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Published in:
Sustainable Value Chains for Sustainable Food Systems

Publication date:
2016

Document Version
Publisher's PDF, also known as Version of record

Food and Agriculture Organization of the United Nations

Sustainable value chains for sustainable food systems

A workshop of the FAO/UNEP Programme on Sustainable Food Systems

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Rome, 8–9 June 2016

Edited by

Alexandre Meybeck
and
Suzanne Redfern

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2016

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ISBN 978-92-5-109532-4

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ABSTRACT

Today's understanding of food systems includes product-specific values (e.g. palatability, taste, nutritional and safety values, health promotion) and process-oriented values (e.g. environmental impact, animal welfare and social fairness). These values are currently challenged and changing. Food habits, cultural, social, ethical, economic and political criteria play an increasingly important role as values. An organic values-based supply chain links food production to values such as partnership, cooperation and trust. Within a values-based supply chain, all actors should be connected through a shared vision. Visions, indicators and parameters have been developed for the organic food system (OFS). In order to identify and leverage values within the OFS, it has to be critically analysed and documented. This makes the OFS a "living laboratory" for sustainable food systems, linking organic production and consumption within one system, thus creating and distributing value along the chains for sustainable food systems.

BACKGROUND

Dietary patterns are becoming more Westernized worldwide (Kearny, 2010). This has tremendous impact on food consumption, the environment, society and individual human health (Tilman and Clark, 2014; Springmann *et al.*, 2016). The consumer can play a pivotal role in participating and influencing this development (Guyomard *et al.*, 2012; Kearny, 2010). The socio-cultural context of food consumption and dietary patterns,

in particular, has been recognized as an essential part of a sustainable food system. A sustainable food system comprises agriculture, environment and human health, but must also include eating patterns (Guyomard *et al*., 2012; Kearny 2010). Indeed, it has been suggested that dietary habits or patterns should be assessed in at least two different dimensions: impacts on health (nutrition) and impact on the environment (Auestadt and Fulgoni, 2015; Macdiarmid *et al*., 2012; Wahlqvist, 2014). Therefore, in order to develop, define and evaluate healthy and sustainable diets, a holistic approach is needed (iPES Food, 2015). This gives the diet a crucial role in solving both global environmental and public health problems (Tilman and Clark, 2014). Recently, dietary guidelines have been transformed from a nutrient-based approach towards a more holistic approach linking both food products and food production processes (Burlingame and Dernini, 2011; Mithril *et al*., 2012, 2013). The central questions can be described as: how can we transform the whole food system to be more sustainable by a combination of sustainable consumption and sustainable production, urgent needs that are currently being taken up by the FAO/UNEP Sustainable Food System Programme (http://www.fao.org/fileadmin/templates/ags/docs/SFCP/SustainableFoodSystemsProgramme.pdf). The Organic Food System Program (OFSP), described here, will actively contribute to answer these questions by using the organic food system as a model or "living laboratory". This is connected to the International Federation of Organic Agriculture Movements (IFOAM) Organic 3.0 (https://shop.ifoam.bio/en/organic-30-truly-sustainable-farming-consumption) activities, which contribute to further transformation of the organic food system itself.

THE ORGANIC FOOD SYSTEM

Visions, indicators and parameters have been developed for the organic agriculture and food production system and are further defined by international standards and regulations. Organic agriculture has been practised for 100 years and takes into consideration the natural environment, animal welfare and food quality as well as public health issues (Reaganold and Wachter, 2016). Organic agriculture has spread to nearly all regions in the world (Willer and Lernoud, 2015). Today it is described in the Codex Alimentarius and its vision is reflected in international standards (e.g. IFOAM – Organics International, https://www.ifoam.bio/) and defined at the regulatory level e.g., in Europe, the US, Japan and numerous other countries (Willer and Lernoud, 2015). In Europe, the organic label is recognized by European consumers and associated with an eco-friendly and health-promoting food system (Kriwy and Mecking, 2012; Pino, Peluso and Guido, 2012; Zagata, 2012; Stolz *et al*., 2011; Hughner *et al.,* 2007, Torjusen *et al.,* 2004). The underlying aim of the organic movement was and still is to create a sustainable and healthy food system with a focus on primary production (agriculture), but one that also includes processing and the entire value chain as well as distribution and organic consumption issues and ethics. The Organic Food System (OFS) offers an example of successfully combining sustainable food production and sustainable consumption patterns within one system (Strassner *et al*., 2015). Based on central findings through surveys and other studies around the world, consumers and producers of organic products share specific attitudes to food that are mainly oriented towards health and environment (Hjelmar, 2011; Verbeke, Scholderer

and Lahteenmaki, 2009, Padel and Foster, 2005). Therefore, the OFSP will bring a shift in focus from the organic agricultural production system to a focus on the whole food chain from primary production to the farm gate and including the organic consumption as part of a (healthy) dietary pattern, thereby linking organic production and consumption. The OFSP brings together initiatives and stakeholders at international, national, regional and local levels. Here the OFS offers a global food system with local multistakeholder initiatives (Willer and Lernoud, 2015). The change in consumption patterns is a crucial issue in the transition to sustainable food systems. Therefore, major questions for shifting food systems towards sustainability focus on how to alter food consumption patterns as well as how to improve the nutritional quality and safety, and related health characteristics of food. The dietary pattern of organic consumers seems to be closer to healthy dietary patterns as well to the sustainable diet concept (Baudry *et al*., 2015a, b; Eisinger-Watzl *et al.*, 2015; Kesse-Guyot *et al.*, 2013). One of the underlying determinants of organic agriculture and food production is the link between sustainability and health .There are various studies showing a contribution of organic agriculture to global sustainability issues (http://www.ifoam-eu.org/en/node/3760/). The organic food market is growing rapidly worldwide (Willer and Lernoud, 2015). Therefore, one goal of the OFSP is to determine the drivers of organic consumption, identify and evaluate organic consumption patterns and translate this learning into tools that enhance and reinforce the necessary changes in lifestyle. In order to achieve this goal, related projects have been and will be further developed within this programme.

THE ORGANIC FOOD SYSTEM PROGRAM

The research association International Research Network for Food Quality and Health (FQH) (http://www.fqhresearch.org) initiated the developmental process of the OFSP in Newbury, United Kingdom in spring 2015. During this meeting the main goals and tasks of the OFSP were identified and the major components of the programme were worked out in a group process. Furthermore, the connection and contribution to the FAO/UNEP-SFSP and IFOAM Organic 3.0 were defined and turned into tasks. From then on, IFOAM (https://www.ifoam.bio/) and BERAS (http://beras.eu/) joined as driving forces in setting up the OFSP as an international initiative bringing together practice and experts from different scientific disciplines. During the European nutrition conference (FENS) in Berlin, Germany (autumn 2015), the partners of the OFSP held their second meeting. During this meeting, the structure of the OFSP was finalized and agreed upon. Furthermore, the work areas as well as some key activities within the project were elaborated and agreed upon, as well as the responsibilities of OFSP and the next steps. During the third meeting in Copenhagen, Denmark (spring 2016), the starting OFSP projects were agreed among the partners. The OFSP was launched during the International Fair on Organic Food, Biofach, Nürnberg, Germany on 10 February 2016 (www.organicfoodsystem.net).

While organic agriculture can be taken as an example of sustainable food production (Reaganold and Wachter, 2016), organic consumption patterns may also be taken as an example of sustainable food consumption (Kesse-Guyot *et al*., 2013). Sustainable consumption was defined by the Oslo Symposium 1994 and further developed towards

consumer orientation of sustainable food systems (SFSs). The Oslo Symposium in 1994 proposed a working definition of sustainable consumption as "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations". The FAO definition of sustainable diets raised in 2010 states that: "Sustainable diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources" (FAO, 2012). The necessary change in consumption patterns seems to be a crucial issue in the transformation to sustainable food systems. Since food systems shape diets and diets play a central role in shaping food systems, the question of organic food products as a basis for a sustainable and healthy consumption as well as further dietary patterns seems an essential topic to be addressed in parallel to sustainable production adapted to each particular region. Therefore, OFSP will use the organic food system as a model to understand drivers of sustainable food consumption and production and to link this to real-world examples. It is important to understand that the OFSP will use the organic food system as a model or a kind of window for exploration but not as the exclusive solution. There are many commonalities between healthy (e.g. WHO, 2012) and sustainable diets (e.g. FAO, 2012); organic agriculture can contribute to enhance both and may act as a model to bridge health and sustainability. The OFSP will address sustainable food system (SFS) issues in the following challenges

- taking the organic food system as a proposed best practice example;
- delivering tools, information and knowledge for establishing sustainable food systems using the organic perspective and experience;
- contributing to the understanding of what constitutes a sustainable food system based on the key issues from the example of the OFS;
- producing data, methodology and standards for developing, improving and testing SFS on the basis of organic as a tested best practice example.

Cores and work areas of OFSP

The main goal of the OFSP is to aggregate knowledge about the drivers for sustainable food production and consumption. The OFS will be used as a pilot model as it is an existing global food system with clear boundaries, theoretical frameworks including scientific underpinning, data on monitoring as well as set to practise in more than 160 countries. There will be several working areas in order to achieve the goal:

a) elaborating on lessons learned from organic food systems for sustainable food systems with a focus on sustainable food consumption and production patterns;
b) identifying, developing and testing tools and indicators for sustainable food systems and sustainable diets, taking organic diets on global and national or regional levels as learning models;

c) building multistakeholder networks in order to increase the efficacy of implementing tools and indicators of sustainable food production and consumption;
d) disseminating best practice examples of sustainable food production and consumption on global and national or regional level.

Taking the OFS as a model, the lessons learned can be translated into guidelines, indicators and other tools as well as knowledge to contribute to sustainable food systems. For this, two core activities have been identified for OFSP: "conceptualizing, studying and modelling sustainable food systems" and "sustainable food systems in practice". Furthermore, there are work areas within the programme; each work area has an objective and provides the framework for developing, realizing and evaluating projects.

Model regions, local sustainable food systems and learning centres within OFSP

The design of global models and the localized projects will give the ability to capture key interactions, processes and features, to better understand the complexity of food systems and make further improvements towards more sustainable production and consumption. Implementation strategies of the OFSP therefore focus on the creation, development and multiplication of local sustainable food systems in model regions. The work in the model region may be performed at national, regional or/and local level. Model regions are supported by a local, globally connected network of researchers dedicated to improving systems and the human experience.

A model region may be a whole country or part of a country, depending on geographical scale, climate, demographics and political context. A defining feature for a model region is the ability and capacity to work at a level that can impact governmental policies. Linking consumption with production expands the concept of a food product or food chain to that of a food system that operates at a territorial level. Good, healthy food and a close connection to its origins could improve life quality by increased awareness about animal and nature welfare, environment and climate changes. Interdependence and mutual support between farmers and consumers mediated through cooperation with processors and traders, and facilitated by supportive public policies and programmes, will ensure a supply of sustainable and healthy food for the population and thereby contribute to both short- and long-term personal and public health. It supports farmers to have economically sound enterprises that also enhance the regenerative power of their farms and surrounding environment, which in turn serves as a basis for local food security and food sovereignty. Support and revival of local systems and economies also positively impact cultural development.

Within model regions, one of the OFSP implementation activities is to enable the establishment of local sustainable food systems (LSFSs) in potentially any location on the planet, under a unified model of co-creation among farmers, processors, traders, policy-makers and researchers. The LSFS are examples of local food clusters that are socially just, environmentally friendly and economically viable – see, for example, Södertälje in Sweden (http://foodsociety.se/en/). They involve all actors in the food chain – from farmers to consumers. These are connected to other actors, such as processors, wholesalers, distributors and consumers in local market clusters. Knowledge exchange is

achieved involving the business sector, public authorities, non-governmental organizations (NGOs), research and education. This creates favourable conditions for environmentally friendly food production, sustainable lifestyles and viable communities.

A major contribution to the activities in model regions and LSFS is the establishment of learning centres as living laboratories for LSFS. The learning centres will be developed to reflect the local context in terms of the environmental, societal, cultural, economic and legal framework.

Coordination of actors within OFSs

The OFSP is a growing global network of people, organizations and communities. Practising with a set of common values and taking a commonly recognized approach, they validate their own work and of the movement as a whole. They are able to learn from each other and build the collective work, bringing benefits to themselves and to others. With access to a global network in potentially more than 120 countries, the OFSP represents a unique opportunity for practical implementation that demonstrates the benefits of best practices. Close interrelationships and processes among scientists, trainers, actors in the food chain, NGOs and authorities aim at working together for practical implementation at local and regional levels. Communities will be continuing to identify where best practices in sustainable production and consumption are happening based on the principles of organic agriculture and using the forefront of research on healthy eating habits and related practices and policies. By replicating and multiplying these actions in many communities around the globe, the OFSP becomes a disruptive force for transforming food production and consumption to be truly sustainable. Multiplication globally validates community action locally and enables shared learning and ongoing improvement. The OFSP will facilitate the development and coordination of LSFS and increase their positive impacts partly by focusing on public health and local economies, e.g. through institutional procurement (http://www.fao.org/ag/ags/ivc/institutional-procurement/en/), education (including school meals) and job creation supportive of sustainable value chain development. It will enhance cooperation among stakeholders through innovations in transparency, accessibility and credibility of information so that people can understand more about the dynamics of production and consumption, product quality, and activities of the people involved, and the connections between food, culture, agriculture and nature. Organizing LSFS in model regions will enable the global OFSP to engage more people in a coordinated effort to make these sustainable models a systemic global innovation. Contributing to international framework programmes (e.g. 10YFP, IFOAM Organic 3.0) OFSP shows how the benefits attained through organic, agro-ecological, regenerative practices contribute to solving the world's problems and help achieve Sustainable Development Goals. The OFSP takes a holistic approach to description, monitoring and benchmarking of processes and their impacts on sustainability and human health, using a transdisciplinary, participatory approach.

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