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Identifying drivers of Vienna's Urban Food System: towards a sustainable diet

Marta López Cifuentes* and Bernhard Freyer*

*Department of Sustainable Agricultural Systems, Division of Organic Farming, University of Natural Resources and Life Sciences, Vienna, Austria

Correspondence: m.lopezcifuentes@boku.ac.at

Introduction

Continuous growing of urban population brings changes on the socio-economic environment, including food, as urban food markets consume up to 70% of the food supply. Scholars show increasing interest in cities and their dynamics in food security. Cities are becoming strategic places for developing more sustainable food systems. Literature on food systems reveals multiple perspectives and frameworks. Those capturing all relevant characteristics of food systems consider food systems as complex human-nature systems, i.e. social-ecological systems (SES). But we identified the need for further systematization of current food system models following the SES approach. Revised models should bring explicit attention to food system dynamics and provide structure to guide sustainability pursuits [1-3]. Thus, we propose a framework which builds on Ericksen's [4] food system model, coupled with Checkland and Scholes' [5] theory of "hierarchical organized wholes" and Ostrom's [6] framework for analyzing SES.

For this study, we have chosen the city of Vienna as a case study to analyze an urban food system. Vienna's Urban Food System (VUFS) is framed considering the proposed framework and a sustainable diet as principal guiding purpose of the food system. There is increasing interest into regional food, organic food and a diet with less meat. Literature indicates that this orientation would have several positive consequences for regional economy, the environment and human health. However, how to make a change towards such a food system is less discussed. Hence drivers have been identified that would contribute to such a transformation.

Methodology

To understand drivers of VUFS a profound knowledge of how VUFS is organized is necessary. We propose a model that includes four main sub-systems of VUFS: Resource; Information; Consumers; and Governance. These sub-systems and their interactions are also influenced by their inputs and outputs. The purpose of the system is to contribute to food security, environmental security and social welfare. Finally, VUFS is embedded in local, regional as well as global scales.

The characteristics of each sub-system of VUFS, their interactions and drivers have been identified and analyzed using the following methods: (i) two focus groups (n=5; 7) with key actors and Vienna's Food Policy Council; (ii) 32 Semi-structure interviews with key actors (n=38); (iii) one participatory workshop (n=39) with representatives from different institutions of VUFS; and (iv) one online survey (n=23) with interview partners and other suggested key actors.

Interview partners were selected via snowball and purposive sampling. All qualitative data (i, ii and iii) was analyzed using inductive and deductive coding. Raw data from the online survey was converted into a 4-Quadrant Matrix Chart, i.e. impact matrix for drivers' direct and mutual impacts. Drivers in the system can act as active (impact on other drivers), passive (impact from other drivers).

Results

Although some interviewees do not perceive VUFS as a system, interviewees identified different sub-systems presented in the framework and the relations among them. The embeddedness of VUFS in global and especially European scales is perceived as critical to understand VUFS. Some main characteristics of VUFS seem to be: the high number of urban producers and share of organic agriculture; the role of the city government in public procurement; the variety of alternative initiatives; the diversity of consumers; and the migration of producers and processors from the city to the rural area. Interviewees mentioned different drivers that seem to influence VUFS, that were then clustered in 15 main drivers.

According to the impact matrix analysis, the drivers found to play the most active role in VUFS are 'Dependency on national and European legal frameworks', 'Dependency on international trade' and 'Food purchase and consumption practices'. Some of these drivers are external drivers that are perceived as difficult to influence or change from a local perspective. Thus, a second rating was done in a participatory workshop. These results show that the most important drivers perceived to have a high influence on VUFS for achieving a more sustainable diet are: (a) *Urbanites' food purchase and consumption practices*; (b) *Information for and education of consumers about food*; and (c) *Urban and Hinterland production*.

Discussion and conclusion

Consumer preferences drive the demand for food and are developed in response to the food market. Consumption patterns seem to be in continuous development, although they are often slow in change. In support of our identified levels to influence consumers' practices, Johnston, *et al.* [7] found that people's diet can be influenced with campaigns involving public education, advertising targeted programs and the provision of better labeling. Consumers seem to be unaware of the origin of their food, making it easier for food systems to remain unsustainable. And even if consumers might be aware of the environmental impact of their consumption habits, they may still not be ready to sacrifice personal benefits in order to contribute to environmental sustainability. Further research on Viennese consumers' barriers to a sustainable diet is needed.

Urban as well as hinterland agriculture seem to be relevant components of VUFS in order to increase regional food production and have the potential to increase regional products. Furthermore, the benefits of linking urban and rural areas include local economic development, public health and ecosystem protection. The increasing interest on urban agriculture is a common trend found in Europe, but it still needs support from the local governments by incorporating urban agriculture into long-term city planning and include different actors of the system. Local governments are increasingly developing their own local solutions for urban food systems. One important tool from city governments are public procurement institutions. Many cities, including Vienna, have started to reform their public procurement services by introducing organic or regional products or by starting cooking from scratch again [8]. These measures should be further developed in VUFS in order to support a sustainable diet.

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