Sustainable Food Systems: Theory of Change for three Alternative Food Networks in the Swiss cities Zurich and Basel

Dubravka Vrdoljak[1], Maria Tereza de Alencar[2], Anja Tesic[3]

[1] Department of Human Health, Nutrition and Environment, ETH Zurich, Universitätstrasse 16, 8092 Zürich, Switzerland

[2] Institute of Systems Sciences, Innovation and Sustainability Research, University of Graz, Universitätsplatz. 3, 8010 Graz, Austria.

[3] Faculty of Science, University of Basel, Klingelbergstrasse 50, 4056 Basel, Switzerland

Email: dubravka_vrdoljak@yahoo.de

Introduction

The importance of cities has grown since the beginning of industrialization. While nowadays 50% of the human population are situated in cities, it is expected that until 2050 around 70% of mankind will accumulate in urban hotspots (The World Bank, 2020). In 2017, 84.8 % of Switzerland's population lived in metropolitan areas (BFS, 2019). This shift in distribution, away from rural to urban areas, creates new challenges that need a political discussion (Diamond, 1997); (International, 2012). Apart from that, the concentration to only a small proportion of the population in actual contact with raw agricultural products has let producers and consumers drift apart from each other (Neff, 2009; Hendrickson, 2008 (Charlebois, 2016)).

A growing high-educated population is criticizing the current food production since they got aware of the negative impact of industrialized and non-sustainable production on the environment, social well-being and health and its negative impacts on the next generation (Umweltdepartement der Stadt-Zürich, 2020, Buttel, 2006). Many consumers don't know what is regionally produced in what time frames of the year. They demand to have any kind of vegetables and fruits at hand any time independently from seasons or from oversea transports for a reasonable price and in impeccable condition. These demands drive a system where individual food consumption habits are responsible for 50% of the negative impact of food in total on CO_2 emissions (Blanco, 2014).

With the Milan urban food policy pact (MUFPP)[1], signed by numerous cities and local governments in 2015, cities try to take responsibility for establishing a sustainable food system in their cities' domain (Ilieva, 2016). Goals reach from providing healthy and affordable food for all people to minimize food waste. In Switzerland, the cities of Zurich, Basel, Geneva and Lugano have all signed the MUFPP and are starting to develop new strategies to improve their citizens' well-being through establishing a sustainable and inclusive food system.

Zurich municipality's objective to become a 2000 - Watt society is part of it and divided into four main strategies (Umweltdepartement, 2020). Zurich intends to reduce food waste by

- evaluating the consumption patterns in public institutions,
- informing and educating the youngest in schools,
- supporting regional sustainable distribution and production of food, and
- generally, promoting mindful consumption habits and sufficient use of resources e.g. in households and institutions.

Many alternative food networks (AFNs) developed over the past few years in Zurich and Basel. AFNs are an umbrella term that encompasses different foci in sustainable food systems, such as community-supported and urban agriculture, short food supply chains up to direct farm retail or food cooperatives with the objectives of shortening the food chain from farmers to consumers, bringing it closer to urban or peri-urban areas; the promotion of community engagement and participation; and the reduction of food waste (Moschitz et al., 2018). AFNs provide:

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[1] http://www.milanurbanfoodpolicypact.org/
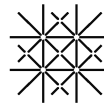
- New ways of thinking of food: a critique of the predominant food system.
- Visibility of food and support of general reflection on the increasing global industrialized food system.
- Facilitation of the debate on sustainable cities and its food systems transformation (Moschitz and Kueffer 2016).

AFNs need support through policies that reach out to all the levels of the food system (Follett, 2009) and address the United Nations Sustainable Development Goals (SDG's) (Nations, 2020), for example:
- **SDG 2** "End hunger and achieve food security and improved nutrition and promote sustainable agriculture".
  - E.g. target 2.4: "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality".
- **SDG 11** "Make cities and human settlements inclusive, safe, resilient and sustainable".
  - E.g. target 11-A: "By 2030, support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning".
- **SDG 12** "Ensure Sustainable Consumption and production patterns". Indicator: the proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by the size of the city.
  - E.g. target 12.8: "By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature".

We analyzed three AFNs operating in Zurich and/or Basel which were selected based on their different business models and our individual preferences, namely Too Good To Go, Urban Agriculture Basel and Bachsemärt. On their webpages, we gathered information about their goals, visions, interventions and formats and organized it in the process-oriented Theory of Change, a tool that serves for planning or evaluating a strategy aimed to achieve a long-term goal, i.e. a change.

Theory of Change

The Theory of Change (ToC) (www.theoryofchange.org, 02.03.2020) yields an analytic framework that graphically arranges intermediate outcomes and related interventions that have to unfold for a long-term outcome or change to be achieved (Taplin, 2012). Experts define it also as the description of a sequence of events that is expected to lead to a particular goal. To develop the framework backward mapping is being applied requiring planners to think backwards from the long-term goal to the intermediate and then early-term outcomes that would be required to cause the desired change (Taplin, 2012). The outcome framework provides the basis for identifying what type of activity or intervention will lead to the outcomes identified as preconditions for achieving the long-term goal (Taplin, 2012). ToC is based on a reflective process involving critical thinking by all involved stakeholders that often reveals a complex web of activities required to bring about change. The graphic model is accompanied by a written narrative that explains the logic of the framework. It is a summary that explains the pathways of change, highlights major assumptions and interventions and presents how and why the strategy is expected to make a difference. Developing a ToC includes the following six steps (Taplin, 2012):
1. Identifying the long-term goal.
2. Backwards mapping and connecting the preconditions or requirements necessary to achieve that goal and explaining why these preconditions are necessary and sufficient.
3. Identifying basic assumptions about the context.
4. Identifying the interventions that the initiative will perform to create the desired change.
5. Developing indicators to measure the outcomes to assess the performance of the initiative.
6. Writing a narrative to explain the logic of the initiative.

Since collecting detailed information would have gone beyond the scope of this report, assumptions, rationales and indicators were only partly analyzed.

Results

1. Too Good to Go

Acknowledging food waste as responsible for 8% of global emissions, this AFN proposes to tackle the societal problem of leftover food and resources. Too Good to Go[2] (Too Good to Go, 2019) is a start-up app available in 14 European countries that connect consumers with restaurants, bakeries, super-markets or any food undertaking that registers to avoid food-waste and give consumers a way to harness food for a cheaper price. Aside from improving and expanding its activities in the app, Too Good to Go (TGTG) also aspires to make a global impact on food waste by announcing its "Global Mission on Reducing Food Waste" in four areas: household, schools, businesses and public affairs. The AFN made clear statements of their future goal with specific targets for each of the four scope areas. Since each area has its own targets and indicators, we built a TOC table for all four areas, backward casting their suggested path for impact (tables 1-4). Each table below shows the TOC mapping.

Table 1 TOC Model for Households TGTG

Long-term goal	Promoting reflection on food waste at households and inspiring people to avoid waste by practising those tips		
Outcomes	People who access become familiar with those tips. Potential problem: there is no assessment available if households really follow these tips.		
Interventions	Conceptualization of the material with the information TGTG wants to deliver to households' members.	Online Material with tips on how to prevent food waste: - Proper storage; - Shopping planning; -Repurposing of seeds, peel, skin, etc. - Explanation of food labels.	Open access to and sharing of the material.

Table 2 TOC Model for Schools TGTG

Long-term goal	Educate the future generation to make them aware of food waste issues		
Outcomes	Students get familiar with study material, case study and tests of knowledge in food waste		
Interventions	Conceptualization and creation of Educational Material, workshops and talks.	Educational Material for four different age groups becomes available.	School and University students and professors can have access to this material.

Table 3 TOC Model for Businesses TGTG

Long-term goal	Positive impact on the food system at the waste and disposal level; Future ambition: to have an impact on all the other levels of the food chain. Potential problem: For this long term goal, there are currently no interventions.		
Outcomes	Avoiding food waste of unsold food in different business; making an additional profit for businesses and offering economical choices for clients;		
Interventions	Identification of the biggest causes of food waste in different businesses: Restaurants, Hotels, Supermarkets, Bakeries/Stores.	Easy information for businesses on how to get started and how to register.	Opportunity for partners to make an additional profit in the selling of left-overs, connect with new clients and become a player in the sustainability agenda.

Table 4 TOC Model for Public affairs TGTG

Long-term goal	To impact the political agenda of other countries, helping to promote food waste policies on national level		
Outcomes	TGTG gained the German prize of the national program "Zu Gut für die Tonne"; and Too Good to Go-Spain is now an active member of the Catalan Strategic Committee against food waste.		
Interventions	Mapping the political context of the regions where Too Good to Go wants to act.	Working on public relations and campaigning through Too Good To Go offices and beyond.	Too Good to Go becomes recognized as a potential partner for policy cooperation.

2. Urban Agriculture Basel

Urban Agriculture Basel [3] (UAB) is a non-profit association established in 2010. Until now, the organization put substantial efforts in developing a network of over seventy urban agriculture projects that in various ways contribute to more sustainability within the food supply chain. Together with the city of Basel UAB is moreover trying to foster policies for more sustainable food systems. The ToC analysis revealed three outcomes as pre-conditions for reaching the long-term goal "Food sovereignty in the city / region of Basel" (Table 5). Here, food sovereignty refers mainly to agricultural products and excludes highly processed food as well as food that due to the local climate cannot be cultivated and is being imported. The concept stands for a "regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops" (Geiss (Follett, 2009) Doerfer et al., 2017). Food sovereignty relies on a regenerative agriculture system achieved through long-lasting design, maintenance, repair, reuse, and recycling, therefore circularity was defined as the foremost outcome that has to be met in order to achieve UAB's long term goal. Both, "a network of urban agriculture projects" and "public services and community engagement linked to urban agriculture" were found as two intermediate outcomes pursued by UAB to achieve circular urban agriculture. These two outcomes are based on different interventions. To build and maintain a network of urban agriculture projects, UAB, for example, provides overall project support including training opportunities or funding of new initiatives in the network through seed-money and micro-credits.

Table 5 TOC Model for UAB

Long-term goal	Food sovereignty in the city/region of Basel					
Outcomes	Achieving a circular urban agriculture					
	A network of urban agriculture projects			Public services and community engagement linked to urban agriculture		
Interventions	Funding through "seedmoney" or micro credits	Providing a platform for collaboration and exchange	Giving overall project support and providing training opportunities	Promoting health and socio-cultural integration with opportunities for people to actively participate in UAB	Providing expertise and ideas for new initiatives including advice for organizational development	Developing policies for sustainable food systems together with the city of Basel

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3. Bachsermärt

Bachsermärt [4] is an AFN and independent limited company (GmbH) that works for the common good offering food supply that is built upon participation, transparency and small structures. In 2008 over 30 regional farmers and food producers supported the formation of this platform of regionally commercialized products. Their producers are farmers, beekeepers, flour mills, bakeries, breweries, cheesemakers, sausage producers, chocolate factories and small urban production kitchens from Zurich and from the surrounding mountains. Their identified long-term goal is to guarantee long-term maintenance of farms and to secure the farmers' indispensable jobs (Table 6).

Since 2008 Bachsermärt has been growing and involves today 5 stores and 1 logistic center. With their inauguration, they directly became part of the teaching network "axisBildung" that enable them to offer apprenticeships for adolescents accompanied by socio-pedagogical structures, to educate their staff and transmit their knowledge. Every new store is financed in collaboration with the municipality or a cooperative association.

In 2010 Bachsermärt inaugurated their logistic center in Zurich Altstetten to efficiently supply the small stores with small quantities. Bachsermärt established two collection centers in the countryside (Buchs and Eglisau)

to collect farmers' products and to deliver them immediately to their 5 stores located in the agglomeration of Zurich. Their logistic staff and trainees are in contact with the farmers every day, which is why Bachsermärt can minimize intermediate storage of fresh vegetables and fruits. Dry goods, drinks and fine foods are stored in Bachsermärt-logistic centers. These have been enlarged in 2011 in cooperation with Terra Verde. Their position as distributers that exclude other middlemen and have access to storage facilities, enables Bachsermärt to facilitate fair pricing of seasonal and sustainable products. This is why they can sell products from the farms and local producers with a higher share of revenues compared to other retailers.

Bachsermärt interventions seem to work. Our analysis provides compelling evidence that close contact with the farmers, a secure delivery organization through an ingenious logistic system, participation in their cooperative shares by getting the farmer and the consumer together on a table to unfold the consumer's behavior without neglecting the environment's capacity, are feasible interventions to reach Bachsermärt's outcomes and long-term goal.

Their greatest achievement, "axisBildung" is fundamental to continue growing and to successfully raise awareness about respectful handling of regional and sustainable food products by passing their knowledge to the next generation.

Table 6 TOC model for Bachsermärt

| Long-term goal	Guarantee primary care in rural areas and secure the jobs in the countryside						
Outcome	Work with local producers		Respectful handling of food products		Connect urban and rural		
Intervention	Buy directly from the farm	Include conventional cultivation, Demeter, Knospe, processed specialities	Learning facility "axis Bildung"	Consumers, farmers and producers are organized in cooperative societies	5 shops in Zurich	New logistic model	"Ab Hof" – delivery service

[4] http://bachsermaert.ch
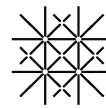
Conclusions

Our findings expand prior work of the Zurich-Basel Plant Science Center[5] by evaluating the strategy of three Swiss AFNs. In summary, we have built ToC analysis based on the information on the webpages of each AFN, crucial contributors to diverse agri-food chains. With the help of the ToC, we could provide compelling evidence that alternative food system initiatives work with a long-term goal model, even though they don't clearly communicate it to the public. Their transparency about their business and long-term goal models can help to make their steps visible. This approach has the potential to help emerging AFN's to learn from existing ones and to establish a bigger network and best practices. To make a change, a concept-oriented, transparent strategy is needed to match AFNs to the political frameworks and existing policies and develop common indicators for monitoring impact of AFNs for local food systems based on the SDGs.

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References

Blanco G., R. G. (2014). *Drivers, Trends and Mitigation.* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

Bundesamt für Statistik (BFS) (2019). Bevölkerung: Panorama 2019: Retrieved from https://www.bfs.admin.ch/bfs/en/home/statistics/population.assetdetail.7846584.html (28.03.2020).

Buttel, F. H. (2006). *Handbook of Rural Studies "Sustaining the unsustainable: agro-food systems and environment in the modern world".* (T. M. Paul Cloke, Ed.) London: SAGE Publications.

Charlebois, S. S. (2016). Food fraud: An exploratory study for measuring consumer perception towards mislabeled food products and influence on self-authentication intentions. *Trends in Food Science & Technology,, 50,* 211-2.

Diamond, J. (1997). *Guns, Germs and Steel.* New York London: W. W. Norton and Company.

Follett, J. R. (2009). Choosing a food future: Differentiating among alternative food options. *Journal of agricultural and environmental ethics, 22*(1), 31-51.

Geissdoerfer, M. S. (2017). The Circular Economy–A new sustainability paradigm? *Journal of cleaner production, 143,* 757-768.

Hendrickson, M. W. (2008). The global food system and nodes of power. *Available at SSRN 1337273.*

International, G. R. (2012). *The great food robbery: how corporations control food, grab land and destroy the climate.* Fahamu/Pambazuka: GRAIN.

Ilieva, R. T. (2016). *Urban food planning: Seeds of transition in the global north.* Routledge: Earthscan.

Moschitz, H. (2018). Where is urban food policy in Switzerland? A frame analysis. *International Planning Studies, 23* (2), 180-194.

Neff, R. A. (2009). Food systems and public health disparities. *Journal of Hunger & Environmental Nutrition, 4* (3-4), 282-314.

Taplin, D. H. (2012). Theory of change basics: A primer on theory of change.

The Center for Theory of Change (2020). *Setting Standards for Theory of Change.* Retrieved from https://www.theoryofchange.org/what-is-theory-of-change/ (02.03.2020).

Umweltdepartement der Stadt Zürich (2020). *Gesundheits- und Umweltdepartement.* Retrieved from: https://www.stadt-zuerich.ch/gud/de/index/umwelt_energie/2000-watt-gesellschaft.html (12.04.2020).

Umweltdepartement der Stadt Zürich (2020). Strategie nachhaltige Ernährung Stadt-Zürich. Retrieved from Nachhaltige Ernährung: https://www.stadt-zuerich.ch/gud/de/index/umwelt_energie/ernaehrung/ernaehrungsstrategie.html (12.04.2020).

[5] https://www.plantsciences.uzh.ch/en.html
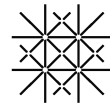
United Nations (2015). *Sustainable Development Goals*. Retrieved from: https://sustainabledevelopment.un.org/# (5.04.2020)

World Bank (2020). Population of largest cities - Switzerland Details. Retrieved from: https://data.worldbank.org/indicator/EN.URB.LCTY?locations=CH&name_desc=true (4.01.2020).