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## Sustainable Transformation of Food Distribution Systems – Research and Practice in a Transdisciplinary Discussion

**Results from a conference session on „Sustainable Food Systems“  
at the 7th Annual STS Conference Graz from 7th–8th May 2018**





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# Sustainable Transformation of Food Distribution Systems – Research and Practice in a Transdisciplinary Discussion

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from 7<sup>th</sup>–8<sup>th</sup> May 2018**

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## Zu diesem Text

Die transdisziplinäre Zusammenarbeit mit gesellschaftlichen Akteuren ist ein richtungsweisender Trend der Nachhaltigkeitsforschung. Betrachtet man jedoch die konkrete Praxis bei wissenschaftlichen Konferenzen und Publikationen, so bleibt die Einbeziehung nichtwissenschaftlicher Akteure marginal. In diesem Artikel werden Reflexionen und Ergebnisse einer Konferenzsession diskutiert, die explizit als transdisziplinärer Dialog zwischen Forschung und Praxis über nachhaltige Lebensmittelverteilungssysteme konzipiert wurde. Die Session war Teil der 17. Grazer STS-Konferenz mit dem Titel „Critical Issues in Science, Technology and Society Studies“ im Mai 2018. Im folgenden Artikel dient uns die multi-level Perspektive (MLP) auf soziotechnische Transitionen als theoretischer Rahmen. Als praktische Beispiele für alternative Lebensmittelverteilungssysteme fungieren die Nischenphänomene „Zero Waste Shops“, „Community Supported Agriculture (CSA)“ und „Foodcoops“. Transdisziplinäre Zusammenarbeit und Co-Autorenschaft ernstnehmend, wurde der Artikel zusammen mit zwei Akteuren aus Nischen geschrieben, die ihre eigenen Standpunkte und transformativen Visionen einbringen (Jenny Fuhrmann für Zero Waste Stores und David Steinwender für CSA).

*Keywords: Transdisziplinarität, Multi-Level Perspektive (MLP), Versorgungssysteme, Solidarische Landwirtschaft (CSA), Zero Waste, Nachhaltigkeitstransformationen*

## About this text

Transdisciplinary collaboration with societal actors is a major trend in sustainability research. However, looking at the concrete practice regarding scientific conferences and publications, the inclusion of non-scientific actors remains marginal. Going one step further, this paper provides reflections and results from a conference session which was explicitly designed as a transdisciplinary dialogue between research and practice, regarding sustainable food distribution systems. The session took place at the “17th Annual STS Conference – Critical Issues in Science, Technology and Society Studies” in Graz in May, 2018. In our paper, we use the multi-level perspective (MLP) on socio-technical transitions as a theoretical staging, while the niche phenomena of “zero waste shops”, “community supported agriculture (CSA)” and “foodcoops” serve as practical examples of alternative food distribution systems. Taking transdisciplinary collaboration and co-authorship seriously the paper was written together with two practitioners of these niche innovations (Jenny Fuhrmann for Zero Waste Stores and David Steinwender for CSA) who contribute their points of view and transformative visions.

*Keywords: Transdisciplinarity, Multi-Level Perspective (MLP), Supply Systems, Community Supported Agriculture (CSA), Zero Waste, Sustainable Transformations*

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# 1 Introduction

The dominant industrialised food system is based on high consumption of material resources and energy, enforcing different sustainability problems like resource scarcity, climate change and marine litter. In this paper, we deal with the question of how transformations of the established food system regime are possible in order to reduce resource consumption with focus on the reduction of packaging and food waste. In the last years, several ideas for alternative forms of food production, distribution and consumption were developed and practiced in society. However, many of these attempts stuck to societal niches, being too radical to become part of the mainstream food system. Yet, the question remains: what are the strategies to successfully up-scale these niche ideas in order to transform the current food system? The aim of this paper is to discuss three niche phenomena and their ambition and potential of transforming the current regime. We use the multi-level perspective on socio-technical transitions as theoretical staging for our analysis. The niche phenomena of “zero waste shops”, “community supported agriculture (CSA)” and “foodcoops” served as practical examples of alternative food distribution. We draw on results of a transdisciplinary session on sustainable food distribution systems at the “17<sup>th</sup> Annual STS Conference – Critical Issues in Science, Technology and Society Studies” in Graz, 2018. Our aim of the session was to enhance a transdisciplinary discussion on sustainable food distributions systems. For this purpose, we connected researchers, investigating alternative practices, with practitioners and activists, engaged in doing and propagating these practices. The first part of the session consisted of presentations from researchers on different topics ranging from food waste, and consumer behaviour to packaging in supermarkets, followed by inputs from a zero waste store entrepreneur and a CSA activist (for an overview of the presentations including abstracts see the Annex). The second part was held as workshop in a world café format, in which the niches were discussed with regard to consumer preferences and mainstreaming. Besides social scientists, participants of the session were either zero waste store entrepreneurs, activists of community supported agriculture or foodcoop practitioners.

Below, we outline the theory of a multi-level perspective (MLP) on socio-technical transitions and explain the central notions of “socio-technical-landscape”, “socio-technical regime” and “niche innovation” along case examples from the presentations. In section three we discuss results from the world café, with focus on questions discussed at the two tables. Section four gives space to entrepreneurs and activists to explain and outline their vision of a sustainable transformation. We conclude the paper with an overall discussion.

## 2 Theoretical input: socio-technical transitions and the multi-level perspective

The aim of the conference session was to fathom possible pathways to a sustainable transformation of food systems, and hence, it is useful to define a common ground for what we mean by the term “sustainable transformation of food systems”. In this regard the multi-level perspective on socio-technical transitions<sup>1</sup> (see Geels 2002, Geels and Schot 2007, Geels 2011) provides an applicable basis.

From our point of view, the term fulfils two requirements of transdisciplinary research: first, it provides a profound and tested framework for empirical analyses of sustainable transitions. Second, the three level approach of landscape, regime and niche is not too complicated or abstract to be intelligible also for societal actors like transition activists and practitioners in the food system. The theory therefore is suitable for transdisciplinary research.

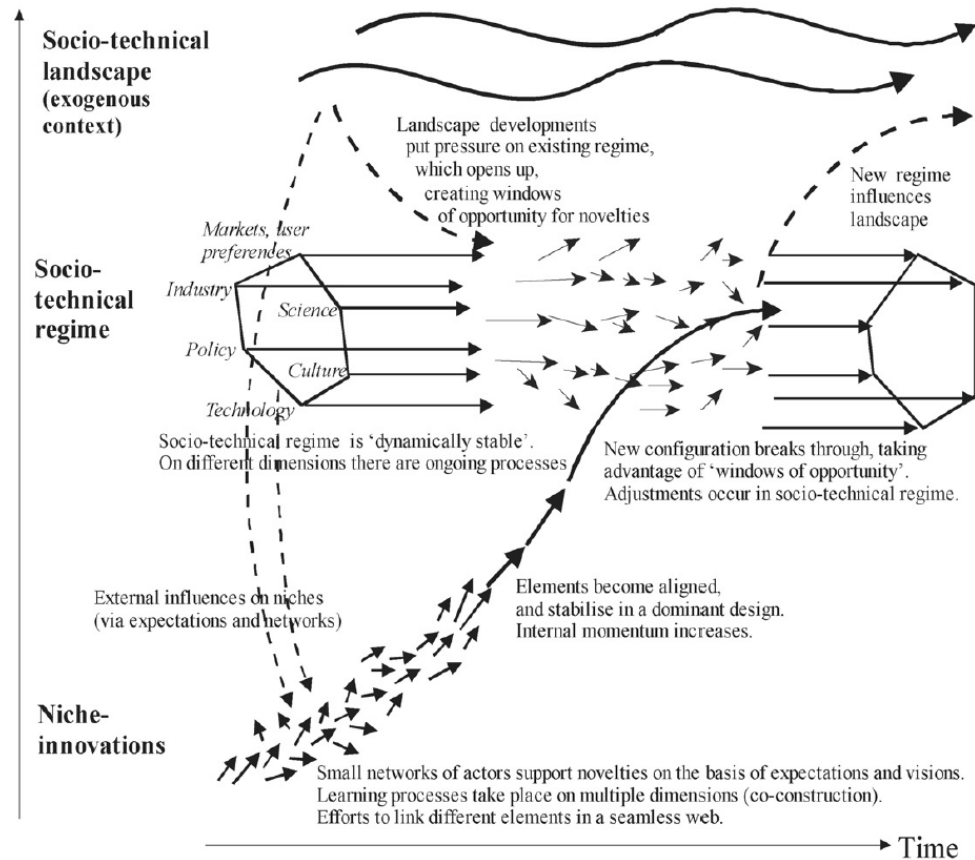
In short, the multi-level perspective on socio-technical transitions (MLP) is a middle-range theory that conceptualizes overall dynamic patterns of socio-technical transitions. Such transitions are defined as major, long-term socio-technological changes in the way societal functions are fulfilled. Socio-technical transitions do not only involve changes in technology, but also changes in user practices, regulation, industrial networks, infrastructure, and symbolic meaning or culture. The MLP views transitions as non-linear processes that result from the interplay of developments at three analytical levels: niches at the lowest level (the locus for radical innovations), socio-technical regimes as middle level (the locus of established practices and associated rules that stabilize existing systems), and an exogenous socio-technical landscape at the highest level. Each ‘level’ refers to a heterogeneous configuration of elements, where ‘higher’ levels are more stable than ‘lower’ levels in terms of number of actors and degrees of alignment between the elements. The level of socio-technical regimes is central to the theory, because transitions are defined as shifts from one regime to another. The niche and landscape levels can be seen as ‘derived concepts’, as they are defined in relation to the regime: the “niche” as practices or technologies that deviate substantially from the existing regime, and the “landscape” as external environment that influences interactions between niche(s) and regime (Geels 2011). Figure 1 shows a graphical model of MLP, focussing on interactions and dynamics between processes at the three different levels. It shows how alternative niche elements can take root in the socio-technical regime, if wider landscape developments put pressure on existing

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<sup>1</sup> We prefer the term “transformation” for the description of fundamental and systemic changes of socio-ecological systems while the term “socio-technical transition” is used to describe shifts in relevant socio-technical regimes which are part of these bigger systems. Frequently, however, the terms transformation and transition can not be separated accurately.

regime configurations. If such windows of opportunity for change exist, the socio-technical regime may change fundamentally, leading to a new kind of regime.

Increasing structuration  
of activities in local practices



*Figure 1: the multi-level perspective on socio-technical transitions  
(Geels and Schot 2007: 401)*

However, such transitions of socio-technical systems are not per se sustainable. MLP claims that sustainable transitions have some characteristics which distinguish them from other historical transformations. First, they are normative and oriented to the collective good sustainability. In this sense, they address concrete and persistent environmental problems. Sustainability, however, is a contested concept and there is disagreement and debate about the directionality of sustainability transitions. This disagreement is fuelled by the fact that sustainability as a collective goal often competes with other goals, especially with economic price-efficiency. It is therefore unlikely that environmental innovations will be able to replace existing systems without changes in economical and political frame conditions (located at the landscape level). These considerations imply that sustainability transitions are necessary for interactions between technology, policy, economics and culture (Geels 2011).

In the following, we will explain the different levels of the model in more detail. Thereto, we will use highlights from the conference presentations on food supply systems that formed the first part of our conference session.



## 2.1 Socio-technical landscape

The socio-technical landscape forms the wider context, which influences niche and regime dynamics. It comprises not only the technical and material backdrop that sustains society, but also includes demographical trends, societal values, political ideologies and macro-economic dynamics. The landscape level usually changes slowly, and in the short run, cannot be influenced by actors at niche and regime levels (Geels 2011).

In the conference session, the presentation “Food waste measurement and prevention in Hungary” by Eszter Doma, Barbara Szabó-Bódi, Dávid Szakos and Gyula Kasza (2018) showed examples for landscape dynamics. Their findings demonstrate demographic differences on the amount of food waste in Hungarian households influenced by the ongoing impact of historical changes in the post war generation and of Hungarian communism. Their data shows that participants between the ages of fifty and sixty, and older than sixty (post-war generation) have a strong waste-avoidance attitude. This can be explained by previous scarcity, hence fresh food remains to be of high value to these generations. Besides such historical influences, the data also exposes differences in food waste production between groups of different income class or place of residence. Figure 2 shows the amount of avoidable food waste by several demographic groups. Potential transition strategies for food waste reduction have to consider these landscape dynamics and demographic influences.



Figure 2: Demographic differences in food waste production (grams/week/capita): comparison of different groups (Doma et al. 2018)

## 2.2 Socio-technical regime

The socio-technical regime consists of several dimensions (comprising technology, industry, culture, politics, science, markets and user preferences) which form the structure that accounts for the stability of an existing socio-technical system. This means that the socio-technical regime refers to a set of rules (within different dimensions) that orient and coordinate activities of social groups and that reproduce various elements of socio-technical systems. These regime rules are both medium and outcome of action: on the one hand, actors enact, realise and draw upon rules in concrete and local practices. On the other hand, rules also determine actors and their practices. Examples of regime rules are: “cognitive routines and shared beliefs, capabilities and competences, lifestyles and user practices, favourable institutional arrangements and regulations, and legally binding contracts” (Geels 2011: 27). Because existing regimes are characterized by lock-in mechanisms, regime innovation normally occurs incrementally. That means that small adjustments and variations accumulate into stable trajectories. These trajectories occur in all dimensions of the regime but also interrelate: science, technology, politics, markets, user preferences and cultural meanings have their own dynamics, coordinated by different sub-regimes, but are also interdependent and co-evolve with each other. The idea of socio-technical regimes captures these dynamics of meta-coordination between different sub-regimes. As an assemblage of these interrelating dimensions it structures and stabilises socio-technical systems (Geels 2011).

An example for a socio-technical regime was provided by Lukas Sattlegger (2018) in the presentation of his ethnographic research in an Austrian supermarket. He showed how the technology of packaging is acting as *code of practice* for handling products in the supermarket. As intermediating technology, packaging is essential for the practical organisation of the supermarket and its logistics. For example, packaging provides structure and reference for the identification, presentation, placement and quality of products. Thereby, the use of packaging including barcodes, labels, product numbers and statistics forms important regime rules in mainstream food retailing, rules that cannot be easily left out. Packaging as a socio-technical regime acts as a stabilising frame for a variety of practices within the food system. Figure 3 shows different types of packaging used in a supermarket warehouse: primary product packaging and secondary packaging such as cardboard boxes or returnable beverage crates, eurolallets and wrapping foil. Niche innovations aiming to avoid the use of packaging are not easily compatible to mainstream food supply systems, as they are in conflict to rather stable regime rules.



*Figure 3: supermarket warehouse (Sattlegger 2018)*

## 2.3 Niche innovations

Niches are ‘protected spaces’ such as Research & Development laboratories, subsidised demonstration projects, or small market niches where users have special demands and are willing to support emerging innovations. Niche actors develop radical innovations which differ from the existing regimes. They hope that their innovative novelty will eventually be used in the regime and replace former structures of the regime. Barriers for innovations are lock-in mechanisms or a mismatch with regime dimensions regarding infrastructure, regulations or consumer practices (Geels 2011).

Niches are crucial for transitions, as they provide the seeds for systemic change. They gain momentum if their expectations become clearer and broadly accepted, if their learning processes result in a more stable configuration of design, and if they build larger networks and collaborations, especially towards powerful actors. Three processes of niche development are crucial (Geels 2011: 28):

- 1) “The articulation (and adjustment) of expectations or visions, which provide guidance to the innovation activities, and aim to attract attention and funding from external actors.”
- 2) “The building of social networks and the enrolment of more actors, which expand the resource base of niche-innovations.”

3) “Learning and articulation processes on various dimensions, *e.g.* technical design, market demand and user preferences, infrastructure requirements, organisational issues and business models, policy instruments, symbolic meaning” (Geels 2011: 28).

In the presentations, two niche innovations were discussed in detail: community supported agriculture (CSA) introduced by David Steinwender (2018) and zero waste shops which were presented by Sarah Reindl (2018) and Melanie Kröger (Kröger et al. 2018a).

Community-supported agriculture is a system which connects the producer and consumers within a food system more closely, by allowing the consumer to subscribe to the harvest on a certain farm or group of farms. CSA is characterised by sharing the harvest (season based price) as well as the risks of agricultural production. It often is connected to various community activities that reach beyond consumption practices. As a niche its organizational structures, modes of production, and value chains differ fundamentally to mainstream agriculture. They are characterised by a stronger focus on societal, cultural, ecological and ethical values (Steinwender 2018).



*Figure 4: community supported agriculture – Biohof Kleine Farm, Austria  
(Steinwender 2018/kleinefarm.org)*

Zero waste stores are small shops which sell (mainly organic) food and non-food items without non-returnable packaging (using bulk containers and/or multi-way packaging). Zero waste stores attempt to change the dominant food regime by a radical reduction of packaging. They aim to reduce the resource consumption of food supply in general and the amount of packaging and plastic waste in particular (Kröger et al. 2018a).





*Figure 5: zero waste store (Kröger et al. 2018a)*

### 3 World café discussion: strategies for sustainable transformations of socio-technical regimes

In two world cafés, we connected researchers with practitioners and activists to discuss practical challenges for sustainable transformation (see Figures 6 and 7). The participants were two zero waste shop entrepreneurs, two foodcoop practitioners, one CSA activist and eight social scientists. At the two tables, we discussed the following questions:

- “How can niches become more accessible for consumers with different social backgrounds?” (Table 1)
- “What strategies for mainstreaming the niche innovation exist and what role science can play in this transformation?” (Table 2).

The discussion was followed by a round-up discussion with all participants where results were presented and jointly discussed. In the following, we present the results of each table and discuss them in relation to the MLP theory.



*Figure 6: discussion on accessibility at table 1 (© STS Unit - TU Graz)*



*Figure 7: discussion on upscaling at table 2 (© STS Unit - TU Graz)*

### 3.1 The role of consumers in the sustainable transformation of food supply systems (Table 1)

Here we discussed the power of consumers for sustainable transitions of socio-technical systems, as well as the possibilities and limitations of consumer organised food supply networks, such as foodcoops and community supported agriculture (CSA). Looking at the MLP model, we talked about two different dynamics that may foster the transforming power of consumers:

First, consumers may put pressure on existing regimes, if they are challenging dominant regime rules. In MLP “user preferences” (see Figure 2) are stated as one dimension of regimes. Thereby, one way to change the dominant regime is based on market mechanisms of demand and supply. However, there was broad agreement in the group that this kind of market power is limited, as consumers can only choose between certain available options, often lacking real alternatives to the existing food regime. In many cases, consumers do not have sufficient resources (*e.g.* time, money, information) to question existing regime rules. Moreover, consumers are actively manipulated by the lobbying and marketing of dominant regime actors. Another barrier for demand driven changes of food supply systems is the fact that unsustainable consumption is not only driven by private end-consumers, but also other sectors of society (*e.g.* public procurement or industry). Certain options for strengthening sustainable consumption were discussed, and education was considered to be particularly important for enhancing consumer power. Specific importance was given to more practical and hands-on forms of learning, and direct experience of sustainable alternatives. Here, potentials of digitalisation and gamification for providing a medium for practical learning of skills and competences for sustainable consumption were discussed. Within the group valuations differed between technology-optimistic ideas of sustainable digitalisation, and more sceptical voices which emphasised the need of returning to more traditional and elementary technologies. Following the later, practical learning cannot be provided by digitalisation, but rather has to be provided by a closer connection to nature and plants. This strengthens the importance of do-it-yourself gardening, cooking and food preserving in education.

Second, consumers may not just act via markets, but actively take part in niche developments. In doing so, they can help to develop bottom-up alternatives to existing regime structures. The participation in alternative food networks like foodcoops and CSAs is an example for this type of consumer power. In this regard we discussed the influence of landscape and regime developments for the establishment of such niche innovations. The spread of foodcoops in Vienna provided the initial point for this discussion. This example shows how a niche innovation may gain momentum through a crisis in the mainstream food market: the “horse meat scandal” of 2013, including associated public and media attention for alternative food systems, boosted an exponential growth of consumer-organised foodcoops in Vienna. Counting only a few in 2013, now more than twenty different foodcoops spread all over Vienna. For the world café participants, such moments of crisis in dominant regimes were clearly

seen as an opportunity for niche innovations. However, it was stated that realizing such opportunities also requires political activism. A crisis can only provide windows of opportunities for niche innovations, if critical actors actively pay attention to grievances and possible alternatives.

The discussion hardly connected the two mentioned forms of consumer power (market preferences & self-organisation). A critical issue for sustainable transformation was seen in this gap between alternative niches and mainstream consumers. There is need for a closer connection of radical niche innovations and the market based consumer power. To this end, niche concepts like foodcoops and CSAs need the involvement of broader consumer groups with different social backgrounds to gain momentum. Without the involvement of new groups, these niches often stay too small to put pressure on dominant regimes. It is a challenge for many niche innovations to be more accessible for new people without losing their transformative claim.

The dispute between different strategies for transformation was also present. It appeared at some points that the reformative ideas of education and science, and the more radical requests of some niche activities were antagonizing, instead of fruitfully joining. To strengthen these connections and interactions between different actors was identified as a crucial precondition for promoting sustainable transformations of food supply systems. Alternative concepts and niche innovations need to build networks and collaborations for their sustainability and establishment. Questions of mainstreaming niche innovations were discussed in more detail at the second world café table.

### **3.2 Strategies for up-scaling the niche innovation of zero waste shops (Table 2)**

Here, strategies for up-scaling the niche innovation of zero waste shops were discussed. In relation to MLP theory we looked at the articulation of visions, the building of social networks, the enrolment of more actors, as well as processes of learning.

A crucial process for social niches to take root in a dominant regime is the articulation and adjustment of visions. As the discussion showed, zero waste shop entrepreneurs are not a homogeneous group regarding their vision. However, most of them are driven by the motivation to provide an alternative way of consuming to oppose the current regime dominated by large supermarket chains. The extent of this ambition ranges from solely providing packaging free and organic products to promoting a zero waste lifestyle through education materials, workshops and public events. In the latter case, the provision of information on the production and distribution of products and the education of customers on overall sustainability issues is central, yet the vision of how to transform the current regime differs. While some pragmatically aim at mainstreaming zero packaging, *e.g.* by having a packaging-free corner in conventional supermarkets, others are driven by ideological critique of the exist-



ing production and consumption system, and aim for a total regime change. It became clear that visions among shop owners differ significantly and that no lobby with a common vision exists, yet. Since the number of shops is increasing and a research project has initiated a networking platform for the exchange of business models and market demands (Kröger et al. 2018b), a growing network of shop owners can be anticipated for the future.

This is in accordance with the second MLP strategy of building social-networks and enrolling more actors such as scientists and supermarkets. The idea to collaborate with conventional supermarkets was assessed as a good option for some entrepreneurs. The challenges, however, include both organisational and infrastructural requirements: *e.g.* having a packaging-free corner in a supermarket affects not only the display but also the supply chain. This requires infrastructural change of the supermarket regime, as conventional supermarkets lack storage possibilities for packaging-free products. Here, the infrastructure and the set of rules of the existing regime have yet to change. For niche entrepreneurs, the option of supplying packaging-free solutions to supermarkets is challenging, due to lacking large-scale supply-capacity so far.

We discussed, with regard to the process of “learning and articulation” user preferences and business models: the targeted consumer groups range from consumers who have a high ecological awareness and want to consume differently (but are not ambitious enough to obtain their food from foodcoops or CSA), to more traditional consumers without transformative visions who just want reduce their packaging waste. One argument in the discussion was that zero waste shops often appear as fancy and luxury, which can discourage certain consumer groups from shopping, as they may think such stores only provide expensive organic food. It was also discussed how to anticipate the needs of “normal people”, as one participant called it. The business model that incorporates a small zero waste shop and a bigger zero waste supermarket was discussed as a strategy to target different user preferences and to create different shopping opportunities with different symbolic meaning. Sarah Reindl, founder of the zero waste store in Graz, recently opened a second shop with a slightly different focus, aiming to gain new consumer groups. While the first store “Das Gramm” is completely organic, “Dekagramm” is more oriented towards classical supermarkets, actively addressing more mainstream consumers by providing cheaper and also non-organic products in bulk. Another alternative business model is a delivery service, supplying packaging-free products to households and offices, as it is done by the zero waste shop gramm.genau in Frankfurt. In this case, delivery costs are lower, as there is no shop rent. By discussing these different business models, we concluded that sustainability is always associated with compromise in order to survive given market conditions.

In a second step we addressed the role of science in transformation processes: the niche phenomenon “zero waste store” is an attractive topic for Bachelor and Master theses with would include a high number of consultations of zero waste shop entrepreneurs. This liaison, however, results in high management efforts. Subsequently,

we discussed the usefulness of a future communication manager who would coordinate requests and topics among all zero waste shop owners. Shop entrepreneurs pointed out that researchers tend to focus on shop and consumers perceptions, while information on product sustainability, *e.g.* the CO<sub>2</sub> footprint, alternative materials, etc., are needed more urgently. Nevertheless, especially entrepreneurs who emphasized the education of consumers assessed the cooperation with researchers as important: research offers a way to generate knowledge on products and processes to inform the consumer in a better way.

In summary, different strategies and business models exist for up-scaling. Nevertheless, the current regime is still quite stable, since the niche innovation of zero waste stores has yet to unfold its full power. Research can provide information for the entrepreneurs and for the wider society to support the niche and to enhance consumers' awareness.

## **4 Transformative visions – conclusions from niche practitioners**

As chapter three showed, there are different pathways for a sustainable transformation of food supply systems. As a transdisciplinary endeavour, we involve practitioners not only in the process of data collection, but provide space for their own articulation. In this section, two participants of our World Café express their visions about the future of niche innovations. They use the discussions within the conference session as starting point to reformulate their own visions and perspectives for a sustainable transformation of food supply. This is done in regard to their own projects (Biohof Kleine Farm/gramm.genau), as well as the broader niche concept they are part of (CSA/Zero Waste Stores).

### **4.1 Community Supported Agriculture (David Steinwender)**

#### **About “Kleine Farm”**

Kleine Farm (German for “small farm”) is a colourful island of diversity in southern Styria about 30 km south of Graz. We cultivate and preserve over 400 old and seed-solid vegetable varieties, many old fruit varieties, herbs, cereals and flowers. The closing of cycles and the creation of a diverse farm organism is a central motive for the work at Kleine Farm. The focus of our work is the living – plant, soil, animal and human – whose health we maintain and promote through careful farming. Kleine Farm is community-based agriculture (CSA), which means that the farm community accepts joint responsibility for costs, risks and harvest. On one hand this responsibility is financial – the harvest dividers guarantee the acceptance of the harvest and pre-finance the associated costs. On the other hand, the community participates in the life of Kleine Farm through active action and helps to shape the organisation of

CSA (see <http://www.kleinefarm.org>). For example, Kleine Farm organizes several courses on different topics with regard to farming (e.g. on heirloom varieties, biodiversity and practical skills like food preservation) for the CSA-members and externals each year. They also offer summer camps for school classes, where traditional and elementary technologies and the contact to nature are used as education approaches, rather than digitalisation or gamification (see section 3.1).

## Our vision

The basic idea of CSAs is to envision a resilient (sustainable and just) food system by establishing direct producer-consumer-relations. This includes the possibility of co-determination in farming and distribution practices, having a payment system that allows risk sharing among the consumers, as well as the decommodification of food. To understand this vision, this chapter introduces two main concepts: *food sovereignty* and *food justice*, as well as a basic instrument at communal level: *food councils*. CSA and different kinds of cooperatives have a crucial role in that vision.

*Food sovereignty* is a concept proposed by *La Via Campesina* – a global social movement consisting of several organizations of peasants, fisherfolk, indigenous peoples, landless people, consumers and many more – which was first introduced at the World Food Summit in 1996 and has since been developed further. The basic idea of food sovereignty is to gain and ensure democratic control and co-determination of how food is produced, supplied and consumed at all levels from local to global, e.g. with regard to policy-making, food subsidies, agriculture and adjoining matters. Food has been conceptualized as a basic human right and not as a commodity (see Declaration for Food Sovereignty 2007).

*Food Justice* is a concept that focusses on communities and is “the right to grow, sell, and eat healthy food”, whereby healthy means “fresh, nutritious, affordable, culturally-appropriate, and grown locally with care for the well-being of the land, workers, and animals” (both: Just Food 2018).

*Food councils* are considered as basic instrument to ensure food sovereignty and food justice. *Food councils* are boards or committees, respectively, of different private and public actors who are concerned with food (e.g. farmers, suppliers, consumer groups, NGO’s, and public authorities) in related issues (e.g. actors from social, cultural and health sector). These boards can have different initial points (generally bottom-up), degrees of institutionalization (mostly at city or county scale), and composition of actors and missions (for details e.g. see Stierand 2018). In Germany, food councils (“Ernährungsräte”) are already widely spread. , In Austria there are only two initiatives, in Vienna and Innsbruck, which are working on the institutionalization of food councils. Small CSA projects such as “Kleine Farm” can be linked through, and act via, such councils.

## Transformative potential

Mainstreaming and up-scaling food provision schemes like CSA or foodcoops (see section 3.2) have potentials but also limits. First, foodcoops and CSA – at least with regard to Austria – avoid becoming too big. For example, limiting the number of members per foodcoop can explain the increased number of foodcoops in Vienna. Another reason is the attempt to avoid anonymity and free-riding, and to enable social connection. The same is true for CSAs. It can be argued, however, that in defined areas, the number of initiatives needs to be limited due to the market saturation. If not, this could lead to competition among, and an on-going commercialization of foodcoops and CSAs, which happened to CSAs in the U.S.A. Big companies used the concept and name of CSAs as a marketing strategy to provide local food to their customers, since the term community supported agriculture is not protected. These enterprises hijacked the idea of producer-costumer-connections, provided online order box schemes and middle-men logistics (see *e.g.* Moskin 2016). For community based food supply and community based schemes the tension between up-scaling and satisfying the values of food sovereignty is a crucial issue.

Nonetheless, there is still an opportunity for CSA to up-scale or to attract more people/consumers by adopting the CSA-concept of France, called *AMAP* (Association pour le maintien d'une agriculture paysanne; *engl.* association to maintain peasants farming). In German speaking countries, most CSAs are specialized in vegetables (and in certain cases some fruits; livestock is rather an exception), whereas an AMAP can consist of a group of different producers offering a complete assortment – depending on the specific AMAP. Thus, AMAPs can be seen as a combination of foodcoops and CSAs. This type of food distribution could be used to address a broad range of user preferences. It would have a bigger impact on the food regime, since a complete assortment can contribute to 'shopping comfort' and thereby attract other types of consumers. Rather than keeping an informal base or the legal form of an association, co-operatives (in Germany/Austria: Genossenschaft) might be an adequate legal form up-scale CSA or foodcoops in terms of membership. However, the size of an AMAP should still be able to maintain personal relationships. The Austrian organic wholesaler "BerSta" (operating as a co-operative of organic farmers) might be an example of successful upscaling with regard to organic food provision. Following Huntley (2016) it can be argued that CSAs might need to adapt and become more consumer-centred in order to keep attractive.

Networking among CSA producers is also a very important aspect in order to improve their work, to exchange practical experiences and talk about legal issues, as some aspects of CSAs are in the legal grey area (*e.g.* voluntary support on the farm, such as weeding, etc.). Thus, networking and learning is crucial – but time is a rare good for CSA-farmers. Networks of CSAs in Austria have been established in several ways – nationally and internationally. *CSA4EUROPE* was a European project (Life-long-Learning-Programme) in order to support the establishment of CSAs. The Austrian food sovereignty movement, which is also politically engaged at national and

in some cases at a local level, has been a very important support network of different actors and NGO's. International exchange has also been organized via *Nyéléni Europe* (the name of the European Food Sovereignty Movement).

Since niche initiatives like CSA or foodcoops may operate in the grey zone of the legal system, they are vulnerable to legal or political oppression, when challenging the regime or regime actors (e.g. by growth or up-scaling). This happened in Upper Austria in 2016, when foodcoops were accused by the *Austrian Economic Chamber* of being business (rather than being a non-commercial initiative by citizens to self-organize their food supply). This could have resulted in the closure of many foodcoops, however, the situation was resolved by a round-table with the assistance of the NGO *Bio Austria*.

Besides that – referring to a discussion at the workshop – other issues like hygiene-regulations and food safety standards have an impact on niche innovations. Such regulations can be seen as a burden for small initiatives, due to their costs and bureaucratic efforts. Another issue is the implementation of educational measures (see chapter 3.1), which typically needs public support by regime actors in order to gain an outreach and not being just a niche. These examples show that changing the food system cannot only be reduced to consumption decisions. The implementation of alternatives requires a political agenda, whether it concerns the defence of holistic thought concepts (like food sovereignty or food justice against segmented co-option and against marketing misuse) or lobbying for the institutionalisation of certain measures, e.g. regarding public procurement or education programs. In Graz, ideas exist to realize food justice by connecting CSAs with *Stadtteilzentren* (community development centres) in order to address marginalized societal groups. So far, there is no public political commitment for such measures.

Decentralized, democratic and participative food supply schemes like CSAs and foodcoops are important actors in the food sovereignty movement. In this regard, the CSA project *Kleine Farm* can be seen as one part of this transformative vision of a sustainable and just food supply system.

## 4.2 Zero waste stores (Jenny Fuhrmann)

### About “gramm.genau”

The business “gramm.genau” evolved from the zero waste movement. From 2014 onwards, more and more zero waste shops opened in Europe, stimulated by authors and speakers like Lauren Singer, Bea Johnson and Louise Dallert, who brought the concept of a zero waste lifestyle to European consumers: “In every city or town I visited to speak, a zero waste shop was opened sooner or later” (Bea Johnson in her talk in Frankfurt, 2017). The zero waste idea rapidly spread through social media and crowdfunding campaigns. On this first ‘zero waste wave’, Gramm.genau was founded

with the intention to open a zero waste store in Frankfurt and to enable plastic-free grocery shopping.

From the beginning our team was idealistic and driven by the vision to provide an alternative way to common grocery shopping. To compensate for our lack of experience in the food and retail industry, we started a pilot project with a local organic store to test the zero waste-concept in Frankfurt. The idea of zero waste grocery shopping resonated well, as a lot of people were interested in that particular lifestyle.

Talks, workshops and events relating to this new way of resource-friendly consumption were as successful as the shop itself – or even more. Consumers were happy to try this new way of shopping yet struggled to integrate the needed planning and preparation into their shopping routine. On one hand, the topic of plastic pollution and waste reduction is more important than ever, but on the other hand it is hard for consumers to change their shopping habits, when dealing with fewer and less convenient options. A study of the HNEE “Unverpackt Projekt” (Kröger et al. 2018b) revealed that zero waste shopper complement their purchase in conventional supermarkets, organic shops and large organic supermarkets like Alnatura, Denn’s or Bio Company as well as farmers markets. A customer survey showed that most of the returning customers live near the store and that they shop for food, household and sanitary items on their way from work or/and close to their homes.

We had several options to expand our service to customers living further away: opening more stores, offering pick-up spots throughout the city or a delivery service. In order to reach as many customers as possible and given the fact that there is a large zero waste community in social media, we decided to launch a plastic free online shop with delivery service ([shop.grammgenau.de](http://shop.grammgenau.de)). Groceries are delivered by a service provider on e-cargo bikes, but only within Frankfurt. By using a glass jar deposit system, package waste on the consumer side is reduced to paper labels stating ingredients, expiry date and allergens. The deposit jars can be returned to the bike service provider upon the next delivery or at the pilot shop. All jars and bags can be returned and reused. On the producer side, we reduced package waste by buying in bulk from organic wholesale dealers. Most products come in paper bags, which are reused or recycled, and some few products come in deposit buckets. So far, there is only one wholesale dealer working with a deposit system. Given that the buckets have to be returned via transport companies, we hope to diminish the carbon footprint by using regional wholesale dealers or a regional deposit system in the future. At the moment, most of our food items are supplied from a warehouse in Erlangen. The purchase of pasta und crunchy granola is challenging for us: these products are available in bulk, but in plastic bags only. Granola is a good example for a product that needs special airtight packaging in order to stay fresh and conserve its taste. This requirement was an important point of discussion in the world café: How can we use less packaging and guarantee that the food we supply does not spoil. We believe that a deposit system for, and awareness on the consumer side can solve this dilemma. Until this is achieved, we have to find a reasonable compromise: utilize

single-use plastics when needed and focus on “quick wins” to which consumers can easily adapt (so called “simple swaps” e.g. using a soap bar instead of shower gel).

We design our products as sustainable as possible and share this process with the media and in our local networks (entrepreneurs, NGOs, schools, food council, local authorities), which are very important promoters of our concept. We believe that these local networks help us spread the zero waste idea, as they have the power to reach people. But even if community support is given, economic constraints still play a role for niche businesses like gramm.genau: we would not have been able to take our business to the next level without our investor. Another very important point for us, with no prior experience in the food industry, was the mentoring we received from the *Social Impact Lab* (a start-up incubator for social businesses) and from the store owner of *Main Gemüse* (the shop where we launched our pilot).

## Our Vision

Gramm.genau literally means “perfectly measured”. The idea behind this name is the reduction of food and packing waste by buying only as much as is needed (from a customer’s perspective) and offering loose items to vary amounts (no fixed package sizes). The idea behind the name is emancipatory: it is meant to motivate customers to think about what they actually need before they go shopping. This is contrary to the principle of pre-defined package sizes and marketing, that tell consumers what they need and why. The vision behind gramm.genau is to prove, that plastic packaging and packaging waste is not a “must” along the supply chain and that it can be avoided by responsibly acting companies. Therefore, economic success is very important for gramm.genau, in order to demonstrate that the zero waste-concept is not only an idealistic idea, but also a market proof business concept. If true, other stores might adapt to these standards.

Gramm.genau’s goal is to spread the zero waste idea and to offer a wasteless shopping alternative to everybody. It is a very important principle not to exclude anyone. Zero waste shopping requires certain skills and preparation. The goal is to keep the threshold low for newcomers and acquire as many as possible. The team therefore, provides help, leads and starter sets to welcome anyone who is new to zero waste shopping. The goal is to stay positive and to engage people through positive emotions. It is important for our gramm.genau team to not judge people, who in any way do not follow the zero waste principles (e.g. use plastic bags) but to rather focus on the advantages of a zero waste lifestyle (e.g. saving money by buying individual batch quantities). This is also the reason why gramm.genau never uses imagery of polluted oceans or garbage in social media. To reach more and more people, it is necessary to provide customers with easily understandable and convenient offers (e.g. delivery service). The gramm.genau team identifies as a facilitator of a special, local and sustainable service, as well as a provider of educational workshops and information on climate change, resource consumption and circular economy.

## Transformative Potential

There definitely is a window of opportunity when it comes to waste reduction and circular economy. Numerous media reports about plastic pollutants and climate change are causing rising concern amongst consumers. There are several trends and user practices that support the zero waste idea. To name a few: “minimalism”, which contrasts a world of consumption and complexity; “cocooning”, which opposes a globalized world and focuses on staying home; the “DIY movement”, which aims the emancipation from classical industrial production cycles; and the rising importance of organic food and healthy lifestyles. These ideas and practices are slowly becoming part of the regime and might pave the way for zero waste shopping. We believe that a niche concept like gramm.genau can be empowered by a community that supports the idea and helps to reach a critical mass. The basis for convincing people is the idealistic idea of creating a world without waste – a concept everybody can easily relate to. Nevertheless, niche businesses like gramm.genau also need to be pragmatic when it comes to the needs of customers. Grocery shopping has to be convenient, fast, easy and always available, factors that are also true for online services. To make use of this window of opportunity which is given by the environmental concerns related to single use plastic zero, waste shop owners need to adapt their offer to customer’s needs and professionalize their marketing. From our point of view, the connection between online and offline business is most important. We believe that a digital community reinforces the transformative power of a zero waste project (like shops or foodcoops/CSAs) and that e-commerce adds to the economic success of these niche businesses. This combination does not only meet the needs of both “analogue” and “digital” customers, but also helps those who plan their zero waste shopping trip as a special event. Customers who cannot come to the store on a regular basis can then use the convenience of online shopping instead. Marketing has to be adapted online and offline, and not only focus on sustainability but also on the quality of the products and their special features. As discussed in the world café, economic success of niche businesses is also a question of supply and demand. Zero waste shops can cross the border of the niche if products are of a good quality, convenient, easy to handle and are reasonably priced (compared to other organic products).

Nevertheless, when it comes to the reduction of packaging and single-use plastics the impact of zero waste shops is small compared to what the impact of supermarkets could be. As a small start-up enterprise, we cannot supply huge quantities of (cheaper) organic bulk foods for the mass market. Following the world café discussion, accessibility is important for mainstreaming zero waste shopping, another aspect is education. To give an example: we have experienced that after the conversion from plastic to paper bags in REWE supermarkets, a lot of consumers believed paper bags to be a sustainable single-use alternative to conventional plastic bags. Hence, in our pilot shop, customers asked for paper bags to carry their groceries. After discussing the ecological footprint of single-use paper bags, many customers decided to rather buy multi-use cotton bags or jars instead. Since we have been raising awareness for the environmental footprint of paper bags, the number of orders in paper wraps has



also declined in our online-shop,. Therefore, the movement should aim at mainstreaming the zero waste idea by using the zero waste shops as pioneers and lobbyists. A first step towards strengthening and institutionalizing such a lobby with a common vision is the founding of a German zero waste association called “Unverpackt e.V.” by a large group of shop owners. Politicians, journalists, scientists, businesses, NGOs, schools and citizens can be addressed and the actual transformative power of the movement can be bundled.

## 5 Conclusion

In this paper, we looked at three alternative forms of food production, distribution and consumption: community supported agriculture (CSAs), foodcoops and zero waste stores. These three niche innovations share the critique on the current food supply regime as unsustainable in terms of production (*e.g.* decoupled from consumer, unsustainable practices of pesticide and fertilizer use), distribution (*e.g.* resource intensive transport) and consumption (*e.g.* material intensive packaging). While described visions of food sovereignty on one side (section 4.1) and zero waste on the other side (section 4.2) differ in their scope and target areas, both aim at the transformation of current supply practices. In order to discuss their transformative potentials, we scrutinized possible up-scaling strategies for discussed niche concepts. For a niche to root in the regime and turn into a regime actor, innovation and the upscaling strategy need to be consolidated, and social networks have to be built, as the multi-level perspective of Geels and Schot (2007) suggests.

Over the last years, the zero waste movement has got stronger and new zero waste stores emerge in Germany and Austria. Furthermore, niche entrepreneurs develop ideas for business models to enrol regime actors like supermarkets. Nevertheless, the niche is still in its infancy and barriers for up-scaling remain with regard to market demand, user preferences and infrastructure requirements. CSAs and foodcoops have a more ambivalent relation to up-scaling strategies. On the one hand they want to promote their vision on food sovereignty and food justice, on the other hand they are limited to a certain number of members in their groups to guarantee personal relations among all members. The development of foodcoops in Austria has also shown that the process of alignment and the attempt to reconfigure the regime can be a conflict-driven negotiation between the niche and the regime actors. Knowledge sharing on best practices and barriers, *e.g.* the legal form in the case of CSA/foodcoops or successful business models in the case of zero waste shops, can ease the replication of these innovations for other actors. The remaining questions regarding the mainstreaming of these three niches are: in which way can their vision and normative claims/attitudes be sustainable in a capitalist landscape? What can be successfully mainstreamed without losing the critical stance? If up-scaling runs the risk to lose its transformative principles, is it a vital strategy to remain independent

and avoid collaboration with the regime? These are questions for further inquiring in research and practice.

As method for this paper, we chose a transdisciplinary dialogue. We aim to take the transdisciplinary claim of eye level collaboration serious by including practitioners into the conference session as well as the writing process of the final paper. This collaboration resulted in the two parts, in which David Steinwender and Jenny Fuhrmann outlined their transformative visions and the practical challenges they face as transformative niche actors. By giving them the authority to formulate their own accounts, we recognize them as experts on transformation processes. The article contains not only *our* scientific interpretation and translation of *their* representation, but gives space to their own views. This asserts an understanding of co-authorship, in which non-scientists hold sovereignty over their representation. By doing so, we hope to contribute to a coproduction of knowledge in which both sides – science and practice – are more equally footed.

For us as sustainability researchers, the transdisciplinary co-development of transformation knowledge enables insights into niche dynamics and transformation potentials that transcend the scope of traditional research methods. Opening up a dialogue with research partners creates a level of understanding that goes beyond an analysis of their practices. Giving niche actors the space to share their visions, as well as the very practical constraints which restrict these visions, helps researchers to create a more inclusive picture of transformation dynamics. It connects the rather general scientific discourse about sustainable transformations to the micro dynamics of social and political negotiation processes on the transformation of food systems. Many of the scientific research questions on transformation are also central to negotiation processes within alternative niches. We recognize practitioners as experts for their field who can shed light on very practical struggles and ambivalences of transformation or up-scaling processes. An example from our discussion is the ambivalence of CSA and foodcoop members, with regard to the issue of growing/mainstreaming. Understanding this inherent ambivalence is crucial for assessing their development and potential of regime transformations.

For niche practitioners, the dialogue with researchers can be equally fruitful. Transition actors already legitimise many of their actions and transformative claims with scientific accounts on sustainability. Sustainability research is thus central for practitioners to evaluate and enhance their own practices. However, in the traditional separation of research and practice, practitioners often have the feeling that certain topics are over-researched while other more open questions and uncertainties remain unobserved. It is often difficult for non-scientific transition actors to apply scientific knowledge. A closer dialogue on relevant questions, research topics, findings or forms of representation can help entrepreneurs, consumers and activists to better integrate scientific knowledge in their practices. The discussed example of the scientific assessment of user preferences for zero waste entrepreneurs (Kröger et al. 2018a)

shows how social research results on sustainable consumption can be used by niche actors to enhance their business strategies and practices.

Summing up, the transdisciplinary dialogue between transformation research and practice in this conference session and publication has proofed to be valuable for all participants. In our opinion, the enhancement of transdisciplinary collaboration at eye level has to be a crucial element for a sustainable transformation of food supply systems.

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### Presentations

- Doma, Eszter/Barbara Szabó-Bódi/Dávid Szakos/Gyula Kasza (2018): Food Waste Measurement and Prevention in Hungarian Households. National Food Chain Safety Office, Budapest.
- Lesny, Andreas (2018): Students' knowledge and attitude towards plastic fruit packaging. University of Applied Sciences Weihenstephan-Triesdorf, Straubing.

Sattlegger, Lukas (2018): An Unloved Actor – An Ethnographic Study on the Role of Packaging at Retailer Level. Institute for Social-Ecological Research, Frankfurt am Main.

Kröger, Melanie/Alexandra Wittwer/Frederic Goldkorn (2018a): Opportunities for packaging waste reduction in the food retail value chain through zero waste stores. University of Applied Sciences Eberswalde.

Reindl, Sarah (2018): Zero Waste Stores as Attempt to Reduce Packaging and Food Waste. Das Gramm – Zero Waste Store, Graz.

Steinwender, David (2018): Resource consumption of alternative food distribution networks like Community Supported Agriculture and foodcoops. Transition Activist, Graz

## Annex

### Conference Session:

**Session 29: Sustainable Food Distribution Systems – Research and Practice in a Transdisciplinary Discussion**

*Conference: 17<sup>th</sup> Annual STS Conference Graz 2018 – Critical Issues in Science, Technology and Society Studies*

Date: 7 May 2018, Venue: Hotel Weitzer, Grieskai 12-16, 8020 Graz; 14:00-18:00

Session Chairs: Johanna Kramm and Lukas Sattlegger (ISOE – Institute for Social-Ecological Research, Frankfurt am Main)

*Part 1 – Presentations:*

Input from Theory and Practice: Current State of Food Distribution Systems

*Part 2 – World Café Discussions:*

Towards a More Sustainable Food Distribution System

### Abstracts of the conference presentations:

***Lukas Sattlegger***

***(ISOE – Institute for Social-Ecological Research, Frankfurt am Main)***

**An Unloved Main Actor – An Ethnographic Study on the Role of Packaging at Retailer Level**

Expending shelf life, presenting product information or defining logistical units – packaging is a crucial actor in modern supermarkets. By providing examples from an ethnographic study in an Austrian supermarket, the presentation highlights some of the roles packaging is playing at the marketplace. Importantly, packagings are not isolated actors but they interact and interplay with human actors in the market. Supermarkets form the stage for diverse interactions between humans and artefacts: Packaging predefine purchasing quantities and thereby support consumers in calculating prices, it assists shop assistants in distinguishing between different products and it allows food manufactures to talk to the final consumer. Packaging does not only mediate between humans and products but also between physical foodstuff and logistical data. Via barcodes and numbers packaging is an important hybrid, facilitating the synchronisation of physical and virtual stock movement. The consideration of packaging as active element in markets brings also new perspectives on packaging reduction strategies. By comparing the supermarket study with observations in a German zero waste store I will highlight some of the challenges that result from the attempt to kick out packaging's from the market. Who is performing the actions which are normally done by packaging? Are the roles adopted by other actors, are they just left out, or is a totally different order emerging? What hinders or fosters innovations like zero waste stores to take a root in the mainstream food supply

chain? Answering such questions, can help to target questions of system transformations at a larger level.

***Kröger, Melanie, Alexandra Wittwer and Frederic Goldkorn  
(University of Applied Sciences Eberswalde)***

### **Opportunities for packaging waste reduction in the food retail value chain through zero waste stores**

In the past few years the negative consequences of plastic waste have increasingly become recognized and publicly discussed. Throughout Europe projects and initiatives are started to reduce the amount of waste creation by consumption. Within the so called “Zero Waste” movement approaches towards the reduction of individual waste creation are particularly popular and the foundation of so called “unpackaged stores” has strongly contributed to the growing public attention the topic receives. Those stores counter the rising levels of packaging waste with a business model where disposable packaging is widely avoided. Despite currently only serving a niche market the concept has the potential of fostering the ecological transformation of processes in the food retail sector. However, the omission of packaging poses a set of challenges throughout the value chain in compensating the functions of packaging. Particularly relevant for the establishment of the concept in the mainstream food system are two factors: changing procurement and supply processes throughout the entire value chain as well as changing customer behavior towards a more sustainable form of consumption. These strategic challenges can be analyzed using Porter’s model of the “five competitive forces” (Porter, 1979; Porter Michael E, 2008) and specifically the bargaining power of suppliers and customers. A high level of bargaining power of suppliers generally means that they are able to limit a markets profitability by charging high prices or other means. Additionally a high bargaining power of suppliers compared to the stores leads to reduced possibilities to influence the processes on the supplier side and specifically the packaging throughout the value chain. While supplier power on the conventional German food-market is relatively low due to strong centralization and the dominance of four retailers who hold a market share of 85% (Pressemeldung des Bundeskartellamts vom 14.02.2011) the organic market might look different. Especially with respect to the low buyer power of single unpackaged stores the supplier power might be considerably stronger. At the launch of the first stores in 2014 the desired packaging materials and packaging sizes were rarely available. The comparatively low demand provided low incentives for suppliers to change their mode of packaging. The dissemination of the concept through the foundation of new stores and adoption by retail chains provides first incentives for suppliers to change those practices due to increased demand. The further dissemination is, however, closely tied to the willingness of customers to adopt new “unpackaged” shopping routines and potentially give up on a certain level of convenience. With a wide range of available substitutes to unpackaged products (such as bioplastics or plastic free packages) it will be increasingly difficult to leave the niche of eco-

logically sensitive customers and convince the mainstream customer of the additional value provided. While a further adoption of the concept in retail by other players might generally be desired the question must be raised whether or not the adoption comes at the cost of losing the values the unpackaged stores were founded upon and might harm those stores by adopting their value proposition.

***Lesny, Andreas***

***(University of Applied Sciences Weihenstephan-Triesdorf, Straubing)***

#### **Students' knowledge and attitude towards plastic fruit packaging**

Plastic packaging waste has increased from 1.5 million tons to 3.0 million tons by over 200% in the last 20 years in Germany causing marine debris and environmental littering. Plastic fruit packaging is a known driver for this problem. Reasons for this increase of plastic fruit packaging waste are among others smaller packaging sizes, and the consumer demand of a thick and rigid packaging. Furthermore, it often substitutes cardboard packaging because it has a cheaper price and better material properties. Fruit packaging has many different functions like e.g. labelling and protection. However, it is only in some cases (e.g. protection of raspberries or labelling of organic fruit) necessary, when the use of the packaging to portion the food is not considered. Besides that, many consumers, especially the younger generation, claim that they don't like plastic fruit packaging. Still, supermarkets and other contributors sell their fruit in plastic packaging (e.g. a box with a lid, foil, bags). Against this background, the aim of this research is to get to know the attitude towards plastic fruit packaging and the environmental attitude of younger consumers. Furthermore, the knowledge regarding plastic fruit packaging and its waste is taken into account. Students were selected as the target group because they have, worldwide but especially in Europe, a positive environmental attitude. They are also likely to have a more environmental-friendly attitude towards plastic fruit packaging. To answer these questions an online survey was conducted to explore students' knowledge of, and attitude towards, plastic fruit packaging. The sample size contains more than 1.000 respondents who study at universities in Bavaria. (Bavaria is a state within Germany). The result of the survey will be presented at the conference.

***Doma, Eszter, Barbara Szabó-Bódi, Dávid Szakos and Gyula Kasza***

***(National Food Chain Safety Office, Budapest)***

#### **Food waste measurement and prevention in Hungarian households**

About one third of the food produced worldwide becomes food waste. Waste is generated in the whole food chain from agricultural production to households. A significant difference can be observed between developed and developing countries in this regard: developing countries waste more at the initial phases of the food chain, while in developed countries the behaviour of the households is the most important sector where unnecessary amounts of food is disposed. In our study, we will present the



results of an empirical data collection conducted in 100 Hungarian households in 2016. The weight and volume of food waste was measured for a whole week's period according to clusters (avoidable, unavoidable and possibly avoidable food waste) and different types (meals, bakery products, fruits, vegetables, dairy products etc.). Data collection methodology was following the EU-FUSIONS technical recommendation. By extrapolation of the results, we have found that an average consumer generates 68 kg food waste a year, of which 49% would be avoidable. The most frequent food items disposed were: meals, bakery products, fruit and vegetables. The analysis covered also the way of the disposed food. We may conclude that about the half of communal waste is derived from food, but a share of this amount is reused as compost material or feed. In case of some demographic categories different wastage levels were observed. It was also confirmed that income has effect on food waste production that varies by foodstuff categories. Based on the results, a communication and education campaign has been elaborated, with a special focus on primary schools. The research was co-funded by European Union's LIFE (L'Instrument Financier pour l'Environnement) programme (Identification number: LIFE15 GIE/HU/001048) and the National Food Chain Safety Office of Hungary.

### ***Sarah Reindl (Das Gramm – the first zero waste shop in Graz)***

#### **Zero Waste Stores as Attempt to Reduce Packaging and Food Waste**

It wasn't our original idea to open up a zero waste grocery store. But once we've heard of the idea it seemed so logical yet simple that we just had to give it a try to start one in Graz. The idea is simple – selling groceries without single-use packaging and offering the possibility to everyone who wants to cut back on packaging waste to bring their own containers for food like rice, cereals, pasta, spices, coffee, etc. Liquids like milk, yoghurt and beer are sold in glass bottles and containers for which the customer pays a small deposit. Fruits and vegetables are sold as one is used to from regular supermarkets – loose and unpackaged as nature intended them. But what is more, we not only encourage a packaging waste reduction but also a food waste reduction as we are offering the customers to buy small amounts from foods, which are normally pre-packaged and where often times parts go to waste (e.g. onions, carrots, garlic, potatoes). The second measure we're taking to reduce food waste is that we're taking all the fruits and vegetables that don't look so good anymore and turn them into delicious dishes (see [fb.com/dasgramm](https://fb.com/dasgramm)). Regarding the selection of producers and wholesalers it's our main priority to get the desired products in the preferred container (no plastic, big quantities, if possible reusable). The smaller the supplier, the more options we have regarding that containers. With some we have a completely zero waste deal, where they deliver the products in buckets which are washed by us and returned at the next delivery. In Germany, the cooperative of zero waste stores are currently in talks with one big German wholesaler to switch to reusable containers for dry goods and imported products. We're also working with Unisapon, a company from Vorarlberg which are selling detergents in a modular way (so you

can create detergents from a few ingredients for all your needs), based on concentrates (no unnecessary water is being transported around) and they're taking back the empty containers. Those empty containers have to be shipped back to Vorarlberg, but it's still a very resource saving way of selling cleaning products. In my presentation I will highlight our way to deal with three important challenges for zero waste stores: a) setting up the shop including sustainable business model, b) finding suppliers for packaging free groceries, and c) building long-lasting consumer ties.

***David Steinwender (Transition Activist)***

**Resource consumption of alternative food distribution networks like Community Supported Agriculture and foodcoops**

Over the last ten years Community Supported Agriculture (CSA) and food-coops (food cooperatives) emerged as a new kind of food provision scheme in Austria focussing on direct producer-consumer-relations and addressing self-determination as well as empowerment of consumers and farmers in regard to how food is produced and distributed. Whereas – basically – a CSA is a model, where consumer gather as a community to finance (a part of) the expenses of a farm over a period (mostly a year), share (financial) risk and gain a share of the harvest in return, a food-coop consists of a self-organized consumer group that orders products according to their wishes and requirements directly from farmers or other small or medium-sized enterprises or cooperatives in the food sector. Both schemes are referred to produce organic food that is distributed regionally. In addition, both schemes support community activities that go beyond the common relation of producers and consumers: food in exchange of money – though not every CSA or food-coop realizes activities to increase the social bonding of the group. The motivation to become part of such a food provision scheme is different. Main reasons comprise ecological production and sustainability aspects. In this context, the avoidance and reduction resource consumption in the form of food waste or packaging is one important issue within these two food provision schemes. On the one hand it can be argued that by these direct producer-consumer-relationships the necessity of packaging can be questioned and can actually be reduced. Further, these schemes convey the notion of authenticity in which freshness of the products is guaranteed in a period, when consumers are overstrained by advertisement, complex information and labelling systems in order to buy ethical and sustainable products from conventional food provision schemes. On the other hand some aspects can be discussed that do not necessarily support the idea of social and ecological sustainability of these schemes: a) whether these initiatives are eco-efficient in total or whether Rebound-Effects occur (in terms of packaging, transport, etc.) – considering single initiatives or trials of up-scaling of these schemes from niche to regime; b) how such initiatives contribute to individual behaviour change considering the usage of packaging or the wastage of food in households ; and c) how such initiatives are limited to certain societal groups (e.g. white middle class phenomenon). The latter can also be discussed in the context of mainstreaming.

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