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für Ernährung  
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# Diversifizierung nachhaltiger und ökologischer Nahrungsversorgungssysteme

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Justus-Liebig-Universität Gießen

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Diversifying sustainable and organic food systems

FOOdIVERSE project

# Final Report



Gefördert durch



aufgrund eines Beschlusses  
des Deutschen Bundestages

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## Zusammenfassung

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Gegenwärtige Ernährungssysteme verursachen erhebliche Umweltschäden. Vielfältigere Ernährungssysteme könnten Nachhaltigkeit und Resilienz fördern. Das FOODIVERSE Projekt zielte darauf ab, die Diversität in Ernährungssystemen auf der Ebene der Konsumierenden (WP2), der Lebensmittelwertschöpfungsketten (WP3) und der Politik (WP4) zu verstehen. Reallabore (WP5) ermöglichte es Partnern von Universitäten in Deutschland, Italien, Großbritannien, Norwegen und Polen, unter realen Bedingungen an lokalen Themen zu arbeiten. Wir untersuchten Vielfalt auf dem Tisch, Agrobiodiversität, Vielfalt in der Organisation von Lebensmittelmärkten und Vielfalt in der Ernährungspolitik. Herausforderungen und Lösungen variieren je nach Fokus, und ein umfassender systemischer Ansatz erfordert die Zusammenarbeit verschiedener Akteure unter Berücksichtigung lokaler Bedingungen und kultureller Aspekte.

- **Vielfältige Esskultur:** Europäische Essgewohnheiten und Wahrnehmungen variieren, wobei Fokusgruppen schwache Verbindungen zwischen Konsum und Produktion aufdeckten, was zu einem geringen Bewusstsein für Agrobiodiversität führt.
- **Organisatorische Vielfalt:** Kurze Lieferketten unterstützen höhere Agrobiodiversitätsniveaus. Interviews mit Stakeholdern aus verschiedenen Lieferketten zeigten unterschiedliche Auffassung.
- **Vielfältige Ernährungspolitik:** Das Maß an Detailgenauigkeit und Einheitlichkeit der regulatorischen Rahmenbedingungen in Europa spielt eine Schlüsselrolle bei der Gestaltung von Ernährungssystemen. Dennoch beeinflusst die Wechselwirkung zwischen Gesetzgebung und lokalen wirtschaftlichen, sozialen und ökologischen Faktoren die Ergebnisse.

Ernährungsinitiativen, die mit externen Partnern zusammenarbeiten, nutzen unterschiedliche Scaling-Strategien. Alle sind mit Herausforderungen wie infrastrukturellen Beschränkungen, geringen Mitgliederzahlen, wirtschaftlichen Zwängen und institutionellen Spannungen konfrontiert.

**Reallabore:** Projektpartner arbeiteten mit bestehenden Lebensmittelnetzwerken als Reallabor zusammen. Die Unterscheidung zwischen alternativen (z.B. CSAs, Lebensmittelkooperativen) und zivilgesellschaftlichen Lebensmittelnetzwerken (z.B. Ernährungsräte) beeinflusst die Mechanismen der Transformation des Ernährungssystems. Die Diversification Roadmap fasst die Ergebnisse der Living Labs zusammen und zeigt, wie verschiedene Ansätze zu mehr Vielfalt auf lokaler Ebene führen können.

## Summary

Dominant food systems cause significant environmental damage and biodiversity loss and are fragile. More diverse food systems could promote sustainability and greater resilience. The project aimed to understand food system diversity at the consumer level (WP2), supply chain level (WP3) and governance level (WP4). The Living Lab methodology (WP5) enabled partners from universities in Germany, Italy, the UK, Norway and Poland to work on local issues in real-life settings. We shed light on agrobiodiversity, diversity at the table, diversity in modes and organisations, and diversity in food governance. Challenges and solutions vary depending on the focus, and a comprehensive approach to food systems requires cooperation between different actors, taking into account local conditions and cultural aspects.

- **Diverse food culture:** European eating patterns and perceptions vary, with focus groups revealing weak links between consumption and production, leading to low awareness of agrobiodiversity.

- **Diversity of food chain organisation:** Short food supply chains support higher levels of agrobiodiversity. Interviews with stakeholders from different supply chains revealed different perceptions of agrobiodiversity.

- **Diversity in food governance:** The level of detail and uniformity of regulation that characterises Europe plays a key role in shaping the characteristics of agri-food systems. However, the interaction between legislation and local economic, social and environmental conditions still determines different outcomes.

Food initiatives engaged with external partners use diverse scaling strategies. All are facing obstacles like infrastructural limitations, member involvement issues, economic constraints, and institutional tensions. **Living labs:** Project partners worked with existing food networks as Living Labs. The distinction between alternative (e.g., CSA, food cooperatives) and civic food networks (e.g., food councils) highlights different mechanisms for transforming the food system. The Diversification Road Map summarizes the Living Labs' results and how various approaches lead to more diversity on a local level.

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## List of abbreviations

AFN – Alternative Food Network

CSA – Community Supported Agriculture

FG – Focus Group

LFSC – Long Food Supply Chain

LL – Living Lab

SFSC – Short Food Supply Chain



# Introduction

## Topic

There has been little understanding of how food system diversification can lead to increased consumption, production and distribution of organic food. Based on the diversity of food cultures and diets, our main hypothesis was that a diverse food system is more sustainable, building resilience and increasing socio-economic and environmental benefits along the food chain. Accordingly, the aim of the FOOdIVERSE project was to better understand diversity in organic and other sustainable food systems at the consumer, supply chain and governance levels. We aimed to provide innovative insights into the characteristics of diversity that stimulate pathways to more sustainable development. We focused on how diversity in food systems builds resilience. Diverse food systems provide a greater variety of resources (processes, social networks and practices, cultural patterns, products, micro-economies, etc.) that can be readily applied and adapted to changing environments. Diversity in food systems ensures that socio-economic and nutritional needs are met in a sustainable manner.

Gaitán-Cremaschi et. al (2019) define three key components in different food systems: the agricultural production system, the value chain, and the associated support structures in terms of governance regulations and infrastructure. The governance of these key components has a critical impact on household availability (sufficient food), access (equitable distribution) and consumption of healthy and nutritious food, as well as on the resilience and stability of the food system as such. The FOOdIVERSE project 'reversed the chain' by focusing on the diversity of local food cultures and diets, as homogenisation of diets has detrimental effects on food systems. Food practices and dietary choices both influence and are influenced by how resources are used and how food is produced and distributed within the food system. Contemporary diets are characterised by an increased intake of calories, animal proteins and ultra-formulated, standardised foods high in sugar, salt and fat. Although the consumption of organic food as a healthier and more sustainable option has increased in recent years, highly educated and/or affluent people are the most frequent consumers (Vittersø et al., 2019b).

Little is known about people's access to and provision of diverse diets, particularly organic and local food. Little is also known about the cultural and social meanings of diverse and sustainable diets from a consumer perspective. In this project we have mapped, compared, analysed and discussed the drivers and barriers to developing a more diverse, local food system. Food provisioning practices vary, even between households and between localities (Mikkelsen, 2011). Therefore, we explored the cultural (values, meanings and representations) and material (physical landscapes, ecologies and political

economy) dimensions of diverse food (Johnston and Goodman 2015) to gain insights into how diversifying diets across different socio-economic groups can strengthen the consumption of local and organic food. The FOODIVERSE project focused on how the relationships and linkages between different features of diversity can enhance resilience and thus support a transition to local food systems that are socially, economically and environmentally sustainable. The organic food system was the focus of our investigation because it is the only legally defined system that follows public and additional private standards.

## Aims

The objective of the FOODIVERSE project was to understand the diversity in food systems at consumer, supply chain and governance levels. This objective was divided into following aims:

- Generate practice-oriented knowledge on how diversity in food consumption, novel food supply chains and food governance contributes to more organic and sustainable food systems.
- Identification of the drivers and barriers for developing a more diverse, local food system.
- Detect how diversification of diets across different socio-economic groups may strengthen consumption of local and organic food and strengthen the accessibility of diverse and sustainable foods at local levels
- Detect how diversity in food systems can reinforce resilience
- Gain insight on local food systems across Europe

The study was designed against the background that organic food systems are more sustainable than the currently dominant food systems. Therefore, within the diversity identified, a particular focus was placed on organic aspects, in line with BÖL's aim to increase the share of organic farming and conditions in the food industry.

## Project set-up

FOODIVERSE compared key characteristics of diversity in five European food systems: the UK, Poland, Norway, Italy and Germany. We combined quantitative and qualitative data and implemented living labs as 'innovation ecosystems'. To promote diversity in the supply chain, we needed to understand the diversity of consumption practices, as previous research has shown that practices vary widely both within countries and across borders (Halkier et al., 2007; Kjærnes, Harvey, & Warde, 2007). Sustainability and organic food have different meanings and connotations depending on food cultures and socio-economic factors. Therefore, the project explored the role of diversity by comparing food cultures, food consumption practices and diets, and how consumption affects - and is affected by - diverse food supply chains and food governance in the participating countries. The project analysed

(1) **diversity in dietary patterns** and socio-economic characteristics of consumers analysing existing quantitative data and focus group discussions.

(2) **diversity in food supply chains** and range of food products conducting a comprehensive market audit of the biological diversity of food products available in supermarket, territorial and private catering supply chains and undertaking key informant interviews with leading actors within these chains in all five study countries.

(3) **diversity in policy interventions** as well as key stakeholders involved in local food systems, which we analyse by supportive frameworks as well as conducting a local network analysis.

Based on this analytical input, we provided a (4) **living lab approach**. This had a practitioner centred design in an open-ended 'innovation ecosystem' bringing stakeholders in local contexts into a dialog, embedded in the broader food system. Through this methodology, we analysed current conditions of local food systems and decided on one aspect to experiment with and find solutions that are adapted to local settings, and that comply with a more diversified and sustainable food system.

## State of the art

Diversity has received little attention as a means of promoting transitions to more sustainable food systems. A systematic, multi-level and transformative approach to diverse food systems is lacking. Diversity needs to be considered not only in terms of biodiversity at farm level (IPES-food, 2016), but also in terms of the activities of different actors and stakeholders in food cultures, food chains and forms of food governance. While biodiversity is important for sustainable food systems, it is imperative to consider the environmental, social, political and economic parameters of sustainable food systems.

Contemporary food systems follow a productivist paradigm that emphasises the role of cost and standardisation (Gaitán-Cremaschi et al., 2019). The IPES-food report affirms that 'food systems initiatives at the interface of science, policy and practice must therefore unify in their diversity, together tracing out pathways to sustainable food systems'. (IPES-food, 2015:17). The EAT-Lancet report (2019) identifies two objectives in this regard: first, diet and nutrition, and second, food production, highlighting important links between human health, dietary patterns and sustainability. To identify future scenarios, it is important to understand the interactions between indicators of diverse, sustainable diets in socio-economic and environmental contexts.

Diverse food systems promote healthy and sustainable diets by supporting diverse needs in local contexts and promoting biological, social and economic resilience by combining a diversity of resources. Resilient systems can either 'absorb' or 'adapt' (equilibrium resilience) or 'transform' in

response to shocks (evolutionary resilience). They also provide socio-economic and environmental benefits by promoting agro-ecological production principles. Current climate change and the COVID-19 pandemic have both demonstrated the instability and vulnerability of global and local food security. More diverse food systems could improve food security. The interdependencies and linkages between biodiversity and food crop diversity need to be taken into account.

Local food systems are perceived as important by consumers, food chain actors and policy makers (Kneafsey et al., 2013, Vittersø et al., 2019a). Diversity in food systems refers to actors and activities at different levels. At the consumer level, more diverse diets across seasons, including social, cultural and geographical aspects, could be considered, which is more likely to meet nutritional needs, as opposed to standardisation and low variety in convenience products (Johnston & Goodman, 2015; Mikkelsen, 2011). At the food chain level, diversity is documented through biodiversity in production, such as in organic farming (IPES-food, 2016). However, little is known about how diversity is conceived and valued differently in different food supply systems, such as mainstream supermarket supply, territorial food systems and catering supply. Furthermore, current approaches to food governance focus on food policies at (supra-)national level and rarely consider local food policies. Policy makers lack the knowledge to address and implement diversity. For example, the role of local food policy councils has gained attention, but their role in how diversity of food practices and diets interact with other parts of the provision system is unclear.

## Material and methods

The FOODIVERSE project took a food systems perspective, focusing on the role of diversity in sustainability transitions. The project reversed the food chain, starting with a focus on diverse food cultures and eating (WP2), further considering diverse food supply chains (WP3) and diverse food governance approaches (WP4). Methodologically, the FOODIVERSE project took a multi-actor and multi-scalar approach to investigate diversity translocally in living labs (WP5). The project was not interested in a top-down sustainability policy approach, but in bringing together local stakeholders to share different perspectives on organic food in a transdisciplinary way. We aimed to create mutual understanding of the hindering or supporting characteristics of diversity towards sustainability transitions in Living Labs (LL), highlighting synergies and interrelationships between actors and stakeholders. LLs are " user-driven open innovation ecosystem based on business-citizens-government partnership which enables users to take active part in the research, development and innovation process " (European Commission, 2009).

The LL approach is widely used in different fields and is flexible to adapt to specific actors, activities and designs. LLs are based on the participation of a wide range of actors, with a particular focus on users/citizens, real-life settings that ensure the realism of behaviours and practices, and co-creation, which is both the outcome of the LL situation and the means to develop new solutions and products (von Wirth et al. 2019). The five countries involved in this project, Germany, Italy, Norway, Poland and the UK, are highly relevant as they all represent a broad spectrum of diverse food systems (Halkier et al. 2007; Kjærnes, Harvey & Warde 2007). FOODIVERSE established Living Labs in all five countries by working with existing food initiatives and networks. A comparison provided a better understanding of how diversity is shaped locally in LLs. To address diversity across the food system in food culture and foodways, food supply chains and food governance, we used a mixed-methods research design that coalesced into living labs.

## Diverse food culture

FOODIVERSE used two data sets to analyse diversity in food culture: a survey and focus group discussions. First, the survey was originally developed for the Horizon 2020 project Organic-PLUS, and we refer to the project report Vittersø et al. (2019) for a detailed description of the questionnaire and sampling method. Here, we provide a brief overview of the questionnaire, the data material and the characteristics of the respondents, as well as the relevance for a better understanding of the diversity of food cultures and eating. The questionnaire was originally designed to collect data on European citizens' views on the phasing out of controversial inputs in organic farming, as well as background information on attitudes, preferences and consumption of organic food. As well as several questions on controversial inputs, the questionnaire included questions on the frequency of eating a range of different foods, meat preferences and different quality aspects when buying food.

Several types of sustainable food practices were mapped, such as: buying local, seasonal and organic food; avoiding food packaging and food transported by air; reducing meat consumption and food waste. Respondents were also asked about their channels for buying food, both organic and 'normal' food, and other food-related practices and experiences such as growing your own food, foraging and composting. The survey also included questions on trust in food system actors, use of food labels and other information channels, and attitudes towards organic farming and food. The results of the questions on preferences and use of organic food, trust in food system actors, as well as the various questions on controversial inputs in organic agriculture are presented in Vittersø et al. (2019). Several of the other questions, which were analysed to a small extent in the Organic PLUS report, can be found in the detailed WP report. The survey was conducted in June 2019 in seven European countries: France, Germany, Italy, Norway, Poland, Spain and the UK. We compared the results between all seven

countries, but with a special focus on the five FOODIVERSE countries: Germany, Italy, Norway, Poland and the UK.

The second method used to assess diversity in food culture was focus groups (FG). Two focus groups were conducted in each participating country. In the end, ten focus groups were conducted (eleven including a pilot in Norway). We used the focus groups as a discussion method and the selected focus groups consisted of consumer-citizens within and outside specific food networks or involved in organic food practices. In all countries, at least one of the groups was recruited from a local food network or from frequent organic consumers (UK). The rest of the focus groups consisted of participants not directly involved in specific food initiatives. The focus group participants had different socio-economic backgrounds in terms of income, gender, age, household structure (size) and housing conditions. Various techniques were used to stimulate discussion among focus group participants, including mapping of the local food landscape. The Norwegian team provided common guidelines to ensure consistent data collection across the focus groups in the five participating countries. Focus group discussion is often used as a qualitative approach to gain an in-depth understanding of social issues. Therefore, we asked participants about the role of diversity in their current food practices and desired changes within their foodscapes and food systems in general.

### Diversity in modes of organisation and coordination

To assess the diversity of food chains, the FOODIVERSE project started with a market audit approach. The supermarket audit data was collected in October/November 2021 in Poland, Italy, Germany, Norway and the UK. It covered key vegetable, fruit, cereal and animal products sold in both, budget and mainstream supermarkets in each country. In total, over 1,500 product lines were audited, with data collected on product name, variety, country of origin, packaging and sustainability/origin certifications. The audits focused on in-store availability of each product. For each line of these key products, data were collected on variety name (where available), product name, country of origin and packaging. For certified products with a sustainability or origin certification, this was also included (including the production method for eggs). Where variety attributes were listed on the pack, these were also included, as were any specific mentions of biodiversity. A full list of data collection categories can be found in the data collection template in the specific WP report. The audits were conducted in-store and included two supermarkets in each country - a market leader and a budget supermarket. For each supermarket, the audits were carried out in the largest store in a major city, proxied by the number of tills. The budget supermarkets were co-ordinated for all countries where this was possible, with all countries carrying out the budget supermarket audits at a Lidl, except Norway where the audits were carried out at a local budget supermarket chain due to the lack of foreign budget supermarket

chains. Budget supermarkets tended to have a narrower range of products, often selling less than half the number of lines of the main products we audited.

The second part of this work package took an interdisciplinary approach to understanding the links between agrobiodiversity and the socio-economic organisation of food provision. This way of thinking about diversity in agri-food systems provides an alternative to both traditional economic accounts, which view natural resources as mere inputs to economic systems rather than integral parts of them, and to certain mainstream approaches to biodiversity, which fail to properly account for the role of human activities in shaping complex and diverse socio-natures. We examined the links between three different food supply systems (mainstream supermarkets, short food supply chains (SFSCs) and public food services) and agrobiodiversity (in terms of diverse species, diverse varieties and diverse farm ecologies). For example, we explored how the socio-economic organisation of mainstream supermarket food provision (e.g. the focus on price competitiveness and standardised product ranges, and the importance of in-store presentation, logistics and storage) is closely linked to particular farming practices and farm biologies (e.g. the focus on a narrower range of crops, the privileging of certain genetic varieties, and the devaluation/externalisation of wider farm ecologies). Similarly, we explored how alternative economic configurations of food provision (such as SFSCs or public food services) are deeply intertwined with alternative farm biologies.

To gain insights into the three food supply systems listed above, we used a case study approach. Each national research team conducted 10-15 semi-structured interviews with different actors in three case studies (one from each type of supply chain). The interviews lasted approximately 60 minutes and covered the following topics: background information and socio-economic context; understanding and valuation of agrobiodiversity in food systems; key drivers and barriers for agrobiodiversity in food supply chains (at varietal, species and ecosystem level); and suggestions for a roadmap to enhance agricultural biodiversity. Case studies and participants were selected to provide insights into each of the food supply systems considered. The nature of the specific case studies and the rationale for their selection are detailed in the relevant sections of each country report.

We addressed the following areas:

- the connections between agrobiodiversity and the socio-economic organisation of food provisioning
- the key drivers and barriers for increasing agrobiodiversity across different types of food provisioning systems
- differences in definitions and understandings of agrobiodiversity between food chain actors and supply chains

## Diverse food governance

The fourth work package first aimed at analysing diversity in food policies, and second at illustrating diversity in food politics. The main goal of the policy analysis was to understand how contextual factors and governance approaches contribute to shaping food systems and actors' capacity to collectively play to promote more diversified forms of production, distribution, and consumption. Three main research questions were addressed:

1. what are the laws and policies that hinder and constraint/support and enhance agrobiodiversity?
2. What are the laws and policies that hinder and constraint/support and enhance bio-cultural diversity?
3. What are the laws and policies that hinder and constraint/support and enhance organisational diversity in food systems?

In order to conduct the analysis, desk research was carried out for each country, as well as 10-15 in-depth interviews with relevant informants. More specifically, the policy analysis was organised as follows:

- Analysis of policy documents to better understand different policies that support sustainable and organic food systems;
- Identification of diversity in policy interventions to favour sustainable resource efficient food production, distribution and consumption across the participating countries and at different levels (national, regional and local);
- Comparative analysis of the different policy interventions governments have taken to support sustainable and organic food systems over the most recent years at different levels (national, regional and local) in the participating countries.

Regarding the analysis of politics, the main goal was to investigate actors' composition and relational structures of the organisations considered as living labs in WP5. The methodology consisted of a desk research considering data collected in other WPs (mainly WP5) and one confirmatory interview per country, to compare results and integrate them with the view of a key informant.

The main focus was on three elements:

- 1) LLs' modes of organisation;
- 2) LLs' capacity to construct diverse value chains based on alternative flows of knowledge, information, and finance;
- 3) analysis of LLs' ties and relational structures based on data retrieved from other WPs.



## Living labs

The fifth work package set up Living Labs in each of the participating countries. The project started by identifying food networks with high innovation potential. Each country selected one network as a basis for the creation of Living Labs. A tool to assess the innovation potential of food networks ("Living Lab Checklist") was developed. This tool was based on the ideal type of Living Lab, defined on the basis of desk research analysis. In 2021, three case studies were carried out in each country using the Living Lab checklist. The project continued by initiating the work of Living Labs created on the basis of existing food networks. These were selected from the networks studied in the first task (assessing the innovation potential). Based on the literature on the subject, two main selection criteria were identified: a) the ability of the network to engage different stakeholders and b) the use of participatory organisational management methods that support the empowerment of citizens and the reconfiguration of roles in the food system.

At the beginning of 2022, a living lab contract template was developed. It was concluded with Living Lab participants in each country later that year. The contract took the form of a letter of intent. In each country its final version was agreed with local partners. The signing of letters of intent led to the creation of Living Labs in 5 countries in cooperation with the following organizations:

1. Nutrire trento (Italy)
2. Wawelska Food Cooperative (Poland)
3. Hadeland Andelslandbruk (Norway)
4. Gießen Food Council (Germany)
5. South West Grain Network (UK)

As part of the task, guidelines for the operation of Living Labs were developed. A system for reporting the results achieved has also been created. The first set of tools dedicated to Living Labs has been prepared. It was titled "Living Lab Stories" and contained a collection of good practices that were an inspiring example for the Labs operating within FOODIVERSE.

Subsequently, the Living Labs started experimenting. An outline of the process that should be carried out in each of them has been prepared. The process was divided into three stages:

1. Problem finding (problem definition stage)
2. Idea finding (the stage of generating proposals for solutions to the problem)
3. Acceptance finding (selection of the optimal solution to the problem).

Tools have been prepared for each stage to facilitate the co-creation of new solutions. These tools were mainly workshop scenarios. The use of them was not mandatory because Living Labs, as self-governing

initiatives, could decide to use their own tools. In each case, the tools developed by the work package coordinators served as an inspiration and guidance for the process.

During the implementation of task 5.3. the first two phases of the innovation process were carried out. They led to the definition of problems that will be solved by individual living labs:

- Wawelska Kooperatywa Spożywcza (PL), which wanted to test a new packaging system
- Nutrire Trento (IT) aimed to co-create local food policy
- Gießen Food Council (GER) wanted to introduce more balanced meals to schools
- Hadeland Andelslandbruk (NO) decided on creating a tool to diagnose the needs of CSA members
- South West Grain Network (UK) chose to define a set of key values and supporting the creation of similar initiatives.

A report template has also been prepared for each stage. Living lab coordinators were responsible for completing it. This made it possible to monitor their work and later evaluate it. Reports from the first two phases of the innovation process included the following information:

1. Description of activities that led to defining the goals of the Living Lab
2. Presentation of local settings that affect the operation of a given Living Lab
3. Description of all tools used in the work of the Living Lab
4. Presentation of the goals of the Living Lab
5. Presenting an action plan how to achieve the Living Lab goal
6. Detailing the information needed to generate solutions to diagnosed problems
7. Description of potential solutions to problems developed during the living lab work

The final task included activities that were part of the third phase of the Living Labs work (finding acceptance). In this phase, prototypes of the prepared solutions were tested. Much attention was given to the preparation of the evaluation process. In line with the idea of co-creation, the Living Labs independently defined evaluation criteria and indicators for assessing the solutions. However, evaluation in the context of a Living Lab has another dimension, which refers to the evaluation of the innovation process itself, and not only of the developed solutions. The aim was to organise "lesson learned" workshops within the Living Labs, dedicated to the formulation of recommendations for food chains interested in implementing the developed solutions. The main activities, experiences and recommendations were summarised and published as a Diversification Road Map.

## Important results

### Key results work package on diverse food culture

Work package 2 has mapped diversity in food consumption in Europe with a view to organic, sustainable and local food, based on a survey with over 15 000 respondents from Germany, Italy, Norway, Poland, the UK, France and Spain. The aim was to have a closer look on the state of dietary diversity as well as consumers' perceptions and practices in relation to sustainability of food. The analysis shows that it is a European divide in eating patterns as well as perceptions and consumption practices. Higher eating frequencies for vegetables, fruits and fish were found in the Mediterranean countries and relatively lower frequencies of meat, compared to northern Europe. Respondents in southern countries to a greater extent emphasized the origin of food, knowing the producer and that food is local and in season. Polish and Italian respondents used local markets and direct purchases from the producer more than in the other European countries.

The results show a socio-demographic divide related to gender and age. Vegetables and fruits were consumed more often by women than men and in the elder- more than in the younger age groups. The highest age group more frequent answered "not relevant" to some of the supply channels (e.g. online purchase of food), which may indicate that some types of supply channels are less available for elderly people. Higher education levels associate with frequent vegetable and fruit consumption. Consumption of local and organic food is often associated with high socio-economic status. We found that this only to some extent is true for organic food, but it varies between countries and the income divide is most prominent in the UK and Germany.

The analysis of ten focus groups in five countries was the second part on diverse food cultures. In all countries at least one of the groups were recruited from a local food network or among frequent organic consumers (UK). The rest of the focus groups consisted of participants who were not directly involved in special food initiatives. This approach provides for a specific insight to the role that alternative food provisioning and consumption may play for improving the diversity of local food systems. In general, there were weak ties between consumption and production due to social and physical distances in the food system, and therefore less awareness of agro-biodiversity among eaters. Nevertheless, improved availability of local, seasonal foods of a diversity of plant varieties and animal breeds was relevant to many participants. Awareness of changes in agro-biodiversity as experienced through lower numbers of varieties available in stores, as well as large differences between varieties that used to be available and those found in supermarkets today was expressed across the focus groups.

There were differences in the diversity of available local and sustainable food among participants, and accounts of how the participation in local food networks would increase this diversity. Being a member of a CSA provided a larger diversity, e.g. members of the Norwegian case of Hadeland CSA gained access to more than 40 different varieties of vegetables, potatoes and flowers, as well as meat from livestock at three local farms, including heritage breeds. Local food networks, such as CSAs, constitute a mode of organisation which favours diversity. As an element of modes of consumption, diversity and flexibility in cooking practices play a key role in sustainable eating within local food networks. This also extends into knowledge and skills in regard to harvesting (in the case of CSAs or own production or foraging), storage, preparation and processing. Diets founded on a diversity of fresh and seasonal foods demand a different approach and set of skills as compared to diets based on standardised foods available all year around in food stores. Food culture, including both tradition and innovation and the will of exploration, with related sets of skills, may represent a key for succeeding in achieving more sustainable eating patterns.

Membership in a CSA or consumer cooperative represented for some participants a way of structuring their food provisioning and limiting the number of single decisions and reflections having to be made. Members of the CSA in Italy expressed relief from these concerns as the CSA supplied them with exclusively organic apples. Also from other cases, e.g. members of the consumer cooperative in Poland, purchasing directly from the producer or trust in others' experience were preferred strategies to those relying on information and labels on the products. The 'functional foodscapes' as described by the individual participants were varied and different from an 'objective' description of the same food environment. Factors influencing the perception of viable local and organic food options included physical distance, but also whether it would be necessary with a dedicated trip, or it could be reached on the way to the workplace, school or similar. Perceived proximity is of course relative – the greater the abundance and proximity to foods which are not local or organic, the lower the perceived accessibility of local and organic foods would be in comparison. One of the largest perceived barriers to increasing the consumption of foods participants thought of as ethical was the over-availability of 'tempting' foods which did not meet these ethical criteria. The possibility of shifting the balance of accessibility of local and organic food from supermarkets to smaller local stores was a common aspect of future aims and possibilities which participants across focus groups and countries expressed. Making the local, organic and sustainable more accessible in practice, and doable in everyday lives.

## Key results work package on diversity in modes of organisation and coordination

Work package 3 was interested in diversity in modes of organisation and coordination. Different types of agrobiodiversity are promoted by different factors and will require different support strategies. Our data indicates that Short Food Supply Chains (SFSCs) currently support higher levels of agrobiodiversity in terms of species diversity, ecological biodiversity and varietal diversity (in relation to the size of consumer base supplied).

Regarding *varietal biodiversity*, consumer awareness of and demand for specific varieties may promote lower varietal diversity and higher imports in supermarket supply chains. SFSCs, however, supplied an equivalent or greater diversity of varieties compared to supermarkets, though they supplied far fewer consumers. *Species diversity* is concentrated at different points for supermarket and short food supply chains: with supermarkets providing the most diversity at the point of sale and short supply chains growing more crops per hectare and potentially encouraging consumers to include a greater diversity of species in their diets by including seasonal and more unusual produce in their supplies. *Ecosystem biodiversity* The availability of organically certified produce was very uneven across our key product types (eggs were most available, beef and bread had very low availability), and across the different European study countries (Germany had a 2.5 times greater proportion of organic lines than Poland) and between mainstream and budget supermarket chains (mainstream supermarkets tended to have more organic lines).

SFSC survey respondents left on average 8% of their land as wildlife habitat and used several farming techniques to enhance biodiversity, with the most common being crop rotation, reducing the use of pesticides and fertilisers, growing biodiversity-supporting crops, and allowing weeds/wildflowers. Furthermore, was Ecosystem biodiversity strongly correlated with feeling part of a collective effort to change agriculture and survey responses indicate that well-functioning SFSCs have been crucial to increasing particularly genetic agrobiodiversity over time, but more work needs to be done to understand the ways in which biological diversity and socio-economic diversity co-evolve. Work package 3 also created insights about increasing agrobiodiversity in our food system from over 50 key stakeholders from 5 countries and three different supply chains.

### *Conceptions and values of agrobiodiversity vary between supply chains:*

Long Food Supply Chains (LFSCs) valued aspects of agrobiodiversity separately: ecosystem biodiversity as protected by certain certification schemes (such as Organic); species diversity as demanded by consumers and varietal diversity as necessary to ensuring consistency of supply. SFSC actors were the most likely to provide more wholistic and interdependent understandings of agrobiodiversity, pursuing it as a key moral as well as economic value. Whereas Public food service actors do not seem to have

articulated a discourse on agrobiodiversity, focusing instead on seasonality and locality which were sometimes viewed as proxies.

*Short food supply chains (SFSCs) were seen to be the most conducive to agrobiodiversity across all countries:* A higher flexibility in SFSC organisation allows them to better accommodate diversity, as well as varietal, species and ecosystem biodiversity are key selling points for SFSC produce. Furthermore, are high species and varietal diversity on each farm key to economic resilience in SFSCs and agrobiodiversity is more integral to the values of SFSC actors and they have more autonomy to pursue these values.

*Mainstream long food supply chains (LFSCs) involve major barriers to agrobiodiversity,* because the prioritisation of cost minimisation and efficiencies of scale aligns with mass monocultural production and runs counter to all three types of agrobiodiversity. Also, infrastructures are designed for large quantities of standardized goods and a large number of intermediaries between farm and fork impedes the valorisation of more agrobiodiverse produce.

*Public food service was generally seen as having large potential to support the growth of more agrobiodiverse food production (less so in Poland). Environmental food purchasing guidelines primarily support ecosystem biodiversity, less so species diversity, and varietal diversity only minimally.* Increasing agrobiodiversity in this supply chain involves overcoming tight budget constraints to pay higher costs of agrobiodiverse food production, increased time and effort of producing a meal with diverse species/varieties. Also, overcoming logistical constraints such as coordinating small amounts from many producers and limited local production.

*Supply chain stakeholders highlighted seven key priorities for increasing agrobiodiversity:*

1. Support agrobiodiversity through public food procurement
2. Support small producers with training, funding, infrastructure, navigating bureaucracy and accessing land
3. Improve the organisation and functioning of SFSCs, enable cooperation and joint ventures
4. Communicate more clearly about negative impacts of monocultures & benefits of biodiverse farming
5. Increase the proportion of Organic produce in mainstream LFSCs and strengthen varietal and species diversity in Organic standards
6. Reduce the dominance of large-scale food provisioning
7. Increase breeding efforts to develop varieties suitable for agrobiodiverse systems

### **WP3.2 Understanding the links between the socioeconomic organisation of food systems and agrobiodiversity**

In Work Package 3.2 of the FOODIVERSE project, we explored the potential for increasing agrobiodiversity within the food systems through insights gained from over 50 key stakeholders across five countries and three different supply chains. The study revealed that conceptions and values of agrobiodiversity vary significantly between different supply chain models.

In long food supply chains (LFSCs), agrobiodiversity is valued in compartmentalized ways. For instance, ecosystem biodiversity is often protected under certain certification schemes like Organic, species diversity is driven by consumer demand, and varietal diversity is crucial for ensuring a consistent supply. These actors tend to prioritize aspects of agrobiodiversity that align with market demands and certification standards, often treating each aspect as a separate entity rather than an interconnected whole.

In contrast, stakeholders in short food supply chains (SFSCs) tend to have a more holistic and interdependent understanding of agrobiodiversity. For these actors, agrobiodiversity is not only an economic asset but also a key moral value. SFSCs are seen as the most conducive to fostering agrobiodiversity due to their flexible organisational structures. This flexibility allows them to better accommodate and promote varietal, species, and ecosystem biodiversity, which are crucial selling points for SFSC produce. High species and varietal diversity on individual farms also contribute to the economic resilience of SFSCs, reinforcing their commitment to agrobiodiversity.

Public food service actors, on the other hand, often lack a coherent discourse on agrobiodiversity. Instead, they focus on seasonality and locality, which are sometimes viewed as proxies for agrobiodiversity. Despite this, there is significant potential for public food services to support agrobiodiverse food production, although this potential is less recognized in certain regions, such as Poland. Current environmental food purchasing guidelines primarily support ecosystem biodiversity, with less emphasis on species diversity and minimal focus on varietal diversity. To enhance agrobiodiversity in this sector, several challenges need to be addressed, including tight budget constraints, the increased time and effort required to produce meals with diverse species and varieties, and logistical constraints related to coordinating small amounts of produce from many producers and limited local production.

The study identified several barriers to agrobiodiversity within mainstream LFSCs. These supply chains prioritize cost minimization and efficiencies of scale, which align with mass monocultural production, thus running counter to the principles of agrobiodiversity. The infrastructure in LFSCs is designed for

handling large quantities of standardized goods, and the numerous intermediaries between farm and fork impede the valorisation of more agrobiodiverse produce. To overcome these challenges and promote agrobiodiversity across all supply chains, stakeholders highlighted seven key priorities:

1. Support Agrobiodiversity Through Public Food Procurement: Encouraging public institutions to prioritize agrobiodiverse produce in their procurement policies.
2. Support Small Producers: Providing small producers with training, funding, infrastructure, and assistance in navigating bureaucracy and accessing land.
3. Improve the Organisation and Functioning of SFSCs: Enabling cooperation and joint ventures to enhance the efficiency and reach of SFSCs.
4. Communicate the Impacts of Monocultures and Benefits of Biodiverse Farming: Raising awareness about the negative impacts of monocultural practices and the benefits of agrobiodiverse farming systems.
5. Increase Organic Produce in LFSCs: Enhancing the proportion of organic produce in mainstream LFSCs and strengthening varietal and species diversity within organic standards.
6. Reduce the Dominance of Large-Scale Food Provisioning: Challenging the market dominance of large-scale food providers to create more opportunities for diverse, small-scale producers.
7. Increase Breeding Efforts: Investing in breeding programs to develop varieties that are well-suited to agrobiodiverse farming systems.

By addressing these priorities, we can create a more robust, resilient, and agrobiodiverse food system that benefits both the environment and society.



## Key results work package on diversity in food governance

### **WP4.1 Diversity in Food Policies**

Despite regulatory uniformity in Europe affecting agrifood, local factors drive diverse outcomes. For instance, strict global seed and trade laws limit state autonomy, while national land property regulations persist. Genetic diversity and seed sovereignty vary among nations, shaping agricultural models and political priorities. Economic challenges, like Germany's rising food prices, impede transitions to sustainable food systems universally, highlighting the overarching influence of economic sustainability on producers' choices. The relationship between the considered Country and the EU deeply affects policy scenarios, public trajectories, and stakeholders' perspectives. For instance, the different length of membership in the EU (Italy, Germany compared to Poland), or the lack of an EU membership as in case of Norway, and Brexit are important.

The level of detail and uniformisation of regulatory settings characterizing Europe, which in some sectors can be very advanced, plays a key role in shaping the characteristics of agrifood systems. However, the interaction between law (even the same legal instrument) and local economic, social and environmental still determines different outcomes. Seed and trade laws are the most strict and homogeneous legal frameworks due to their derivation from international law regimes. The consequence is little regulatory space left to States and little room for change. Conversely, as the EU has not used its powers to regulate land property circulation, this is still a mainly nationally regulated sector, shaped by historical differences and reflecting political, economic and social equilibria. Land access and tenure are crucial elements affecting the diversity of food systems.

Regarding genetic diversity, the considered countries offer different scenarios according to the dominant agricultural model and climatic conditions. In addition, the level of adherence to the official legal seed system - that allows only certified varieties to circulate – plays a role in the utilisation of old varieties, and in the related political priorities.

### **WP4.2 Diversity in Food Politics**

The study findings highlight the prevalent traits of open, democratic organizational structures in analyzed food initiatives, with distinct internal setups (e.g., food policy councils in Italy and Germany; Alternative Food Networks in Poland, Norway, and the UK). These initiatives engage with external partners to varying extents, exhibiting diverse scaling strategies—such as scaling up, deep, and out—tailored to their objectives and resources. Scaling through is the less practiced strategy, witnessing, in general, scarce connections with public institutions. However, the initiatives analyzed encounter obstacles like infrastructural limitations, member involvement issues, economic constraints, and institutional tensions, which impact their ability to meet Living Lab objectives aimed at sustainable food systems.

The analysis concentrated on the internal and external organizational models, coordination approaches, scaling strategies, and the capacity of Alternative Food Networks (AFNs) to achieve their objectives. Especially, the findings from WP4.2 underscored the subsequent aspects:

### **1. Modes of internal organisation**

The cases studied exhibit open, democratic structures with participatory decision-making, encompassing food policy councils in Germany and Italy, and Alternative Food Networks (AFNs) like a CSA in Norway, a food cooperative in Poland, and a diverse network in the UK. Membership is informal across all, only individuals are members in the Norwegian CSA and Polish food co-op, while other cases include organizational members. Participant demographics show a consistent middle-class profile, highly educated and mostly aged between 30 and 60, indicating significant socio-economic homogeneity among the initiatives.

### **2. Modes of external coordination**

All the initiatives analysed have relations with external actors, although with varying degrees.

### **3. Scaling strategies**

Strategies vary between the countries. In Poland and Norway scaling deep is the major strategy as well as in the UK additionally to scaling up. The latter is also dominant in Italy and Germany.

### **4. Capacity to meet the LL objectives**

- Germany: Focus on increasing local and organic products in public canteens. Strength lies in rising awareness, but obstacles include infrastructural limitations and higher costs.
- Poland: Aims to address packaging waste. Challenges include member involvement and effort of researchers in the living lab, while efforts to mitigate this issue are notable.
- Norway: Emphasis on producing and consuming sustainable food, preserving the CSA's identity and fostering community engagement. Strong commitment of members is an enabling factor, but hurdles include economic constraints, weak connections with the local community and local institutions and lack of time.
- UK: Building an alternative human-scale grain economy. Enabling factors include committed founders and network support, while obstacles include financial pressures, time constraints and legislative barriers.
- Italy: Co-production of local food policies as main long term goal. Hurdles include power imbalances and tensions with institutional environments, while trust-building within the table, horizontal relationships and collaboration with other municipalities are enabling factors.

## Key results work package on living labs

Via a desk research, 12 characteristics were identified of ideal-typical food system living labs:

Living labs should pursue explicit goals related to sustainable development (1) and should have experience in the preparation and implementation of solutions that are an alternative to the dominant food system (2). Furthermore, they should have the potential to monitor and evaluate the effectiveness and efficiency of these solutions (3). It also requires embeddedness in the local context (4), as well as the ability to diffuse innovation (5) and engage a wide set of actors (6). It should have the potential to conduct activities related to the co-creation of new solutions (7) and have a mode of self-governance that empowers citizens (8) and transforms relationships between actors within the agri-food system (9). Finally, it is important that it has adequate resources at its disposal (10), including a funding scheme (11) that ensures its durability (12).

Alternative and civic food networks are a suitable base for establishing living labs due to several key factors. Firstly, they are aligned with goals of sustainable development and offer alternative solutions to the dominant food system. Secondly, these networks, deeply rooted in local contexts, have the potential to spread innovation and impact the broader food system by engaging a diverse range of actors in co-creation activities. Thirdly, they uphold high levels of democracy, empowering citizens in food system governance. Additionally, their transformative potential lies in reshaping the dynamics among actors within the agri-food system.

It is crucial to differentiate between alternative networks like CSA and food cooperatives, and civic networks such as food councils, as they employ different mechanisms for influencing food system transformation. Civic networks are embedded locally, while alternative food networks disseminate their solutions through replication.

The key activities, experiences, and recommendations of living labs are summarized in a Diversification Road Map.

## Discussion of the results

The results of the different WPs are discussed in this section. We emphasise some key points on issues that are of relevance for the overall project objectives. After providing some key discussion points, we also summarise these discussions and conclude

### **Work package 2.1 Comparative Study of European Eating Patterns**

This comparative study confirms significant differences in eating patterns and food practices across European countries. However, we also identified some socio-demographic trends that transcend regional divides. Notably, eating patterns vary significantly between men and women, as well as between different age groups. Women tend to consume less meat and more vegetables and fruits than men. Similarly, older age groups eat more vegetables, fruits, and fish compared to younger groups.

Mediterranean countries like Italy exhibit a more varied diet, with higher consumption of vegetables, fruit, and fish, and lower meat consumption compared to Northern European countries. This difference may reflect a distinct food culture between Northern and Southern Europe—a biocultural diversity potentially influenced by differences in agrobiodiversity and food accessibility. For instance, Norwegian respondents reported lower fruit consumption, likely due to limited access to local, seasonal, and affordable fruits compared to Southern European countries like Italy.

Previous research suggests that Southern Europeans associate food quality with culture, origin, taste, and typicity, while Northern Europeans link quality more with visual appearance, shelf-life, nutrition, and hygiene (Amilien, 2011; Barjolle & Sylvander, 2000). Our survey supports this to some extent. Overall, taste, freshness, and price were the top factors for most respondents, except in Italy, Spain, and to some extent France, where seasonality and origin were highly valued. Respondents from these countries also showed a higher preference for specific apple varieties and sustainable practices, such as buying local and seasonal food and purchasing directly from producers.

The research literature often states that local and organic food consumption is related to higher socio-economic status. Our findings indicate this is true for organic food to some extent, with income disparities most prominent in the UK and Germany. Understanding the factors influencing sustainable food practices and their national and regional variations requires further statistical analysis and qualitative methods, which will be conducted in later stages of the FOODIVERSE project.

### **Work package 2.2 Focus Group Discussions**

Focus group discussions revealed that diversity influences and is influenced by the valuation and use of food products. Participants frequently relied on grocery stores (supermarkets/hypermarkets) for food provisioning and generally viewed them positively. However, a recurring theme was the perceived standardization and reduced variety of fruits (particularly apples) and vegetables in supermarkets. Participants noted a decline in agrobiodiversity, with fewer varieties available compared to the past.

Participants involved in local food initiatives reported that their food choices and home food stocks were significantly influenced by seasonally available foods from these initiatives. The topic of sustainability emerged variably in the discussions, with some participants explicitly using the term, while others mentioned related issues or did not make the connection between their practices and sustainability. Concerns about organic products being wrapped in plastic and the lack of information about their origin and variety were also raised.

### **Work package 3.2 Enhancing Agricultural Biodiversity**

Interviewees from several countries, particularly Poland and Italy, found it challenging to envision future actions for enhancing agricultural biodiversity. Norwegian respondents focused more on general sustainability measures, such as energy and waste reduction, rather than agrobiodiversity. Due to the reluctance of mainstream long food supply chain (LFSC) actors to enhance agricultural biodiversity and their limited representation in case studies, the discussion is skewed toward the perspectives of short food supply chain (SFSC) actors and public procurement stakeholders. The national case studies highlighted seven key areas for progress:

#### **1. Increase Agrobiodiversity in Public Procurement**

Governments should strategically support agrobiodiversity by collaborating with SFSC producers to use more local and organic food in public procurement.

#### **2. Support Smaller and More Agrobiodiverse Producers**

Smaller producers need financial support, training, simplified bureaucracy, and access to land and infrastructure to compete with larger, monocultural producers.

#### **3. Improve the Organization of Short Food Supply Chains**

Building personal relationships and collaboration among SFSC actors is crucial for resilience and success, enabling consumers to support biodiversity-enhancing farming practices.

#### **4. Improve Communication About Farming Impacts**

Clear communication about the negative impacts of monocultural production and the benefits of agrobiodiverse farming is essential to educate consumers and shift preferences.

#### 5. Increase Organic Produce in Supermarkets

Increasing the proportion of organic produce and strengthening species diversity in organic standards within LFSCs can enhance agrobiodiversity.

#### 6. Reduce the Power of Large-Scale Supply Chain Actors

Limiting the dominance of large actors and supporting smaller farms can foster agrobiodiverse food production.

#### 7. Increase Breeding Efforts for Diverse Systems

Breeding programs should focus on resilience and efficient use of agrochemicals, prioritizing species and varieties suitable for agrobiodiverse systems.

### **Work Package 4 Food governance in policies and politics**

Local embeddedness is crucial for the success of food initiatives, as seen in the Italian case where the local municipality plays a pivotal role. However, this embeddedness is weak in Norwegian and Polish cases, risking limited external impact. Civic Food Networks (CFNs) are evident only in Italy, while other cases are better characterized as Alternative Food Networks (AFNs), facing time and financial constraints. The Italian CFN also experiences power asymmetries, with dependence on municipal support. Scaling strategies vary, with Norway and Poland focusing on deep scaling by changing eating practices among members, while all cases attempt to scale up by involving wider audiences, particularly school children and youth.

### **Summary of Discussions**

The overarching objective of the FOODIVERSE project was to understand the diversity in food systems at consumer, supply chain, and governance levels. This objective was divided into several aims, which were explored through various work packages. Diversity in Food Consumption and Practices was considered in work package 2. The comparative study revealed significant differences in eating patterns and food practices across European countries. Notably, Mediterranean countries like Italy showed higher consumption of vegetables, fruits, and fish compared to Northern European countries. Socio-demographic trends also emerged, such as women and older age groups consuming more vegetables

and fruits. These differences highlight the influence of cultural, economic, and environmental factors on food consumption. This resulted in drivers and barriers for a diverse, local food system. The focus group discussions underscored the importance of local food initiatives and their impact on participants' food choices and home food stocks. However, barriers such as standardization and reduced variety in supermarkets, as well as the high cost and complexity of more diverse farming practices, were identified. Support for smaller producers, better organization of short food supply chains, and improved communication about the benefits of agrobiodiversity were highlighted as essential for overcoming these barriers. It also reveals socio-economic factors in diet diversification. The work package found that local and organic food consumption is often linked to higher socio-economic status, with income disparities most pronounced in the UK and Germany. Nevertheless, the promotion of organic food in supermarkets and strengthening varietal diversity within organic standards were seen as ways to make diverse and sustainable foods more accessible to a broader population.

Another crucial aspect of the project was the resilience through food system diversity. Enhancing agricultural biodiversity was recognized as a critical factor for resilience. Key areas for progress included increasing agrobiodiversity in public procurement, supporting smaller producers, and reducing the power of large-scale supply chain actors. The focus on organic produce and breeding efforts for species suited to diverse systems were also emphasized. The study highlighted the varying levels of local embeddedness and involvement of public actors in different countries. For example, Italy demonstrated strong local government support for food initiatives, while Norway and Poland showed weaker connections with external environments. These differences illustrate the diverse approaches and challenges faced by local food systems across Europe. The findings of this project provide knowledge on how diversity in food consumption, supply chains, and governance can contribute to more organic and sustainable food systems. The study identified drivers and barriers to developing a diverse, local food system and highlighted how socio-economic factors influence diet diversification. By promoting agrobiodiversity and supporting local food initiatives, the project aims to enhance the resilience and sustainability of food systems across Europe. This aligns with BÖL's objective to increase the share of organic farming and improve conditions in the food industry, reinforcing the role of diversity in achieving these goals.

## Expected benefit and usability of the results

This projects' core activities were based on basic research. Information can be useful for future research projects. The project took a systems approach and considered various actors who are involved in food systems. Hence, it took a rather holistic approach to the sustainability issues related to food systems. Such an approach enables reflection, informed debate and joint decision making to foster organic food

and enhance a transition towards sustainable food systems. Through direct involvement in a transdisciplinary approach, the project acknowledges the diversity of local food cultures and eating patterns as well as different provisioning systems. A harmonised approach allowed a comparative analysis that led to key insights on local food systems across Europe. In order to advance impact, FOODIVERSE produced as key innovation a 'diversification road map'. The diversification road map is designed as a comprehensive, yet easily applicable and accessible open source document addressed to wide audiences. It shows the context dependence of the different ways to address changes in the food systems. FOODIVERSE involved existing networks and food initiatives in the five participating countries. The initiatives demonstrated diverse organisational forms, from bottom up initiatives of consumers and producers, to registered organisations as well as public private partnership.

## Planned objectives compared to reached objectives and research prospect

WP 3.1: The original plan was to investigate territorial food systems using a case study approach to focus on at least three different types of local supply chains (varying in size and economic organisation). Documentation of the biological diversity of the products being sold and the extent to which this diversity is communicated to consumers. The case studies were changed to a **survey** of producers due to the fact that SFSCs are so diverse that three case studies in each country does not allow for a meaningful comparison of agrobiodiversity, either between different types of SFSC, different countries, or between SFSCs and supermarket supply chains. Surveying a larger number of SFSCs across the country would provide a more valid and interesting comparison

WP 4.2: The original work plan concerning 4.2 was changed with respect to the methodology. Instead of performing a social network analysis based on the administration of a questionnaire to local farmers, the task was based on data already retrieved from other WPs, mainly from WP5, and a confirmatory interview. However, the WP objectives and issues addressed remain unchanged.

## Future research questions/program:

The next step would be to use this data to analyse and develop methods to strengthen pro-environmental food culture, how to support agrobiodiverse SFSCs and how to support and strengthen food initiatives. Also, continuing the work within the LLs would be useful to use the momentum and proceed with the already initiated work. However, inertial forces of the currently dominating systems must be considered and taken into account. Therefore, efforts made for WP 4.1 should be incorporated and emphasized in future work.



## Summary

Current dominating food systems are largely responsible for environmental degradation and biodiversity loss. The mainstream food supply chains and their governance are characterised by a food regime that creates large quantities of standardised food. Furthermore, an instability and vulnerability of global and local food security has been shown due to the corona pandemic and ongoing climate change. More diverse food systems might be more sustainable ones, which might promote healthy and sustainable diets and advance biological, social and economic resilience. More diverse food systems might enhance food security, too.

The objective of the FOODIVERSE project was to understand the diversity in food systems at consumer, supply chain and governance levels. The living lab methodology enabled the partners to work in a real-life setting on local topics. Investigating this objective was a joint task of the University of Giessen, Germany, University of Trento, Italy, Coventry University, Centre for Agroecology, Water and Resilience, UK, Oslo Metropolitan University, SIFO, Norway and Jagiellonian University in Krakow, Poland. The project aimed to generate practice-oriented knowledge on how diversity in food consumption, novel food supply chains and food governance contributes to more organic and sustainable food systems. Furthermore, identification of the drivers and barriers for developing a more diverse, local food system was of interest as well as detecting how diversification of diets across different socio-economic groups may strengthen consumption of local and organic food and strengthen the accessibility of diverse and sustainable foods at local levels. Detecting how diversity in food systems can reinforce resilience and gaining insight on local food systems across Europe were other tasks of the project.

The FOODIVERSE project consisted of 5 Work packages: WP1 was in charge of the project management whereas WP2 investigated diverse food cultures. Here, an existing questionnaire on frequencies of eating different food products and preferences of European citizens was analysed. Furthermore, each country conducted two focus groups with consumers to investigate diversity in food consumption. In WP 3 diverse food chains were at the core of analysis. An online survey was conducted with short food supply chain farmers and a supermarket audit was conducted in 2 supermarkets of each country. One large supermarket and one budget supermarket (LIDL in all countries beside Norway). Interviews were conducted by each partner with representatives of long and short food supply chains and public catering. To analyse diverse food governance in WP4, at first, we conducted a desk research about food policies on EU level, national and local level. This was complemented with key stakeholder interviews. Furthermore, we investigated the actors' composition and relational structures of the organisations considered as living labs in WP5. The methodology consisted of a desk research considering data collected in other WPs (mainly WP5) and one confirmatory interview per country. In WP5 we

conducted 3 case studies of food networks and chose one to work with in a Living Lab and signed a letter of intent. The experimentation within the Living Lab was divided into three phases, i.e. problem definition, idea finding and acceptance finding. Based on the Living Labs, a Diversification Road Map was created which summarises key activities, experiences and recommendations.

### **1. Diverse food culture**

Work package 2 investigated food consumption diversity in Europe, focusing on organic, sustainable, and local food. Findings revealed regional variations in eating habits and perceptions, with Mediterranean countries emphasizing local sourcing and seasonal produce more than northern Europe. Ten focus groups examined diverse food cultures. Groups included participants from local food networks or frequent organic consumers. Weak ties between consumption and production were noted due to social and physical distances in the food system, impacting awareness of agro-biodiversity. CSAs were highlighted as an organizational mode favoring diversity. Diversity and flexibility in cooking practices, along with knowledge and skills related to harvesting and preparation, were deemed essential for sustainable eating within local food networks. Participants viewed organic food as a way to simplify decision-making and expressed preferences for direct purchasing from producers. Participants expressed a desire to shift towards smaller local stores for more accessible local, organic, and sustainable food options in their everyday lives.

### **2. Diversity in Modes of Organization and Coordination:**

Work package 3 explored diversity in modes of organization and coordination within food systems. Short Food Supply Chains (SFSCs) were found to support higher levels of agrobiodiversity compared to mainstream long food supply chains (LFSCs). SFSCs offered greater varietal and species diversity, as well as ecosystem biodiversity, and were seen as more conducive to agrobiodiversity across all countries. Mainstream LFSCs faced barriers to agrobiodiversity due to prioritization of cost minimization and infrastructures designed for large-scale production. Increasing agrobiodiversity involved overcoming challenges such as tight budgets and logistical constraints.

### **3. Diversity in Food Governance:**

Work package 4 examined diversity in food policies and politics. Regulatory uniformity in Europe interacted with local factors to shape diverse outcomes in agrifood systems. National land property regulations and economic challenges influenced transitions to sustainable food systems. The analysis also highlighted open, democratic organizational structures in food initiatives, with distinct internal setups and scaling strategies. However, these initiatives faced obstacles such as infrastructural

limitations and economic constraints, impacting their ability to meet objectives for sustainable food systems.

#### **4. Living Labs:**

Work package 5 created local Living Labs, working with existing structures. It emphasized the role of alternative and civic food networks for sustainable food systems. These networks, rooted in the local context and promoting inclusiveness and citizen empowerment, offer solutions as alternatives to the dominant food system. The distinction between alternative and civic food networks points to different mechanisms for influencing the transformation of the food system. The summary of key Living Lab activities, experiences, and recommendations was published as a Diversification Road Map.

## References

- EAT-Lancet (2019) Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems, *The Lancet*, 393 (10170): 447-492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- European Commission (2009) Living Labs for User-Driven Open Innovation: An Overview of the Living Labs Methodology, Activities and Achievements, January 2009. Luxembourg: EUR-OP. <https://op.europa.eu/en/publication-detail/-/publication/3f36ebab-4aaf-4cb0-aada-fe315a935eed>
- Gaitán-Cremaschi, D, Klerkx, L, Duncan, J et al. (2019) Characterizing diversity of food systems in view of sustainability transitions. A review. *Agron Sustain Dev* (2019) 39: 1. <https://doi.org/10.1007/s13593-018-0550-2>
- Halkier, B, Holm, L, Mafalda, D et al. (2007) Trusting, Complex, Quality Conscious or Unprotected?: Constructing the food consumer in different European national contexts. *J Con Cul* 7(3): <https://doi.org/10.1177%2F1469540507081629>
- IPES-Food (2015) The new science of sustainable food systems: over-coming barriers to food systems reform. First Report of the International Panel of Experts on Sustainable Food Systems. [http://www.ipes-food.org/\\_img/upload/files/NewScienceofSusFood.pdf](http://www.ipes-food.org/_img/upload/files/NewScienceofSusFood.pdf)
- IPES-food (2016) From Uniformity to Diversity: A paradigm shift from industrial agriculture to diversified agroecological systems. International Panel of Experts on Sustainable Food systems. [http://www.ipes-food.org/\\_img/upload/files/UniformityToDiversity\\_FULLL.pdf](http://www.ipes-food.org/_img/upload/files/UniformityToDiversity_FULLL.pdf)
- Johnston, J & Goodman, M (2015) Spectacular Foodscapes. Food Celebrities and the Politics of Lifestyle Mediation in an Age of Inequality. *Food, Culture & Society*, 18(2): 205-222. <https://doi.org/10.2752/175174415X14180391604369>
- Kjærnes, U Harvey, M & Warde, A (2007) *Trust in Food - A Comparative and Institutional Analysis*. London: Palgrave.
- Kneafsey, M, Venn, L, Schmutz, U et al. (2013) Short food supply chains and local food systems in the EU: A state of play of their socio-economic characteristics. European Commission. <https://doi.org/10.2791/88784>
- Mikkelsen, BE (2011). Images of foodscapes: Introduction to foodscape studies and their application in the study of healthy eating out-of-home environments. *Perspectives in Public Health*, 131(5):209–216.
- Vittersø, G; Torjusen, H; Laitala, K et al. (2019a) Short Food Supply Chains and Their Contributions to Sustainability: Participants’ Views and Perceptions from 12 European Cases. *Sustainability*, 11(17), <https://doi.org/10.3390/su11174800>
- Vittersø, G.; Torjusen, H.; Thorjussen, C. B. H.; Schjøll, A.; Kjærnes, U. (2019b) Survey on Public Opinion in Europe regarding contentious inputs – a report. Deliverable 2.2. Organic PLUS - Pathways to phase-out contentious inputs from organic agriculture in Europe 2019.
- von Wirth, T; Fuenfschilling, L; Frantzeskaki, N & Coenen, L (2019) ‘Impacts of Urban Living Labs on Sustainability Transitions: Mechanisms and Strategies for Systemic Change through Experimentation’. *European Planning Studies*, 27(2):229–57. <https://doi.org/10.1080/09654313.2018.1504895>

## Overview of all publications on the project

Press releases were published in the beginning of the project by the partners to inform the local public about the project.

Six newsletters were distributed. The homepage was updated and fed with information regularly and the Diversification Road Map (DRM) was created and uploaded on the homepage as well. A print version of the DRM is also available since 06.2024.

Current events were reported on the X account of the project.

In various conferences the project was presented with the results and information which were available at that time. To disseminate the information a special issue is agreed with the “International Journal of the Sociology of Food and Agriculture”. Further, scientific paper are planned to be published in various journals.

### Scientific articles for the special issue:

- Wahlen, Kopczynska: Editorial: Characterising diversity in food systems – an introduction to the special issue
- Brunori: Factoring food systems diversity in EU agriculture law
- Forno, Giovannini, Kopczynska: Impacting conventional foodways: diverse scaling strategies in Alternative Food Networks
- Stepnik, Kopczynska: Alternative and Civic Food Networks as the bases for Living Labs: opportunities and challenges
- Evans, van Kesteren: Mapping agrobiodiversity in European food systems: a comparison of supermarket and short food supply chains.
- Torjusen, Vittersø, Kuraj: Understandings and practices of ‘good food’ among members of organic and local food networks in five European Countries
- Wahlen, Torjusen, Vittersø, Kuraj, Forno, Giovannini, Mahr: Bio-Cultural Diversity and Good Food Conventions. A Comparative Analysis across three European countries
- Mahr, Brunori, Stepnik: Sound interdisciplinarity for better transdisciplinarity. How to use diverse researchers’ experiences to better cooperate with stakeholders in rural areas.

Further articles (planned, in progress, submitted/published):

Brunori M, “Looking for a compass for navigating interdisciplinary seas”, *Ragion Pratica*, fasc.1/2023, pp 239–250.

Brunori M, “Agricultural diversity: unfolding the concept in EU law”, *Rivista di Diritto Agrario*, fasc. 4/2022, pp 628–649.

Forno, F., & Andreola, M. (2022). Il progetto Nutrire Trento: evoluzione e aggiornamento dell’esperienza. *Re| Cibo*, 1(2).

Giovannini, M., & Forno, F. (2023). Doing transdisciplinary action research: A critical assessment of an Italian lab-like sustainable food initiative. *Journal of Entrepreneurial and Organizational Diversity*, 12(1), 75-84.

Giovannini, M., Forno, F., & Magnani, N. (2023). Practicing sustainable eating: zooming in a civic food network. *Agriculture and Human Values*, 1-13.

Carrieri de Souza M, Rover OJ and Forno F (2023) Food Networks and Agroecology in the Province of Trento – Italy. *Front. Sustain. Food Syst.* 7:1130082. doi: 10.3389/fsufs.2023.1130082

Evans, van Kesteren, Kneafsey, Schmutz (forthcoming) Bioeconomic diversity: Rethinking the connections between biodiversity and the economic organization of food provisioning. *Environment and Planning E: Nature and Space*

Mahr: From biodiversity to biocultural diversity at the table. In progress. *Food, culture and society*.