. They grow a **diverse range** of vegetables, herbs, berries and fruits, sold mainly at the **local market** in Fribourg. The farm stands for more than just a way of farming—it is also an **ecological and political project**.



Satellite image of Biohof Tannacker, Rechthalten (FR) – farm area marked (01.01.2023)

OPPORTUNITIES

Resilience

Diverse mixed cropping and small-scale plots reduce pest and disease spread. The wide range of crops and varieties prevents total crop failure - if one fails, others still yield. Long crop rotations further suppress soil-borne pests and pathogens.

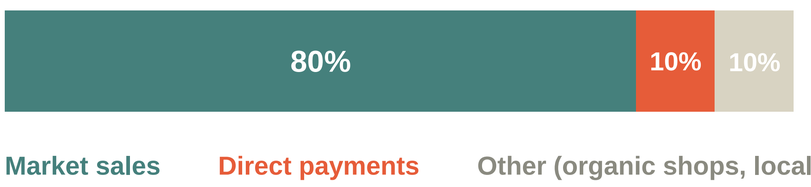
Sustainability

Ecological: Extensive manual labour, minimal use of machinery, and the avoidance of synthetic fertilizers and peat help reduce soil compaction, energy consumption and CO_2 emissions. The animal-free system enables efficient resource use while reducing methane emissions and the farm's overall environmental footprint.
Social: Small-scale farming and collective work strengthen teamwork and collaboration, while direct sales foster close relationships with customers.
Economic: Direct local marketing and short transport distances make small-scale farming economically viable. Diverse sales channels (market, restaurant, organic shops) increase economic stability.

CHALLENGES

Financial situation

Because direct payments are strongly tied to farm area rather than labour, livestock-based farms benefit considerably more. At Tannacker, only around 10% of income comes from direct payments, while 80% comes from market sales – enough to live on, but with little economic return.



Staffing

Finding and retaining long-term employees is challenging due to labour-intensive work and limited financial resources.

AGROBIODIVERSITY ASPECTS

Genetic diversity

A wide variety of robust, resistant and open-pollinated cultivars is grown, including many old varieties from Pro Specie Rara.



Species diversity

Over 100 different plant species are grown on the farm – vegetables, herbs, berries, fruits and wild plants – and multiple varieties within individual species



Biodiversity of agricultural land

Around half of the total area (1.5 ha) is covered by ecological meadows, while 30 ares are used to cultivate a wide variety of vegetables and herbs. The small-scale fields and mixed-culture beds are complemented by hedges, shrubs, brush and standard fruit trees.



Diversity of agricultural management practices

The farm combines permaculture, forest gardening and mixed cropping, supported by long crop rotations, green manuring and mulching. Unheated tunnels and careful irrigation help to reduce resource use, while no purchased fertilizers or peat are used. Nutrients are recycled through lightly composted meadow cuttings from the farm.



No Animals, No Manure – No Problem?
The extensive meadow is the farm's main nutrient source. It is cut in stages, stacked and stored over winter to partially decompose. In spring, the pre-rotted hay is incorporated into the soil and used selectively as mulch. This well-established strategy aims to minimise nutrient losses from the farm.

Diversity of production and food supply systems

Harvest is processed on-farm using traditional methods such as fermentation, canning and drying. The plant-based products are sold locally, mainly at the weekly market in Fribourg, as well as to organic shops, the Freiburger Biokorb and a local restaurant.



Diversity of stakeholders

The farm brings together a diverse group of actors: Nadia and Jann as farm managers, co-workers within the collective, local marketing partners, customers at the weekly market, and the broader public – including neighbours, society and policymakers.



REFERENCES

Biohof Tannacker. (n.d.). *Permakultur-Landwirtschaft*. Retrieved September 1, 2026, from https://permakultur-landwirtschaft.org/hof/biohof-tannacker/

biohof-tannacker.ch—STARTSEITE. (n.d.). Retrieved September 1, 2026, from https://biohof-tannacker.ch/STARTSEITE/

Mehr als nur Bio. (n.d.). wir Freiburg. Retrieved September 1, 2026, from https://freiburger-nachrichten.ch/story/152836/mehr-als-nur-bio

Krättli, J. (2026). Personal interview conducted by S. Krebs. Rechthalten, 9 July 2026.

Agrobiodiversity Summer School 2026

Agrobiodiversity in Practice: An Organic Mountain Farm in the Swiss Alps

Milena Trinkler
MSc Environment and Natural Resources, ZHAW
milena.trinkler@gmail.com

1 Case & purpose

Hof Giudem Vitg is a third-generation organic mountain farm in the Domleschg region of Graubünden, located at approximately 1200 m a.s.l. The farm manages 24 hectares of agricultural land, most of it in Mountain Zone III. It combines 40 cattle, 12 sheep, five goats and five chickens with small-scale winter-wheat cultivation. The farm places particular emphasis on nature-conscious management and animal welfare. The coexistence of different livestock species, land uses and management practices makes the farm a relevant case for examining agrobiodiversity under mountain conditions.

Research question

How do locally adapted breeds, species, land uses and management practices support resilience and what trade-offs emerge?



2 Agrobiodiversity dimensions

Genetic diversity
Crossbreeding (Angus, Limousin, Braunvieh); locally adapted breed Bündner Strahlenziege; White Alpine sheep; Montalbano winter wheat

Species diversity
Cattle, sheep and goats fulfil complementary grazing functions

Biodiversity of agricultural land
Species-rich meadows, extensive grassland, biodiversity-promotion areas and alpine grazing habitats

Diversity of management practices
Rotational grazing, seasonal alpine grazing, staggered mowing, manual or mechanical weed control, adapted mowing practices according to terrain

Diversity of production system
Direct meat sales, regional wheat value chain (Gran Alpin), contract cattle rearing, farm shop

Diversity of stakeholders
Connection to Gran Alpin, ecological advisory services, customers and public authorities, which support the management and economic use of diverse crops, livestock and agricultural habitats

3 Challenges

Heat and drought
Lower forage and wheat yields, possible feed purchases

Wolf predation
Losses and uncertainty for sheep and goats on alpine pastures

High labour demand
Manual work on steep land and repeated trips for staggered mowing

Economic pressure
High organic and mountain-farming costs meet lower-priced competition

Administrative burden
Detailed documentation for grazing, animal movements and organic compliance

Lower yields
Grassland and wheat require manual weed control and generate lower yields under organic conditions

Need for investments
Ageing infrastructure creates a need for investment in maintenance, repairs and replacements





4 Benefits

Efficient use of heterogeneous terrain
Different livestock species enable the management of different terrain

Conservation of genetic resources
Keeping the Bündner Strahlenziege conserves a locally rooted breed and practical knowledge

Grassland biodiversity protection
Adapted management safeguards flowering plants, insects and ground-nesting birds

Diversified income
Multiple production lines (meat, wheat, contract cattle and the farm shop) reduce economic dependency on a single commodity

Regional value creation
Direct marketing, cooperation with Gran Alpin and the farm shop strengthen the local economy

Conclusion

Hof Giudem Vitg illustrates how diverse livestock species, locally adapted breeds, complementary land uses and site-specific management practices can strengthen the resilience of mountain farming. They enable the use of heterogeneous land, support landscape management and ecological functions, and diversify products and marketing channels. However, these benefits involve trade-offs, including high labour requirements, limited mechanization and economic pressure. The case therefore shows that maintaining agrobiodiversity in mountain agriculture depends not only on ecological adaptation, but also on viable regional value chains and supportive agricultural policies.

REFERENCES

[1] Interview with J. & R. Raguth Tscharner (2026).
[2] ProSpecieRara. n.d. ‘Bündner Strahlenziege’. Retrieved 7 August 2026. https://www.prospecierara.ch/tiere/rassenportr%C3%A4ts/ziegen/b%C3%BCndner-strahlenziege
[3] WAS Zuchtverband. n.d. ‘Weisses Alpenschaf’. Retrieved 7 August 2026. http://www.was-zuchtverband.ch/weisses-alpenschaf/haltung/
[4] SwissAngus.ch. 2024. ‘Swiss Angus’. https://swissangus.ch/
[5] Braunvieh Schweiz. n.d. ‘Braunvieh’. Retrieved 5 August 2026. https://homepage.braunvieh.ch/braunvieh-rasse/
[6] La Limousine. n.d. ‘Limousin’. Retrieved 5 August 2026. https://www.limousine.org/la-limousine.html
[7] Cornale, Paolo, Roberto Senatore, Luca Maria Battaglini, and Mario Baratta. 2025. ‘Climate Change and Livestock Welfare in the Alps: A Comprehensive Review’. Animals: An Open Access Journal from MDPI 15(24):3578. doi:10.3390/ani15243578
[8] Schilperoord, Peer. 2010. Gesammelte Erfahrungen Im Berggetreidebau. NAP 03-02. Schweiz
[9] Münsterländer Saatgut OHG. n.d. ‘Montalbano’. Retrieved 7 August 2026. https://www.biosaat-muensterland.de/Montalbano
[10] Bundesamt für Landwirtschaft. 2025. ‘Landwirtschaftliche Zonen’. https://www.blw.admin.ch/de/landwirtschaftliche-zonen
[11] Bundesamt für Landwirtschaft. 2025a. ‘Biodiversitätsbeiträge’. https://www.blw.admin.ch/de/biodiversitaetsbeitraege
[12] Bundesamt für Landwirtschaft. 2025b. ‘Kulturlandschaftsbeiträge’. https://www.blw.admin.ch/de/kulturlandschaftsbeitraege
[13] Verordnung über die Direktzahlungen an die Landwirtschaft. 2013. Vol. 910.13

REVIVAL OF AUTOCHTHONOUS GRAPE VARIETIES ZELEN AND POKALCA IN THE VIPAVA VALLEY

A Contribution to Agrobiodiversity and Sustainable Wine Production

Summer School Agrobiodiversity

BF UNIVERZA V LJUBLJANI Biotehniška fakulteta

ŠTUDENTSKI SVET Biotehniške fakultete

Author: Anja Žižmond
Affiliation: Biotehniška fakulteta, Univerza v Ljubljani (University of Ljubljana, Biotechnical Faculty)
E-mail: anja.zizmond4@gmail.com

Date: July 2026

INTRODUCTION

The Vipava Valley is one of Slovenia's most renowned wine regions, known for its mild Mediterranean climate, numerous sunny days, and characteristic Burja wind. Among its viticultural treasures are the autochthonous varieties Zelen (white) and Pokalca (red, also known as Črna rebula). Both varieties were nearly forgotten – Zelen was reduced to only 1.7 ha in the 1980s, while Pokalca was legally restricted to the Goriška Brda region for decades.
This case study explores the revitalization of these varieties through the work of the Slejko family and their brand Vina Dornberg, analyzing how their cultivation contributes to genetic diversity, landscape preservation, and sustainable wine production (2,3).



AGROBIODIVERSITY ASPECTS

Genetic diversity
Conservation of two autochthonous varieties: Vitis vinifera L. 'Zelen' and 'Pokalca', representing unique genetic resources of the Vipava Valley.

Biodiversity on agricultural land
Integrated production allows controlled use of mineral fertilizers and most pesticides. Priority is given to organic fertilizers and natural preparations support soil biodiversity.

Diversity of practices
Use of indigenous yeasts, natural fermentation, manual work on steep slopes, selective harvesting, green pruning.

Diversity of supply chains
Direct sales, shop at Bled Castle, wine tourism, export – combining short and longer supply chains.

Diversity of stakeholders
Slejko family, Konzorcij Zelèn, agricultural institute, Ministry of Agriculture, consumers (especially tourists) (3, 5).

THE WINEMAKER AND THE VARIETIES



Vina Dornberg is a family-run winery in Zalošče, Vipava Valley. The winemaking tradition began in 1982 with Davorin Slejko, who established the brand in 2005. Today, his son Sandi Slejko continues the legacy (2).

ZELEN

- Autochthonous white variety, unique to the Vipava Valley.
- Described by Matija Vertovec (1844) as having a "specially noble spirit".
- Nearly extinct in the 1980s (only 1.7 ha remained).
- Now approx. 2300 vines; recent new plantings.
- Distinct herbal profile (sage, rosemary, green tea) in lower alcohol content (1, 3).



POKALCA (ČRNA REBULA)

- Autochthonous red variety
- Slejko family among the first to plant it in the Vipava Valley 15 years ago (cuttings from Čedad)
- For over 10 years, only sold as blended wine due to legal restrictions
- Winemaker personally negotiated with the ministry; mono-varietal wine legal for the last 4 years
- Aromas of dark fruits, herbs, black pepper (3, 4).









BENEFITS

🌍 Ecological Adaptation
Autochthonous varieties are adapted to local conditions. Zelen shows good resistance to botrytis; Pokalca maintains high acidity even in warm vintages.

🏛️ Cultural Sustainability
Revival strengthens regional identity, preserves cultural heritage. Partnership with Bled Castle (official wine) promotes Slovenian wine culture.

💰 Economic Sustainability
Strong brand presence (Bled Castle, direct sales, export) provides stable revenue for continued investment.

⚖️ Legislative Advocacy
Winemaker's negotiations with the ministry enabled mono-varietal Pokalca in the Vipava Valley, benefiting all growers (3,5).

CHALLENGES

📜 Legislative Barriers
Pokalca was restricted to Goriška Brda for years. Winemaker personally negotiated with the ministry – a process that took years.

🌿 Viticultural Difficulties
Zelen has specific soil requirements (does not tolerate too much marl); Pokalca is prone to sunburn, uneven ripening, and fungal diseases.

🏪 Market Competition
International varieties (e.g., Sauvignon) are better known. Consumers need education about autochthonous varieties.

🌡️ Climate Change
Increasing drought affects all varieties. Long-term response of autochthonous varieties to climate change remains unknown (3, 5).

KEY TAKEAWAY

This case demonstrates how forgotten varieties can be transformed into multiple forms of value – ecological, cultural, and economic. Zelen and Pokalca are not just wines; they are a living part of the Vipava Valley's heritage and a cornerstone of its sustainable future.



REFERENCES

1. Vertovec, M. (1844). Vinoreja za Slovence [Winegrowing for Slovenes]. (Historical source describing the Zelen variety).
2. Vina Dornberg. (2026). Tradition and vineyards. Retrieved July 23, 2026, from https://www.vinadornberg.si
3. Slejko, D. (2026, July). Personal interview. [Interview with the founder of Vina Dornberg].
4. Kmetijsko gozdarski zavod Nova Gorica [Nova Gorica Agricultural and Forestry Institute]. (n.d.). Autochthonous varieties of the Vipava Valley. [Unpublished material or brochure].
5. Wezel, A., Gemmill-Herren, B., Bezner Kerr, R., Barrios, E., Rodrigues Gonçalves, A. L., & Sinclair, F. (2020). Agroecological principles and elements and their implications for transitioning to sustainable food systems: A review. Agronomy for Sustainable Development, (40). https://doi.org/10.1007/s13593-020-00646-z
6. Photo sources: Vina Dornberg (official website); author's personal collection.





The economically viability of a highly diversified farm – mini case study on the Auenhof

Introduction

The Auenhof is a **3-hectare farm** situated between Feldbach and Uerikon, which is run in accordance with **Demeter** guidelines. Marcus Pan is the owner and the manager of the farm. Depending on the workload, **between 2 and 8 people** work alongside him on the farm, either as **volunteers** or as part of a **training program** or work placement. The farm is laid out according to the principles of **permaculture** and is characterized by a **very high diversity** of plants and animals, in terms of both species and varieties.



? How economically viable is a highly diversified agroforestry-based system within the Swiss agricultural policy framework?

Agrobiodiversity aspects

Genetic diversity of crops and livestock

Many different many different varieties and breeds, including some from Pro Specie Rara

Species diversity within crops and livestock

On the farm live/grow many different small animals, fruits, berries, vegetables, herbs, mushrooms and young plants (vegetables and perennials)

Biodiversity of agricultural land

Hedges with wildfruits; mixed planting rather than monoculture; small structures such as stone piles and piles of branches

Diversity of stakeholders

Costumers, Volunteers, HAFL (University of Agricultural, Forestry and Food Sciences), permakultur-landwirtschaft.org, Soil to Soul

Diversity of production and food supply systems

Direct sale on farmshop, for lack of time not elsewhere e.g. on markets

Diversity of agricultural management practices

Permaculture, Keylinedesign, Vitiforst, Syntropic Agroforestry, more interesting and instructive for interns/farmers

Results

The Auenhof generates income mainly through **direct sales** at the farm shop, complemented by **permaculture courses** and **consultancy services**. Its high diversification provides **several income sources** and increases **economic resilience**, while avoiding costs for fertilizers, pesticides, and transportation. However, the system is highly **labour-intensive**. That's only financially viable because he leads a simple life. And all the interns work for free.







Conclusion

A highly diversified, small-scale farm can be economically viable when combined with **direct marketing** and **additional income sources**.
However, **labour requirements** and current **agricultural policies** remain major constraints. Better support for small-scale farming and easier farm succession could improve its long-term viability.

References

Interview with Marcus Pan
MSc Umwelt und Natürliche Ressourcen, Module Course "Agroecology and Food Systems“
BSc Umweltingenieurwesen, Module Course "Designing Sustainable Food Systems«
BSc Umweltingenieurwesen, Modules in the specialization in "Organic Agriculture and Horticulture"

Autor

Nadine Krieg
Mail: nadine_krieg@gmx.ch

Agrobiodiversity Summer School 2026
Presented by Natalie Abbt, abbtnat1@students.zhaw.ch

COMMUNITY SUPPORTED AGRICULTURE AS A PATHWAY TO AGROBIODIVERSITY: THE CASE OF STADTRANDACKER ZÜRICH

How does Stadtrandacker's CSA model contribute to agrobiodiversity?
Diverse cultivation · Ecological management · Habitat creation · Community participation

BACKGROUND: WHY AGROBIODIVERSITY MATTERS

Agricultural specialisation and standardised market requirements often favour a limited range of crops and varieties, contributing to the decline of agrobiodiversity. This can reduce the ecological resilience of farming systems. Community Supported Agriculture (CSA) offers an alternative model based on direct relationships between producers and consumers, shared responsibility and greater flexibility in cultivation. These conditions can support diverse crops, ecological management and local knowledge exchange (Egli et al., 2023).

WHAT IS COMMUNITY SUPPORTED AGRICULTURE (CSA)?

CSA is a long-term partnership between producers and consumers. Members provide financial support in advance and receive a share of the seasonal harvest. By sharing the risks and benefits of food production, CSA can strengthen farmers' planning security, shorten supply chains and encourage closer relationships between producers and consumers (Egli et al., 2023).

CASE STUDY: STADTRANDACKER ZÜRICH

Stadtrandacker is an organic CSA initiative located at Zurich's urban periphery. Through its vegetable subscription and self-harvest plots, the initiative enables urban residents to participate directly in food production. Professional farmers carry out tasks such as soil preparation, sowing and planting, while participants contribute to cultivation, maintenance and harvesting. This collaborative model combines professional agricultural knowledge with community involvement, short supply chains and direct producer–consumer relationships (Stadtrandacker, n.d.; Balmer, 2026).

STADTRANDACKER'S CONTRIBUTION TO AGROBIODIVERSITY

Contribution	How it supports agrobiodiversity	Stadtrandacker example
Crop diversity	Cultivating multiple crops reduces dependence on individual species and increases diversity within the production system.	Approximately 25 vegetable species are cultivated in the *Querbeete* system.
Ecological management	Organic cultivation and careful soil management can support soil organisms, pollinators and other beneficial species.	Certified organic production without synthetic pesticides or fertilisers.
Habitat creation	Diverse landscape elements provide habitats, food sources and ecological connectivity.	Flower strips, hedges, fruit trees, dry-stone walls and branch piles.
Community and knowledge exchange	Participation connects people with cultivation practices and strengthens practical knowledge about seasonal and diverse food production.	Farmers, subscribers, plot tenants, volunteers, interns and participants in social programmes work together.
CSA as an enabling model	Shared financial responsibility and direct relationships can provide greater flexibility for cultivating diverse crops.	Vegetable subscriptions and self-harvest plots connect production directly with participating consumers.

Sources: Egli et al. (2023); Savels et al. (2024); Stadtrandacker (n.d.); Balmer (2026).

STADTRANDACKER AT A GLANCE

Founded	2010 as an association; non-profit LLC since 2022
Location	Five sites at Zurich's urban periphery
Area	Approximately 3 ha of leased farmland
Cultivation	Certified organic vegetable production
Models	Vegetable subscription and *Querbeete* self-harvest plots
Crop diversity	Approximately 25 vegetable species in the Querbeete system

Sources: Stadtrandacker (n.d.); Balmer (2026)



Vegetable cultivation at Stadtrandacker Zürich (Source: Stadtrandacker (n.d.))



Community members working on the field. (Source: Stadtrandacker (n.d.))

CHALLENGES AND RESPONSES

Leased land creates long-term uncertainty, while coordinating participants and transferring knowledge require substantial effort. Professional coordination and practical guidance support participant engagement, but secure long-term access to land remains unresolved (Balmer, 2026).

CONCLUSION

Stadtrandacker illustrates how CSA can support agrobiodiversity by combining diverse cultivation, ecological management, habitat creation and community participation. However, its long-term contribution depends on secure access to land and sustained participant engagement.

REFERENCES:

Egli, L., Rüschhoff, J., & Priess, J. (2023). A systematic review of the ecological, social and economic sustainability effects of community-supported agriculture. *Frontiers in Sustainable Food Systems, 7*, 1136866. https://doi.org/10.3389/fsufs.2023.1136866
Savels, RAgriculture farms in Flanders, Belgium. *Frontiers in Sustainable Food Systems,* ., Dessein, J., Lucantoni, D., & Speelman, S. (2024). Assessing the agroecological performance and sustainability of Community Supported *8*, 1359083. https://doi.org/10.3389/fsufs.2024.1359083
Stadtrandacker. (n.d.). *Stadtrandacker – Gemeinsam Gemüse anbauen*. https://stadtrandacker.ch/
Interview: Tinu Balmer, Co-Director of Stadtrandacker, July 14, 2026.

HofLabor: Designing the Future of Mosaic Agriculture

Summer School Agrobiodiversity

Author:

Noemi Schai
schainoe@students.zhaw.ch

HofLabor is an experimental farm and innovation platform located in the Zurich Oberland, originating from the regenerative farm SlowGrow. The project combines research, practical farming and technology development to test mosaic agriculture under real farming conditions, by integrating strip cropping, controlled traffic farming, reduced tillage and mulch-based intercropping. 1 HofLabor aims to produce vegetables, cereals and potatoes without synthetic pesticides or mineral fertilizers while improving biodiversity and soil health[4].



Figure 1: Strip cropping at HofLabor. Photo: Noemi Schai

1 Agrobiodiversity Aspects

Genetic diversity of crops and livestock

Different crop varieties are tested to identify those best adapted to regenerative farming systems. Genetic diversity increases resilience to pests, diseases and climate variability while supporting stable production under low-input conditions[5,6].

Examples:
- Adapted vegetable and cereal varieties[5]
- Variety trials under mulch systems[5]
- Selection for resilience rather than maximum yield[5]
- Improved adaption to reduced tillage[4]

Species diversity within crops and livestock

Species diversity is a key feature of HofLabor's mosaic agriculture. Vegetables, cereals, potatoes and cover crops are grown together in strip-based systems, increasing functional diversity and ecosystem stability[4,5].

Examples:
- Cover and companion crops[6]
- Strip cropping instead of monocultures[4,6]
- Natural pest suppression and nutrient cycling[4]

Biodiversity of agricultural land

Mosaic agriculture creates a structurally diverse agricultural landscape. Reduced soil disturbance, permanent soil cover, and diverse cropping structures provide food, shelter and nesting habitats for a wide range of organisms[4].

Examples of supported species and groups:
- Earthworms and soil microorganisms[4,6]
- Pollinators[4,6]
- Insects and spiders[4,6]
- Beneficial predators (e.g., birds of prey, weasels)[4,6]

Diversity of agricultural management practices

HofLabor combines several regenerative farming practices into one integrated management approach. Their interaction forms the basis of mosaic agriculture and enhances agrobiodiversity across the entire farming system[2].

Examples:
- Controlled Traffic Farming (CTF)[7]
- Strip cropping[4]
- Reduced tillage[4]
- Large-scale mulch systems[4]
- No synthetic pesticides or mineral fertilizers[4]

Diversity of production and food supply systems

Beyond food production, HofLabor develops machinery, cultivation methods and digital tools that enable regenerative farming systems to be replicated. Products are marketed through regional value chains[4].

Examples:
- Digital management tools[4]
- SlowGrow direct marketing[4,5]
- Knowledge transfer to other farms[4]
- Regional food networks[4,5]

Diversity of stakeholders

HofLabor is based on close collaboration between practice, research and technology development. This interdisciplinary network supports innovation and facilitates the transfer of regenerative farming systems into practice[4].

Stakeholders
- SlowGrow farm[4]
- Farmers[4]
- Research institutions (e.g. ZHAW, FiBL)[4]
- Machinery developers[4]
- Universities and technology partners[4]

2 Results

Mosaic Agriculture combines several regenerative practices:
- Controlled Traffic Farming (CTF)[2]
- Strip Cropping[2]
- Reduced Tillage[2]
- Mulch Systems[2]

Together these practices:
→ improve soil structure[2]
→ increase biodiversity[2]
→ reduce erosion[2]
→ suppress weeds naturally[7]
→ improve water retention[7]
→ increase system resilience[7]



Figure 2: Inner-row Mulcher [4]

Innovation beyond farming:
HofLabor develops practical tools to make regenerative farming technically feasible and scalable[1].

HofLabor develops:
- Specialized machinery: Custom-built solutions where commercial machinery is lacking
  → RTK-GPS retrofit kits
  → Modified grain trailers for mulch application
  → "Corkscrew rotary harrow" for mechanical weed control[7].
- Digital management tools: Apps support complex field planning, crop and machinery tracking, and knowledge management[4,6].
- Cultivation techniques: CTF, diverse strip cropping and large-scale mulching are combined and adapted for practical implementation.[4]

→ **Key take-away**: These innovations help overcome technical and management barriers to scaling regenerative agriculture.[1]

3 Discussion: Niche or future model

Key points
- ✓ Strong ecological and agronomic benefits[7]
- ✓ Innovation through machinery and technology development[7]
- ✓ Potential for knowledge transfer and replication[4]
- ⚠ High investment and management complexity[4,7]
- ⚠ Economic viability not yet fully demonstrated[1,4]
- ⚠ Scaling depends on policy support and farmer adoption[4,7]

Assessment: HofLabor currently remains a niche innovation because its implementation requires specialized machinery, technical expertise, close collaboration and relatively high initial investment.[4,7] At the same time, the project addresses some of the barriers by developing practical tools and generating transferable knowledge.[4,6,7] Its transition from niche to future model will therefore depend on whether these solutions can become more accessible to farmers and economically viable at a broader scale.[4,7]

4 Conclusion

HofLabor demonstrates how mosaic agriculture can integrate food production with agrobiodiversity, soil health and resilient farming systems. By combining regenerative practices with adapted machinery and practical knowledge, the project provides a real-world model for implementing complex ecological farming systems. While its wider scalability remains to be demonstrated, HofLabor offers valuable insights for rhe future development of regenerative agriculture in Switzerland.

References

[1] Bücheler, E. (2025, August). *Personal interview.* Project Leader, HofLabor.
[2] HofLabor. (2025). *Einstieg in die Mulch-Landwirtschaft.*
[3] HofLabor. (n.d.). *Ladewagen umbauen für grossflächiges Mulch verteilen.*
[4] HofLabor. (n.d.). https://www.hoflabor.ch
[5] HofLabor. (n.d.). *Passende Kulturen für die Mosaik-Landwirtschaft: Eine Perspektive des HofLabors.*
[6] Martin, F. M., & van der Heijden, M. G. A. (2024). *The mycorrhizal symbiosis: Research frontiers in genomics, ecology, and agricultural application. New Phytologist, 242*(4), 1486–1506.
[7] Antille, D. L., Chamen, W. C. T., Tullberg, J. N., & Lal, R. (2015). *The potential of controlled traffic farming to mitigate greenhouse gas emissions and enhance carbon sequestration in arable land: A critical review. Transactions of the ASABE, 58*(3), 707–731.

Microfarms and their role in promoting biodiversity
A Case Study from the Canton of Fribourg, Switzerland

What is a microfarm?

Microfarms are **small-scale farming systems** combining diversified production, sustainable practices and short supply chains. Their small size allows for **intensive use of space** while maintaining a strong focus on biodiversity. (2)



Standard-sized Swiss farms [redacted] 30-50%

Microfarms receiving direct payments* [redacted] 5-10%

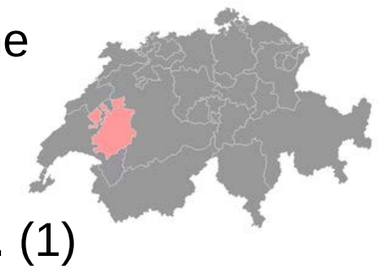
Microfarm Au P’tit Marché [redacted] 15%

Fig. 1: Direct payments as a share of farm income. Values are approximate and may vary considerably depending on farm type.(3)

*Around 80% of microfarms receive no direct payments because they are either too small to qualify as farms or do not meet the required agricultural qualifications.

Au P’tit Marché

is a microfarm located in the Canton of Fribourg, Switzerland. (1)





Key numbers:

- 9,200 m² — total farm area
- 15% — biodiversity area
- 140% — total farm workload

Main activities:

- **direct sales** of vegetables and fruits
- **flowers and cereals** sold to a local florist
- **educational visits** for school classes



What are the challenges for this type of agricultural structure?

“The big challenge is how to bring together economic viability, biodiversity and crop diversity.”

— Farmer of Au P’tit Marché, translated from French

How does the microfarm Au P’tit Marché contributes to biodiversity?

- **Variety choice**: traditional varieties are used when valuable for sales; resistant fruit trees help cope with diseases and climate change.
- **Biodiversity habitats**: hedges, high-stem trees, rock and branch piles, ponds and birdhouses support wildlife.
- **Agroforestry**: vegetables and fruit trees share the same surface, combining production with biodiversity.



- **Limited financial support**: direct payments are poorly adapted to the small size and activities of microfarms.
- **Biodiversity vs. profitability**: ecological goals must remain compatible with economic viability.
- **Risk of precarity and exhaustion**: low farm income often requires additional off-farm work.

References

- (1) Au P’tit Marché. (n.d.). Microferme Au P’tit Marché [Facebook page]. Facebook. https://www.facebook.com/p/Microferme-Au-Ptit-March%C3%A9-100057566134669
- (2).Association Suisse des Microfermes (ASM). (n.d.). Association Suisse des Microfermes, https://microfermes.ch/
- (3) Girardin, B. (2026, July 2). Personal interview conducted by Noémie [Unpublished interview].

Contact:
Noémie Simon; noemonsimie@gmail.com

Acknowledgement:
I would like to thank Benoit for his time, insights and sharing of experience during the interview.

FARMING UNDER SOLAR PANELS

Quirin Ball | Technical University of Munich |
Agrobiodiversity Summer School 2026

Can Agri-PV support agrobiodiversity and climate-resilient agriculture?

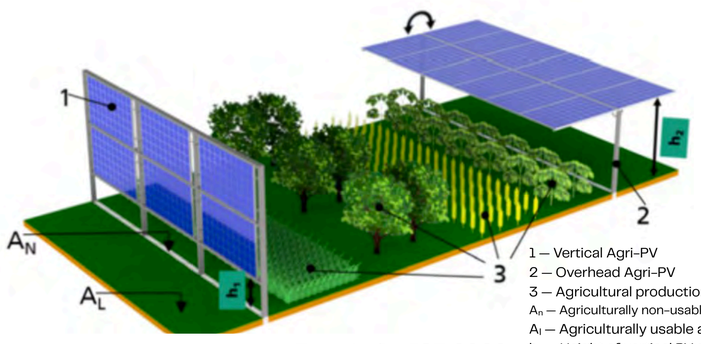
TUM Agri-Photovoltaics Research Facility

Dürnast, Freising, Bavaria, Germany
Technical University of Munich

WHY AGRI-PV?[1]

The expansion of renewable energy increases competition for agricultural land. Agri-PV addresses this challenge by combining agricultural production and solar electricity generation on the same land. Instead of converting farmland entirely to energy production, crops continue to grow beneath and between elevated photovoltaic modules. This allows the Land Equivalent Ratio (LER) to exceed 1.0, thereby improving land-use efficiency. But it also raises an important question:

Can this new agricultural environment also create opportunities for agrobiodiversity?



Fraunhofer ISE 2026

1 — Vertical Agri-PV
2 — Overhead Agri-PV
3 — Agricultural production
A_n — Agriculturally non-usable area
A_l — Agriculturally usable area
h_1 — Height of vertical PV system
h_2 — Height of overhead PV system



INTRODUCTION[2]

Agri-PV is increasingly discussed as a way to reduce competition between food and renewable energy production. At the same time, photovoltaic structures alter light, temperature and water availability within agricultural fields and therefore create new growing conditions.
The TUM Agri-PV research facility provides an opportunity to investigate these interactions under practical farming conditions. This case study explores Agri-PV not only as an energy technology, but as a potential multifunctional agricultural system.

THE CASE[3,4,5]

Opened July 2025 – about 2.5ha – 14 rows vertical and tracking PV modules – 630 kWp capacity

The facility in Dürnast combines solar energy generation with agricultural research and crop production. The site is used to study how different PV configurations affect farming conditions and crop growth.

Main crops and vegetation:
- Maize (Zea mays)
- Soybean (Glycine max)
- Spontaneous vegetation between and beneath the PV structures

The research plant provides setting to investigate interactions between PV technology, crop production and the agricultural environment.

OPPORTUNITIES[2,5,6]

- More efficient use of agricultural land
- Protection from heat and extreme weather
- Potentially improved water availability
- More heterogeneous microclimatic conditions
- Diversification of income
- Favorable policy framework

CHALLENGES[1,4,5]

- No targeted biodiversity measures
- Mainly conventional crop production
- Biodiversity effects not yet systematically studied
- Technical constraints for agricultural management
- Need for stronger interdisciplinary research



Agri-PV connects expertise from agriculture, energy technology, ecology and research. The case shows the value of interdisciplinary research, but also the difficulty of integrating research questions across different university groups.[4,5]

Agricultural production remains the primary land use while renewable electricity is generated on the same site. Allows for a diversified income. [1]

PV modules create differences in shade, temperature and moisture, producing heterogeneous microhabitats within the field. Spontaneous vegetation already occurs beneath and between the structures.[2,5]

The agricultural area is currently dominated by conventional crops, particularly maize and soybean. Different conditions beneath and between modules could provide opportunities to test additional crops adapted to partial shading.[5]

Agri-PV changes the physical environment in which farming takes place. Machinery, crop management and field operations must remain compatible with the PV infrastructure. However, no targeted biodiversity management, such as flower mixtures, has yet been introduced at the site.[5]

POTENTIAL ≠ PROVEN BIODIVERSITY BENEFIT

AGRI-PV CAN CREATE MORE HETEROGENEOUS AGRICULTURAL ENVIRONMENTS, BUT INSTALLING SOLAR PANELS DOES NOT AUTOMATICALLY INCREASE AGROBIODIVERSITY.[5]



Conclusion

- Agri-PV goes beyond food and energy production. Its value depends on integrating agricultural, ecological and technological goals.
- Research facilities can help identify best practices through biodiversity monitoring and comparison of management approaches.
- PV design, crop choice and vegetation management should be adapted to balance productivity and ecological benefits.
- Agri-PV is a flexible land-use concept, not a biodiversity measure itself. Its sustainability depends on how each project is designed and managed.

THE QUESTION IS NOT ONLY WHETHER AGRICULTURE CAN COEXIST WITH SOLAR ENERGY, BUT HOW IT CAN BE DESIGNED TO DELIVER MULTIPLE BENEFITS FROM THE SAME LAND.

Quirin Ball | quirinball@web.de

References

1 Bundesministerium für Landwirtschaft, Ernährung und Heimat. (2025). Agri-Photovoltaik. https://www.bmleh.de/DE/themen/landwirtschaft/klimaschutz/Agri-PV.html
2 Fraunhofer ISE. (2026). Agri-Photovoltaik. www.ise.fraunhofer.de/de/geschaeftsfelder/solarkraftwerke-und-integrierte-photovoltaik/integrierte-photovoltaik/agri-photovoltaik-agri-pv.html
3 Hans Eisenmann-Forum für Agrarwissenschaften. (2025). TUM nimmt Forschungsanlage für Agri-Photovoltaik in Betrieb. https://www.hef.tum.de/hef/aktuelles/nachrichten/article/tum-nimmt-forschungsanlage-fuer-agri-photovoltaik-in-betrieb/
4 Hans Eisenmann-Forum für Agrarwissenschaften. (2026). Agri-Photovoltaik. https://www.hef.tum.de/hef/agri-photovoltaik/
5 Kolmann, J. (2026, July 30). Interview by Q.Ball
6 Vezzoni, R. (2025). Farming the sun: the political economy of agrivoltaics in the European Union. Sustainability Science, 20(4), 1519–1534.

EXTENSIVE FARMING PRACTICES AT ZENHOF

Summer School Agrobiodiversity

Zürcher Hochschule für Angewandte Wissenschaften

zhaw

CULTIVATION & PROCESSING OF NUTRIENT-DENSE CROPS

INTRODUCTION

ABOUT THE FARM ZENHOF[1]

- **Size**: 18 hectares (6 ha arable land, 1 ha forest garden, 11 ha pasture and hay meadows)
- **Farming practices**: extensive and organic with resilient breeds and nutrient-dense crops
- **Main focus**: cultivation and processing of barley grass and ancient grain einkorn
- **Soil cultivation tool**: Geohobel for minimal tillage
- **Goal**: holistic health for humans and nature

STAKEHOLDERS[1]

- **Owners and managers** of Zenhof: Marc & Daniela
- **Temporary helpers** for specific tasks
- **Customers** who buy the products



7

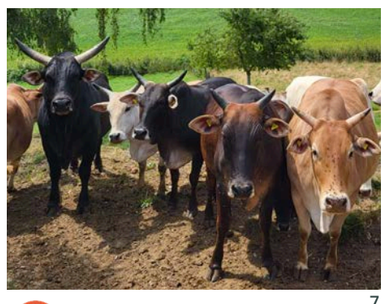
FOREST GARDEN

- Plants arranged in layers in the forest garden:[1]
  Tree Layer: high-stem fruit trees in rows with 10m spacing
  Shrub Layer: different types of berry bushes in between
  Ground layer: open spaces between the rows for vegetables and barley grass
- The biodiversity promotion area is **20%**. St. John's Wort, mullein and chestnut trees grow in the biodiversity strip[1]



7

BIODIVERSITY STRIP



7

CATTLE ZEBU

- Originally domesticated in **South Asia**[2]
- Very **resilient breed** in terms of heat and diseases[2]
- **Simple husbandry** with minimal stable facility[2]
- Only old animals are slaughtered[1]

PROCESSING OF BARELY GRASS



Freeze Dryer 7

START

STEP 1: JUICING & FREEZING

After the harvest, the barley grass is pressed into juice and frozen in a blast freezer to preserve the highest possible quality.[1] A high nutrient density without fiber is achieved.[3]



Freeze-dried barley grass juice 7

STEP 2: FREEZE-DRYING

The juice is then freeze-dried for 45–50h. This way, less oxidation occurs and the material is never heated above 42°C. It maintains the raw food quality of the juice and ensures a long shelf life.[1]



Pulverization in a blender 7

STEP 3: PULVERIZATION

The freeze-dried juice is ground into powder and packed into glass jars.[1] The powder is very nutrient-dense[8] with high bioavailability and can be consumed as a dietary supplement to strengthen the immune system and support detoxification.[3]

STEP 4: PACKAGE & SALES

It is portioned into monthly supplies and distributed through the online shop gesundesgras.ch and direct sales at the farm.[1]

Recommended daily dose: 1 g powder[3]
= 20 ml freshly pressed juice
= 0.5 kg fresh, mixed vegetables



7

Monthly supplies in the shop

ANCIENT GRAIN EINKORN



7

THE GRAIN[4]

- Domesticated 9'500 years ago
- Origin in South-East Turkey
- High nutrient density
- Great amount of protein, carotenoids and minerals
- Resistant to pests and diseases



7

HOW TO CULTIVATE[5]

- Low-input agriculture
- Cultivation with Geohobel
- Crop rotation including fallow periods



7

ABOUT THE PRODUCTS[1]

- Processed into flour and pasta
- Sold directly at the farm
- Long-lasting feeling of satiety



7

SOIL TILLAGE WITH GEOHOBEL

THE TOOL[1]

- Developed in Austria around 10 years ago
- Weight approx. 900 kg
- Cultivation, grass pressing and seeding in one device



7

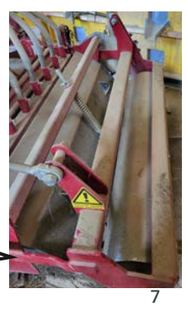
HOW IT WORKS

- Cultivates only the top 2–4 cm of soil without blades[5]
- Preserves soil structure, promotes humus formation and reduces erosion[5]
- Reduced tillage protects earthworms and other organisms and improves soil fertility[6]

IN THE LONG TERM

- Soil structure, water flow, and moisture retention improve significantly[6]

A roller at the back presses down the cut grass to compost it faster[1]



7

RESULTS

BENEFITS

- Resilient and low-input crops
- High in micronutrients crops
- Forest garden and diversity strip support ecosystems
- Minimal tillage with the Geohobel tool

CHALLENGES

- Required investments in infrastructure
- Long development process with many trials and adjustments
- Difficult marketing of rare grains
- Limited practical experience with Geohobel
- Work-life balance on a family-run, residential farm

CONCLUSIONS

The case study illustrates a **holistic** and **resilient** approach to **sustainable** farming. **Robust crop varieties** like barley grass and einkorn grow without fertilizers or pesticides while offering **high nutritional value**. **Biodiversity** is strengthened through the forest garden and diversity strip and **soil health** is improved by **reduced tillage** using the Geohobel. These practices not only benefit the environment today but also lay the foundation for a more **climate-resilient** and **nutrition-focused** agriculture in the **future**.

SEPTEMBER 2026
Céline Dietrich
dietrcel@students.zhaw.ch

REFERENCES

[1] M. Häfliger, personal communication, July 4, 2025

[2] Häfliger, M. (n.d.). Zebu. Zenhof. Abgerufen 10. Juli 2025, von https://www.zenhof.org/zebu

[3] Häfliger, M. (n. d.). Gerstengras. Das Superfood. gesundesgras.ch. Abgerufen 10. Juli 2025, von https://www.gesundesgras.ch

[4] Zaharieva, M., & Monneveux, P. (2014). Cultivated einkorn wheat (Triticum monococcum L. subsp. monococcum): The long life of a founder crop of agriculture. Genetic Resources and Crop Evolution, 61(3), 677–706. https://doi.org/10.1007/s10722-014-0084-7

[5] Häfliger, M. (n.d.). Ackerbau. Altes Brotgetreide. Zenhof. Abgerufen 10. Juli 2025, von https://www.zenhof.org/speisegetreide

[6] Clemenz, D. (2019). Weg vom Pflug—Auch im Biolandbau möglich. LANDfreund,10.

[7] Dietrich, C. (2025). Own photographs.

[8] Filip, E. (2023). Barley Grains and Barley Grass – Nutritional Value and Therapeutic Potential. Hop and Medicinal Plants, 31(1–2), 120–137. https://doi.org/10.15835/hpm.v31i1-2.14743

“An oasis to show another way”

Summer School Agrobiodiversity

How can community-supported agriculture (CSA) contribute to an ecologically more sustainable food production?

THE FARM

- *Biogemüse Simon Rauch* since 2015
- started the community-supported agriculture (CSA) *Solawi Stoapfalz* in 2018
- relocation to a new farm in Krummennaab (Bavaria, Germany) in 2019
- owner Simon Rauch + 1 part-time employee
- area: 1 ha horticulture + 0.5 ha potatoes



SPECIES DIVERSITY WITHIN CROPS

- ~ 60 different fruits and vegetables
- nut and fruit trees
- experimenting with unusual and “forgotten” crops (e.g. black radish, black & purple salsify, turnip varieties, ginger, peanut)
- \+ attractive product portfolio throughout almost the whole year: crucial for CSA and direct sales
- \+ resilient towards harvest losses/failures
- – perfect quality can not always be achieved, less efficient cultivation (no special equipment)

GENETIC DIVERSITY OF CROPS

- preferably open-pollinated varieties, but also hybrids
- successful seed saving with some crops, but for most, buying seeds is inevitable

CULTIVATION PRINCIPLES

- certified organic agriculture
- biointensive microfarming / market gardening, inspired by J.M. Fortier
- pest control:
  - protection nets and natural substances
  - in some cases: no measures (“80 % is 100 %”)
- fertilisation: only nature-based (e.g. liquid plant manure from nettles)
- weed control: mostly hoeing = more manual work



BIODIVERSITY OF AGRICULTURAL LAND

- beehive and meadow next to the farm: pollinators are present (yet, additional bumblebees must be bought)
- additional habitats: bird nests, holes in a clay wall
- Simon’s impression: higher rather than lower plant and animal diversity compared to before (meadow)

References:
[1] Bonfert, B. (2022). Community-Supported Agriculture Networks in Wales and Central Germany: Scaling Up, Out, and Deep through Local Collaboration. Sustainability, 14(12), 7419. https://doi.org/10.3390/su14127419
[2] Egli, L., Rüschhoff, J., & Priess, J. (2023). A systematic review of the ecological, social and economic sustainability effects of community-supported agriculture. Frontiers in Sustainable Food Systems, 7, 1136866. https://doi.org/10.3389/fsufs.2023.1136866
[3] Egli, L., Schmidt, J., Grunow, H., Palliwoda, J., Zech, M., Rommel, M., & Paech, N. (2025). Potenziale Solidarischer Landwirtschaft in Deutschland. Berichte über Landwirtschaft - Zeitschrift für Agrarpolitik und Landwirtschaft, 103(2). https://doi.org/10.12767/BUEL.V103I2.531
[4] Savels, R., Dessein, J., Lucantoni, D., & Speelman, S. (2024). Assessing the agroecological performance and sustainability of Community Supported Agriculture farms in Flanders, Belgium. Frontiers in Sustainable Food Systems, 8, 1359083. https://doi.org/10.3389/fsufs.2024.1359083
[5] Schmidt, J., Egli, L., Gaspers, M., Zech, M., Gastinger, M., & Rommel, M. (2025). Conversion to community-supported agriculture—Pathways, motives and barriers for German farmers. Regional Environmental Change, 25(1), 1. https://doi.org/10.1007/s10113-024-02332-2

All information without a reference number is taken from an interview with Simon Rauch on 15 July 2026.

Images are used with the consent of the copyright holders and may not be reproduced or published.

DISTRIBUTION

- ~ 80 % of the harvest goes to CSA (120 members): weekly pickup
- remaining ~ 20 % are sold in
  - self-service farm shop (= direct sales price)
  - organic shops
- \+ reduced risk, safe income, diverse customer groups
- \+ no dependency on wholesalers, competitive prices, higher margin
- \+ time and cost efficient system



A SUCCESS STORY?

- \+ happy and satisfied owner, sufficient wage and recreation
- \+ creation of an “oasis” to showcase an alternative + two jobs
- \+ functioning system
- – hard and much work for little money, no weekend or summer holidays

PERSPECTIVES

- cooperative or collaboration with other farms [1]
  - specialisation → more efficient production
  - share resources, co-organise tasks
  - collective purchases, mutual trade
  - capacity for political/educational engagement
- new helpful technologies may be available soon
- potential threats: cheap imports, reduced willingness to pay of members, growing bureaucracy, constraining regulations

COMMUNITY SUPPORTED AGRICULTURE (CSA)

- principle: community financing [5]
  - members pay a fixed amount per year in advance and receive a share of the actual harvest throughout the year
  - shared costs, risks and output
  - true cost coverage instead of market prices
- highly heterogeneous (size, products, origin, organisation, member involvement) [1]
- horticulture is very widespread [4, 5]

ECOLOGICAL ASPECTS OF CSA

- lack of data on environmental indicators [2]
- most CSAs have ecological sustainability as a main principle, e.g. most German CSAs operate as organic agriculture [2, 3]
- study from Belgium: CSA is an “advanced agroecological system”, regarding [4]
  - nutrient recycling and ecological pest control
  - high crop diversity, local varieties, perennials
  - natural vegetation and animal presence
  - soil health

STATE AND POTENTIAL OF CSA

- fast spread, but still in a niche: currently ~ 500 CSA farms in Germany (0.2 % of all farms) [3]
- 13 % of German farms could imagine conversion into CSA, 5 % intend it already [3]
- opportunities[5]:
  - preventing small farms from closure
  - sustaining/creating jobs and cultural sites in structurally weak regions
- barriers[5]:
  - member acquisition (inflation, prejudices, …)
  - hard to find skilled workers & available land
  - often self-exploitation and low wage
  - bureaucracy and problems with authorities
  - lack of knowledge, skills, support and advice

CONCLUSION

- combination of CSA, low-input cultivation and high crop diversity provides various benefits for farmers and society
- despite limited data: clear trend indicating ecological advantages of (such) CSA
- although still in a niche and despite some barriers and threats: great potential for more CSA farms and cooperation among them

Jannis Pfeffer · jannis.pfeffer@uni-bayreuth.de

UNIVERSITÄT BAYREUTH

M.Sc. Global Change Ecology · August 2026

AGROBIODIVERSITY SUMMER SCHOOL 2026

TWO VILLAGES, ONE PROGRAM

THE FATE OF FARMER-LED RICE LANDRACE CONSERVATION IN SATKHIRA, BANGLADESH

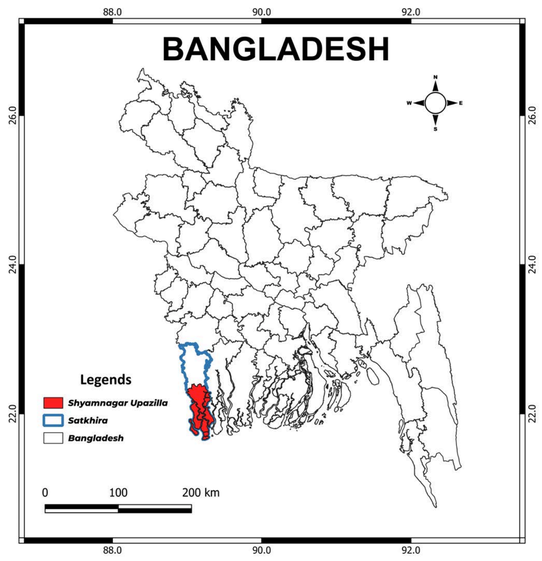
SHADHIN KUMAR ROY

MSC IN ENVIRONMENTAL ENGINEERING • UNIVERSITY OF SOPRON, HUNGARY

INTRODUCTION

- Indigenous rice landraces bred for saline, waterlogged conditions, passed farmer to farmer, no repeat purchase needed
- Coastal Bangladesh is growing saltier: soil salinity in Shyamnagar rose from 3.9 dS/m (2021) to 8.12 dS/m (2024)
- Since 2009, BARCIK supported landrace conservation: first Sheba Songothon (Shyamnagar), then Koikhali IFM (from 2024)
- This study compares institutional continuity, farmer incentives, and resilience of community-based conservation under climate stress.

STUDY AREA



Bangladesh
↓
Khulna Division
↓
Satkhira District
↓
Shyamnagar Upazila

SHEBA SONGOTHON
2009–2024

KOIKHALI IFM
2024–present

↔ **~15–20 km apart same upazila**

RESEARCH OBJECTIVES

1. **Document the model**
   Record the BARCIK-supported conservation model operating in both villages.
2. **Compare outcomes**
   Contrast genetic-diversity outcomes where NGO support continued vs. ended.
3. **Assess continuity**
   Assess the role institutional continuity plays in farmer-led conservation.
4. **Inform programming**
   Identify design lessons for climate-adaptation programming more broadly.

METHODOLOGY

A five-step path from published record to verified, comparative evidence

01 **Literature Review**
Mongabay, bdnews24, TBS News — published coverage of Sheba Songothon

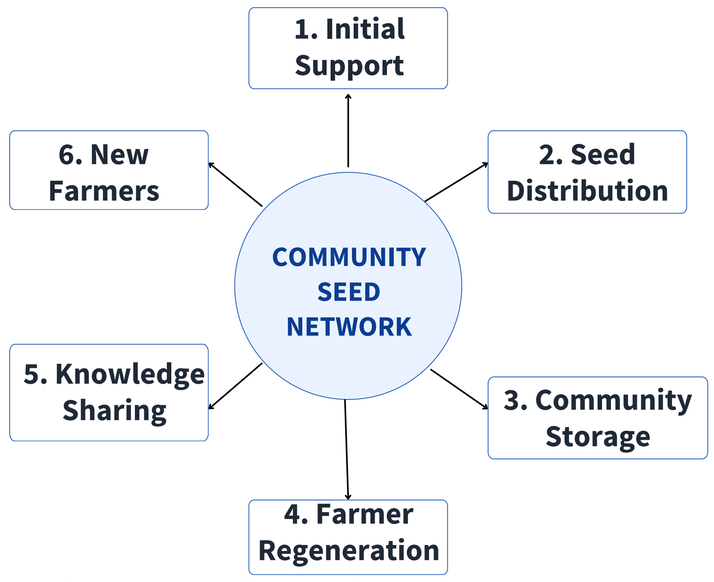
02 **Desk Research**
BARCIK materials, SRDI-derived regional salinity data

03 **Program Officer Interview**
Mofijur Rahman, BARCIK — both sites, WhatsApp/phone, Bengali, 2026

04 **Founder Interview**
Sheikh Sirajul Islam — confirmed BARCIK exit, personal shift to hybrid

05 **Comparative Case Analysis**
Sheba Songothon vs. Koikhali IFM, synthesized into one verified case

BARCIK NGO CONSERVATION MODEL



BARCIK funds only the first growing cycle; the network then self-propagates as farmers regrow, store, and share conserved seed.

SEASONAL FARMING CALENDAR

MONSOON SEASON

Indigenous rice landraces grown in waterlogged, flooded field conditions the varieties adapted to over generations. This is the core season for in-situ genetic conservation.

DRY SEASON

Watermelon and mustard, rotated onto the same land once the monsoon rice is harvested — confirmed dry-season crops at Koikhali, alongside likely other homestead vegetables.

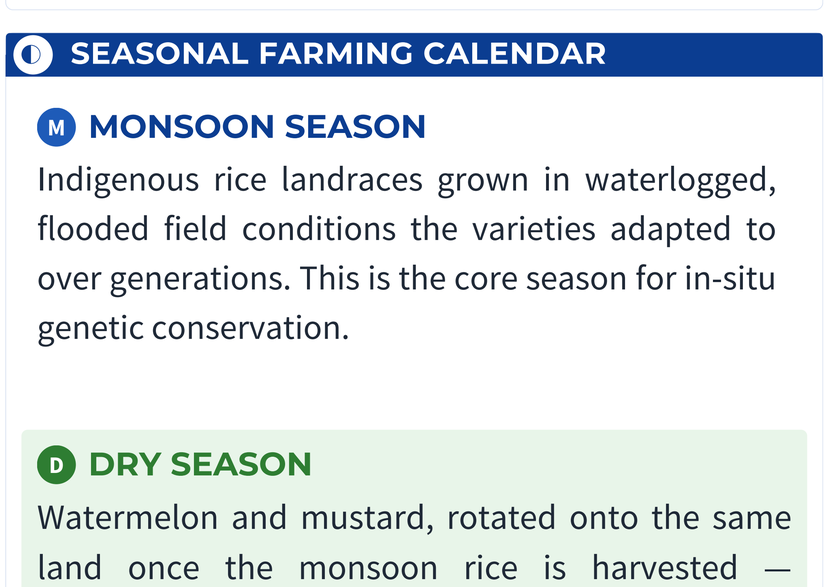
AGROBIODIVERSITY ASPECTS COVERED

- Genetic diversity of crops and livestock
- Species diversity within crops and livestock
- Biodiversity of agricultural land
- Diversity of agricultural management practices
- Diversity of production and food supply systems
- Diversity of stakeholders

COMPARATIVE ANALYSIS

Dimension	Sheba Songothon	Koikhali IFM
BARCIK support	2009–2024; ended 2024	Active since 2024
Membership	Unconfirmed since exit	49 members
Rice varieties	~218 peak; largely shifted	164; +3–4/yr
Conservation model	Individual collection	Community storage, self-conserve
Current practice	Shifted to modern/hybrid	Ongoing, expanding
Sustainability evidence	NGO-dependency risk shown	Self-extending; untested long-term

STATISTICAL CHARTS



FIELD PHOTOGRAPHS


Seed selection


Women farmers


Harvest


Community conservation

"Photos: Mongabay (2023), "Amid changing climate, Bangladesh farming groups conserve indigenous rice seeds""

BENEFITS

- Replicable farmer-led model
- Genetic diversity conservation
- Gender-inclusive participation
- Community resilience building

CHALLENGES

- Rising soil salinity
- Landrace-to-BRRI yield gap
- NGO-dependency risk
- Uncertain post-exit sustainability

DISCUSSION

- Koikhali (continued BARCIK support): landrace conservation kept expanding — 164 varieties and growing
- Sheba Songothon (support ended 2024): landrace cultivation not sustained, even by the founder — shift to modern varieties
- Best read as rational response to yield gap (2–3 vs. 5–6 t/ha), not organisational failure
- Worsening salinity is a shared pressure toward modern varieties — and the reason landraces stay valuable
- For climate-adaptation programming, the open question is how NGO-supported conservation models can be structured to outlast the institutions that start them.

CONCLUSION: Under one NGO program, in one upazila, two villages produced two outcomes. Where BARCIK's support continued, farmer-led landrace conservation continued — 164 varieties, 49 members, still growing. Where support ended, conservation ended too, even for the movement's own founder. Institutional continuity appears strongly associated with whether farmer-led genetic conservation persists under climate stress. ***Takeaway: conservation programs must be designed to survive their own institutional exit, not only to succeed while support is active.***

REFERENCES

1. *Mongabay (2023) — Sheba Songothon membership (197) and landrace-collection (218) figures.*
2. *bdnews24 (2021) — ~35 farmer-bred rice varieties reported in Shyamnagar.*
3. *TBS News (2024) — Shyamnagar soil salinity data, 2021–2024.*
4. *Regional SRDI data, secondary literature review — salinity trend, 1973–2009.*
5. *BARCIK official website- organizational background; women's involvement.*
6. *Interview: Mofijur Rahman, Program Officer, BARCIK, Jul–Aug 2026.*
7. *Direct conversation: Sheikh Sirajul Islam, Aug 2026.*

FUTURE WORK

27 **2027 — Variety verification**
Confirm named landraces and current figures with farmers directly.

28 **2028 — Longitudinal monitoring**
Track Koikhali's variety count and membership over time.

29 **2029 — Post-NGO assessment**
Assess durability once BARCIK's active support period ends.

30 **2030 — Policy design**
Translate findings into NGO exit-strategy design principles.

ACKNOWLEDGEMENT

With thanks to Mofijur Rahman (Program Officer, BARCIK) for field access and interview time across both Shyamnagar and Koikhali sites, and to Sheikh Sirajul Islam for speaking candidly about Sheba Songothon's history and transition. Thanks also to the Agrobiodiversity Summer School 2026 coaching team, and University of Sopron, Hungary, for supporting me.

David Alonso Núñez,
USC
david.alonso@usc.es

Three small local businesses, three examples of resilience in Santiago de Compostela

Motivations for setting up

- **Luz Castiñeiras → Froitería A Horta, 2001** (R. Santa Marta de Arriba 37)**: be a "Praza de Abastos" in the south of Santiago.**
- **Xosé Manuel Durán → A Cesta da Saúde, 2016** (R. Fernando III O Santo 20): **to leave large-scale distribution and to sell organic products**.
- **Diana Fernández → A Tenda das Herbas, 2017** (R. Pitelos 26): **to offer vegan products, and, if possible, organic ones**.

Objectives

- Understanding the **supply chains** of these businesses.
- To find out **what motivated** the owners to open their shops.
- Check their **current situation** by speaking to their owners.
- Check which **organic products** they sell and whether these have any **certification**.

Results and Conclusions

- All three businesses have **supply networks made up of small-scale farmers and/or people from the municipality of Santiago and neighbouring areas**, who supply them with fresh produce, fruit and vegetables, as well as various bulk goods.
- **A Tenda das Herbas** has the smallest local supply network, as its priority is to ensure **its products are vegan above all else**. This means that a large proportion of its supplies come from distributors in other parts of spanish State. The owner herself admits to selling some processed products, as **vegan does not necessarily mean organic (as many people mistakenly believe).** However, the vast majority of the products on offer are organic and carry the relevant certification labels: **EU Organic and CRAEGA logos**.
- Thus, all three businesses offer their customers **'third-party' products supplied by other brands or distributors**. However, most of these come **from other Galician shops** (for example, artisanal sweets from "Quinteiro Doce" in Rianxo -A Coruña-). In other words, all three are committed to **a slight diversification of the products on sale**, alternating these "external" products with organic and fresh local produce.
- These two labels **feature on a large proportion of the products on offer in the three shops**: from packaged organic products to cleaning products, among others.
- However, **all three shops stock some uncertified organic products**, such as artisanal vegan cheeses made by a local resident and herbal teas (A Tenda das Herbas), as well as dry fruits and vegetables grown organically by individuals **within the supply networks**.
- Thus, A Horta and A Cesta da Saúde form **value chains with their respective stakeholders**. These chains encompass all the activities, stakeholders and processes involved, from the primary production of the products, through the subsequent stages of processing and marketing, to, finally, consumption in shops.
- As regards the **customer base**, the **age profile of consumers is varied**, **but adults (over 35 years old) with stable jobs and finances predominate**. This is linked to the fact that **the main constraint across all three businesses is the price of the products**, which, due to their characteristics, are **more expensive than those found in mass-market retail**. The owners themselves are aware that **not everyone is prepared to make this investment in health**, even though their benefits have been amply demonstrated.
- We can define these businesses as **supportive and cohesive environments that encourage the adoption of sustainable practices through these value chains.**
- The owners of A Horta and A Cesta da Saúde have noticed that **their supply networks has shrunk over the years. The exodus from rural areas is cited as the main reason.** Within their networks, **many of those involved have stopped working the land**, and **those who remain are mostly elderly people who continue to farm after retirement**. Only two people across both supply chains are young people working full-time in agriculture.
- Finally, all of the above means that **the three owners share a sense of resilience**; in other words, they are aware that their approach to running their businesses **will not yield as much financial profit as other companies that are more deeply entrenched in the logic of agro-industrial capitalism.** However, **they share a sense of a job well done and a consequent pride** in the work they have carried out over the years.

Diversity of production and food supply systems





Diversity of stakeholders



References

- CARREIRA PÉREZ, X. C., CARRAL VILARIÑO, E. (2014): *O pequeno é grande. A agricultura familiar como alternativa: o caso galego*, Através Editora, Santiago de Compostela.
- DORGBETOR, I. K., ONDRASEK, G., KUTNJAK, H., MIKUS, O. (2022): "What If the World Went Vegan? A review of the Impact on Natural Resources, Climate Change, and Economies", *Agriculture*, 12 (10), University of Zagreb, Croatia.
- FERNÁNDEZ PRIETO, L., SOTO FERNÁNDEZ, D. (2010): "El Atlántico no es el Mediterráneo: el cambio agrario al otro extremo de la Península Ibérica. El mismo Estado, otros paisajes, ¿los mismos paisajes?", en GARRABOU i SEGURA, R., ROBLEDO HERNÁNDEZ, R.: *Sombras del progreso. Las huellas de la historia agraria,* Crítica, Barcelona pp. 231-264.
- FUNDACIÓN RIA, HISTAGRA (2023): *Cando eramos sostibles. Aprendendo no Barbanza as claves do futuro,* Editorial RIA, Galiza.
- MARTINS, C. (2015): *Agrobiodiversity - the key to food security, climate adaptation and resilience*, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Alemaña.
- PAN MONTOJO, J., MARTIIN, C. (2025): "European agriculture and international trade in historical perspective, 1945-2000", en ESPETER, L. M., HERING, L., *Commodity Chains under Presure. Resilence through Coping, Adaptation and Transformation,* Edward Elgar Publishing, Inglaterra, pp. 164-185
- PICADO UMAÑA, W. (2008): "Ciencia y geopolítica en los orígenes de la Revolución Verde", *Revista de Ciencias Ambientales*, v. 36, nº 2, pp. 46-56.
- WEZEL, A., GEMMILL HERREN, B., BEZNER KERR, R., BARRIOS, E., RODRIGUES GONÇALVES, A. L., SINCLAIR, F., (2020): "Agroecological principles and elements and their implications for transitioning to sustainable food systems. A review", *Agronomy for Sustainable Development,* V. 40, nº 40.

Supporting Agrobiodiversity through Food Cooperatives: The Case of Grassrooted & rampe5

Jil Amrein

amreijil@student.zhaw.ch

Why this case?

The problem: Conventional food systems often favour standardised products, long supply chains and economies of scale. This can make diverse, seasonal and non-standardised products harder to market.

→ Grassrooted emerged from activism around food waste and the loss of edible but non-standardised food. In 2022, it established the cooperative rampe5 as a practical alternative to conventional food retail.

The case: Grassrooted is a Zurich-based food cooperative. Its member-run shop rampe5 connects consumers directly with regional and small-scale producers through cooperative retail and collective purchasing.

How does the cooperative work?



Members
- ❖ pay an income-based contribution
- ❖ participate in the cooperative
- ❖ access the shop

rampe5
- ❖ sells regional, organic & seasonal products
- ❖ organises collective purchasing
- ❖ builds direct relationships with producers

Producers
- ❖ gain alternative market access
- ❖ receive fairer conditions
- ❖ can market diverse and non-standardised products

How does this support agrobiodiversity?

Genetic diversity
Creates market access for traditional varieties such as: ‘Spinoso di Menfi’ artichoke
→ Alternative market access can help make diverse varieties economically viable.

Species & crop diversity
Collective orders include a wide range of products such as: citrus fruits, artichokes, plums, melons
→ creates demand for diverse and seasonal agricultural products.

Agricultural diversity
Works with small-scale and organic farms and develops direct relationships with partner farms such as Gut Rheinau and StadtLandWinti.
→ supports diversified farming practices and alternative production systems.

What are the benefits?



For producers
- ❖ Alternative market access
- ❖ Fewer intermediaries
- ❖ Direct producer–consumer relationships

For consumers
- ❖ Access to regional and seasonal food
- ❖ Greater transparency about producers and production
- ❖ Participation in a cooperative food system

For the food system
- ❖ Shorter supply chains
- ❖ Stronger regional networks
- ❖ Reduced food waste

But how sustainable is the model?

Challenges & limitations

1. Accessibility
Even with income-based membership contributions, organic and sustainable food can remain expensive and the cooperative mainly attracts relatively well-educated and higher-income consumers.

2. Labour
The model relies heavily on voluntary participation, raising questions about fair and sustainable working conditions.

3. Scale
As a small-scale cooperative, rampe5 has limited reach and its model may be difficult to replicate or scale without changing its social and organisational structure.

4. Financial sustainability
The cooperative recorded a CHF 14,706 loss in 2024, showing that long-term financial viability remains a challenge.

Conclusion:
Food cooperatives can support agrobiodiversity not only by selling diverse products, but by creating the social and economic conditions that make agricultural diversity marketable.

Rererences:

- rampe5 — grassrooted (n.d.). https://grassrooted.ch/rampe5 [Accessed 05.06.2026].
- SOLROSA – Der solidarische Konsumverein (n.d.). https://solrosa.org/. [Accessed 05.06.2026].