

EXPLORING THE FUTURE OF GLOBAL FOOD AND NUTRITION SECURITY FOODSECURE (No. 290693)

Publishable summary

1.1 Executive Summary

Challenges facing decision-makers in the global food system ...

The current distress to food consumers and farmers related to El Nino illustrates that food and nutrition security concerns require continued and strengthened attention from decision-makers in the realms of policy and business. Nutrition security, inclusive and sustainable agricultural growth and social protection are also commonly seen as cornerstones for meeting the Sustainable Development Goals against a background of relatively tight food markets and variability in global food prices.

Indeed, there are concerns that food and nutrition security (FNS) might decrease in the future across the world. At the same time, macroeconomic stagnation and rising challenges with the double burden of malnutrition provide an incentive for many developing countries to strengthen the contribution of their farmers to national economic growth, poverty reduction and a stable and nutritious food supply.

Policy makers and opinion leaders, however, often lack sufficient information to gauge the likely effects of fundamental changes in global and domestic food markets on their country. An effective policy dialogue will benefit from an unbiased and rigorous assessment of the approaches for addressing food and nutrition security which include, for example, the right to food, international trade and sustainable agricultural intensification. The research project FOODSECURE has responded to this call for evidence and tools to design effective and sustainable strategies for assessing and improving global FNS, now and in the future.

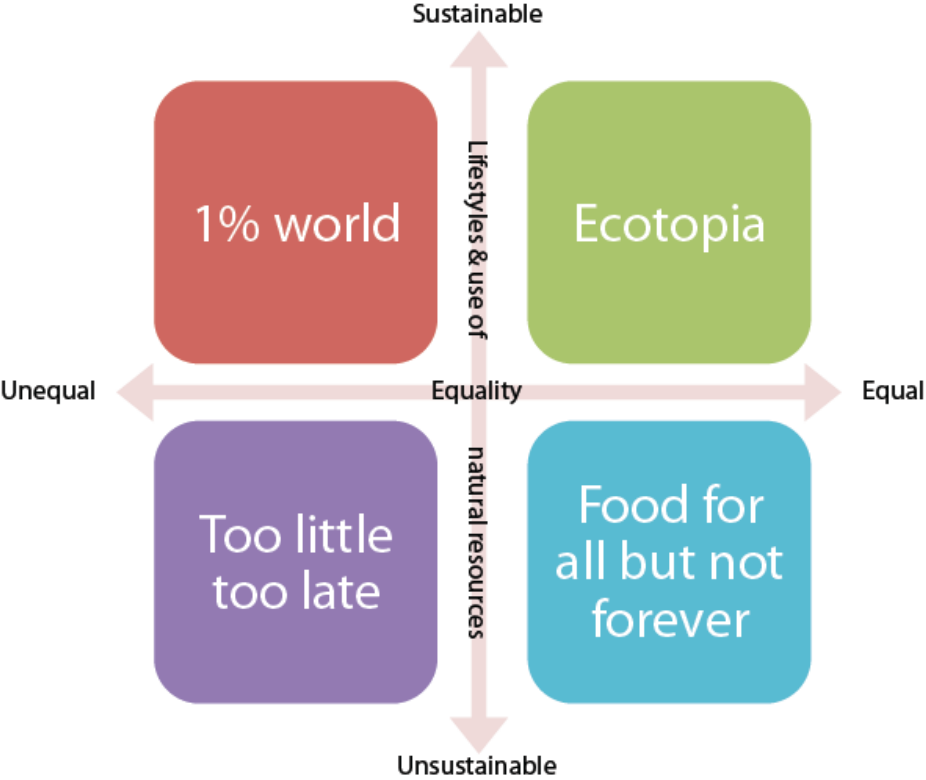
... require a comprehensive analytical framework

Over a period of 5 years the FOODSECURE-research team has developed an overview and catalogue of the risks and uncertainties (of drivers) of the changing food system, to improve the understanding of the determinants of food and nutrition security. The results of this work found their way into the analytical framework used for assessing future changes to FNS.

Building a coherent long term vision regarding the global food security is a complex exercise. Quantitative models have limited capacity to predict the future and qualitative approaches could lead to incoherent projections. To investigate potential food security outcomes by 2050, the FOODSECURE project has bridged the gap between traditional approaches by linking a rigorous scenario building exercises involving an international group of stakeholders and a systematic quantification exercise based on the FOODSECURE 2050 Toolbox.

The completion of elaborate scenarios storylines that were developed using a participatory approach with stakeholders was a major achievement. The stakeholders decided to organize the scenarios around two axes that highlight two major uncertainties for the future of FNS, 1) lifestyle and use of natural resources ranging from a sustainable to an unsustainable world and (2) equality, with the two polar views of an equal and a highly unequal world (figure 1). Together, they define for different scenarios: *1% World (ONEPW)*, *Ecotopia (ECO)*, *Too little, too late (TLTL)* and *Food for all but not forever (FFANF)*. The four scenarios have been projected to 2050 with consideration to a large number of differentiated drivers, among which: population, GDP, diet preferences, yield development, land use constraints, trade patterns.

Figure 1: Scenario logic of the FOODSECURE scenarios



Source: van Dijk et al. FOODSECURE Working Paper no. 38, Jan. 2016

1.2 A summary description of project context and objectives

While the issue of food and nutrition security (FNS) has been extensively studied, a more systematic, thorough approach is needed to assess, predict, and ultimately achieve the complex state of food and nutrition security. Traditional approaches which look only at narrow definitions of food supply and demand are inadequate to address the FNS multi-dimensionality, which can only be understood within a larger societal context. In addition to the population growth, income distribution and resource constraints, newly recognized challenges in the form of climate change, speculation and biomass demand for non-food uses, to name just a few, have further muddled an already complex food system.

A long term policy framework on FNS is required for enhancing the resilience of the food system to volatility, both economic and climatic. The price spikes of the past years, with widespread effects on nutrition and diet quality, have reinforced the importance of providing proper guidance. An integral part of this framework is a “Green Growth” strategy which incorporates both FNS and sustainable agricultural growth at a fundamental level. In short, the immense societal challenges of satisfying world food needs requires a wide-ranging reassessment of the problems relating to food and nutritional security, and a re-conceptualization of the approaches to solving those problems.

FNS challenges go far beyond aggregate supply and demand factors. Critical needs include:

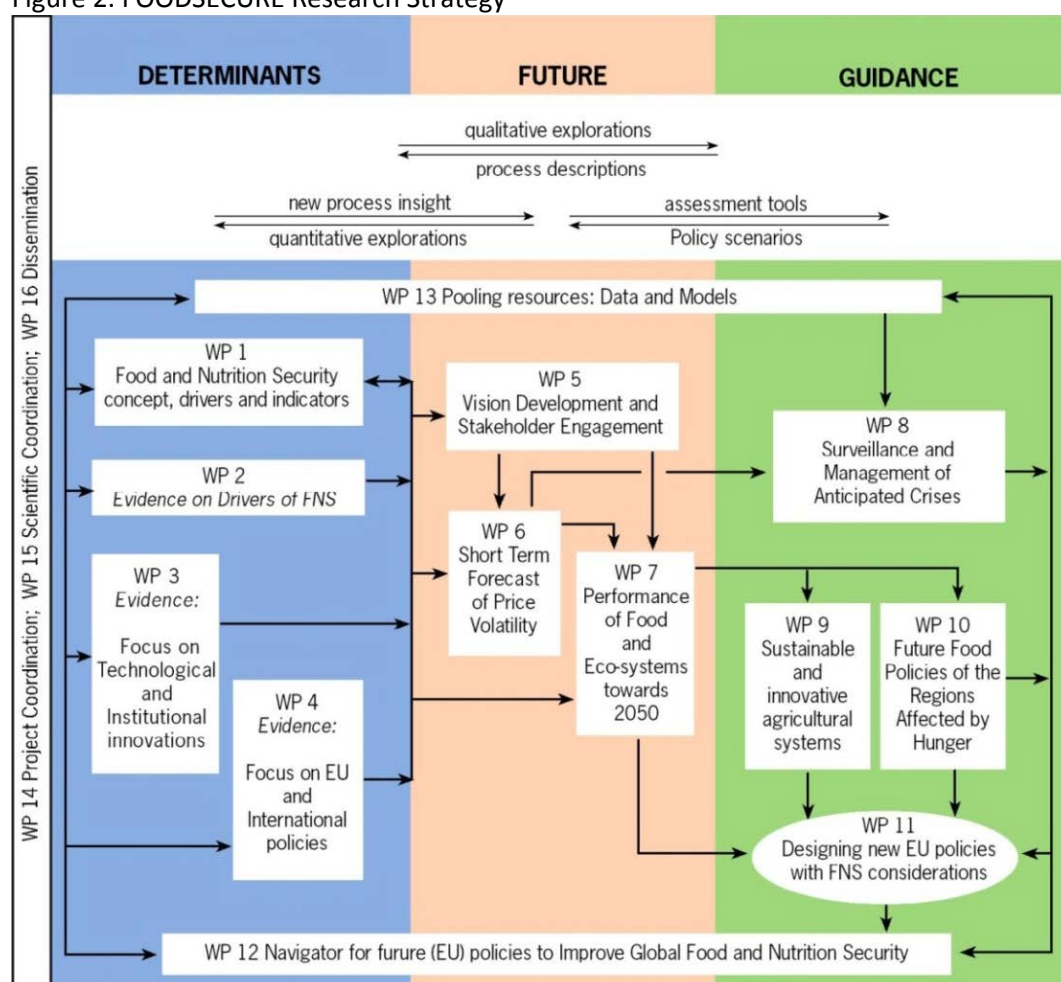
- An overview and catalogue of the risks and uncertainties of the drivers of the changing food system and an understanding of the determinants of food and nutrition security.
- A comprehensive analytical framework for assessing future changes to FNS which better incorporates the relationship of the food system to the other systems: for instance, ecosystems, energy markets and financial markets, all of which can provide potential sources of shocks that will disrupt the food system (UK Foresight, 2011, Agrimonde, 2011).

- In addition, along with expert scientific views and recommendations, stakeholder perceptions and insights must form an intricate part of the framework.

The objective of the FOODSECURE project is to design effective and sustainable strategies for addressing and assessing the short- and long-term challenges of food and nutrition security. The project will provide a variety of analytical tools to experiment, analyse, and coordinate policies. In doing so, the research will inform the decision-making process of a broad range of stakeholders in the EU and developing countries on consistent, coherent, long-term strategies to improve global FNS.

FOODSECURE identifies questions related to FNS by revisiting and advancing theory, recasting and testing evidence, rigorous analyses and stakeholder participation. Within the overall aim of increasing the capacity of stakeholders to design effective and sustainable actions to address acute hunger crises and long term challenges in the world food system (comp. Figure 2).

Figure 2. FOODSECURE Research Strategy



In order to respond to the research challenges in an integrated fashion, three modules are defined within the FOODSECURE research: Determinants, Future and Guidance. Figure 2 shows how these modules interact. The research process is organized into several work packages, as indicated in Figure 1, each of which has important interactions with other work packages.

The above-mentioned challenges and objectives translate into a focussed scientific agenda for the project:

1. Determinants of hunger and malnutrition

- Integrate food prices and income in the analysis of FNS drivers and indicators.

- Analyze role of agricultural innovation systems, and the impact of agricultural and trade policies on FNS.
- 2. Price volatility modelling toolbox
 - Investigate effects of excessive price volatility on the poor and FNS.
 - Propose an early warning system and policy analysis tools to test crisis response.
- 3. Long-term modelling toolbox
 - Set fundamentals of global agricultural markets in an integrated assessment framework.
 - Use the long-term modelling toolbox to model technologies, climate change, and competition over scarce natural resources.
- 4. Food crisis surveillance and management
 - Develop a surveillance system for food price volatility and price spikes.
 - Pre-test policy responses to mitigate risk and for crisis management.
- 5. Policies for food security and sustainable development
 - Analyse the role of sustainable agricultural intensification in saving protected areas and maintain ecosystem services.
 - Make proposals for alignment of EU policies with developing country strategies to improve FNS.
- 6. Vision development and stakeholder engagement
 - Integrate stakeholders' views on future scenarios for FNS, towards 2050, through participatory research and foresight analysis
- 7. Pooling data and modelling resources
 - Make key research results accessible and present them in a user friendly format, facilitating th interaction between modelling tools and stakeholders.

1.3 Concise description of the main S&T results/foregrounds

Main findings

Many drivers of FNS still poorly understood

By limiting access to education, land, finance, or labour markets, discrimination and social exclusion can constrain income generating opportunities and thereby undermine food and nutrition security. This issue presents itself in the EU as well. Original FOODSECURE research finds that people of lower socioeconomic status and socially excluded groups, such as single mothers, the elderly, and ethnic minorities continue to be particularly vulnerable to food and nutrition insecurity. There is also insufficient attention for culture and the traditions around food consumption. Indeed, even the definition of healthy eating is culture-driven. These factors are typically poorly embedded in strategies and analyses of FNS.

A balanced strategy towards EU policies affecting global agricultural markets is needed

Several aspects of EU policies affect global agricultural markets, food security and sustainable development. They include the Common agricultural policy, the EU bioenergy policy, trade policy, climate change policy and development policy, not to mention macroeconomic and monetary policies. The coherence of these policies has long been questioned, and their global impact on food security remains subject of debate. Current EU farm support instruments still have some effects on world market due to risk aversion and wealth effects but they are limited compared to those caused by recent policy developments in the U.S and emerging countries. EU biofuel policies do have significant effects on land use and prices, even when focusing on second generation biofuels. The impact of EU preferential trade schemes on welfare and food security in low and middle countries is questioned and the evidence is mixed. EU policies should also be scrutinised on their indirect consequences on global markets that affects food security, for example through land-use change and deforestation. Economic modelling of EU agricultural, environmental and trade policies is required in order to complement traditional sustainability impact assessments (e.g. standard life cycle analyses).

The effectiveness and coherence of EU aid for food and nutrition security is severely hampered by donor proliferation, aid fragmentation and lack of coordination.

Our knowledge of what activities donors are engaging in and which interventions have been shown to be successful in increasing food and nutrition security (FNS) needs to be improved. A review of available evidence demonstrates that the question whether interventions improve recipients' food and nutrient intake, remains largely unanswered. In the context of increasing levels of funding for aid for FNS and uncertainty with regards to the impact of interventions, the need for improved coordination between donors is high. Despite great political commitment, progress in terms of reducing EU aid for FNS proliferation by concentrating in selected recipient countries and/or by specialising in selected aid sectors has been limited.

Playing agricultural innovation for win-win

As agriculture faces new challenges, technological change and innovation are set to play an increasing role to strengthen nutrition security, empowering small farmers within an agricultural resilient to global environmental change. However, a country's basic institutions need to be in place (like education, health care) before innovations – institutional or technical – can be effective. Also, technological innovations alone (e.g. improved varieties, GM crops, (precision) mechanization, etc.) will not ensure FNS sustainably. Managerial and institutional innovations, both focusing strongly on the local context and actors, hold a high potential for impact on FNS at the global scale.

Inequality and inclusiveness: long term scenarios and robust policy response

There is sufficient food produced globally to feed the world, however access to sufficient food of the right quality is not universal. Poverty and income inequality remain the main cause of undernourishment, explaining 60-70 percent of cross-country variation in FNS status. We have examined how (lack of) equity and inclusiveness may undercut or support food and nutrition insecurity in contrasting future worlds. We focus on inequality by household type along a rural-urban gradient. The scenario exercise suggests that improved income equality between countries does not necessarily translate into improved within country equality – economic growth seems to exacerbate current income inequalities between richer and poorer households, unless redistributive policies are put in place. Ghana provides a clear illustration with the more equal worlds in national terms resulting in a worsening of the within-country income distribution. Demographic change through education and urbanization is a key factor for redressing inequality; on average, both trends support improvements in the income distribution and reduced FNS risk of the poor. The scenario analysis highlights the need to take the wide view, and to consider developments in agriculture and non-agriculture together and account for trends in urbanization and education. Policies that operate in this arena include investments in agricultural productivity and education as long-term policies and medium term interventions to support the poor in the form of transfers, redistributive tax policies and provision of school meals to support the returns to schooling and educational investments.

Food Prices: what information and regulations to avoid extreme events

High and volatile food prices are two different phenomena with distinct implications for consumers and producers. The major problem we phased in 1970's was high prices but in 2007 onwards it was excessive levels of volatility. Fluctuating food prices (volatility) are to some extent a natural phenomenon, what matters more for FNS are abrupt and unanticipated price changes that prevail for several months. On the other hand, long term market drivers of FNS such as food prices, or aggregate supply and demand can have positive or negative impacts depending on the characteristics of the specific households.

Although prices for farm output serve as an incentive to improve global crop supply as expected, output price volatility acts as a disincentive. Output price volatility has negative correlations with crop supply, implying that farmers shift land, other inputs, and yield-improving investments to crops with less volatile prices.

Among the key factors playing a role in creating price volatility are increasing biofuel production, the medium- and long-term effects of climate change, and higher levels of trading in commodity futures markets. Export restrictions in important food-producing countries also contributed to price increases and market jitters in 2010 and 2011. The major proposed actions can be grouped by the objectives they try to achieve: (1) better information and more research, (2) easier trade in agricultural commodities, (3) larger food reserves and better-managed grain stocks, (4) more active use of financial instruments to influence agricultural commodity markets, and (5) stricter regulation of these markets. Scholars and policymakers are debating the merits, feasibility, and likely effectiveness of many aspects of these proposals.

Avoid trade-offs in realising the Sustainable Development Goals and steer towards a stable and resilient +1.5°C food system

The global food system will likely have to contribute substantially to the mitigation efforts required for achieving the ambitious climate change stabilization target agreed in the 2016 Paris Conference of the UN Framework Convention for Climate Change (UNFCCC). The target is to curb global warming at 2°C warming above pre-industrial temperature, and preferably to limit warming to 1.5°C. The contribution of agriculture to mitigation will require efforts at the level of the food production and processing, but also land use efficiency gains to decrease deforestation and free land for negative emission technologies deployment, in particular afforestation and bioenergy production coupled with carbon capture and sequestration.

Most of the mitigation technologies are potentially in competition with food production. Effects however differ depending on the type of instrument used, the sector targeted and the overall macroeconomic context. EU agriculture and food policies will need to be revisited in coordination with other climate policies to integrate the climate change dimensions without jeopardizing food security. International action is also required and the EU should support the progress of negotiations to see agriculture's role recognized as part of the problem but also of the solution. More resource efficient supply chains, better soil management practices and smarter nutrition orientations (including a reorientation towards more plant-based diets in high income countries) appear as efficient options to limit the adverse impact on food production, and should be promoted

The European Union is in need of a new policy vision to accelerate a transformation into an inclusive and health-driven food system

Food and nutrition security (FNS) is a European problem as much as it is a global challenge. The main FNS challenge in the EU is the impact of poor diets on the disease burdens, i.e. the prevalence of both undernutrition and rising overweight and obesity. It is to a large extent driven by socio-economic exclusion in the food system and other forms of inequity: the poor, ethnic minorities and the elderly are particularly vulnerable groups within the EU. Geographically, the FNS challenges are concentrated in the Eastern member states of the EU, where problems of poor food environments compound with compromised access to food. These observations underline the importance of aligning traditional FNS policies targeted at the generation of incomes as well as rural development, with strategies for preventing diet-related non communicable diseases. In general, there is a need to analyse the quality of the food environment across the EU and its relation to the consumption choices, nutrition outcomes and health burdens from diet-related diseases.

Governance of FNS

The challenges of achieving food and nutrition security (FNS) involve a number of traditional sectors (e.g. agriculture, health, trade, social services, education, environmental protection), with various time-frames for action (e.g. transitory or chronic food insecurity) across a range of scales. In this governance landscape, fragmentation of decision-making is a serious risk and at the same time an often observed bypass for dealing effectively with complexity and safeguarding particular interests (Candel, 2014; Gillespie et al. 2013). Therefore, the challenge for decision-making on FNS policy and action is to comprehensively as well as effectively address multiple dimensions.

1.4 Potential impact, main dissemination activities and exploitation of results

The FOODSECURE project has made a large number of significant scientific contributions, and also tried to build bridges to the policy community. The policy areas addressed include agricultural and trade policies, natural resource management and climate change policies, and science and technology policies. The following three innovations in the project have an important impact for decision makers in these areas of policy making:

- (a) a deeper understanding of the determinants and different levels of causality that underpin global food and nutrition security;
- (b) improved ability of decision makers to foresee and respond to future food and nutrition security crises on the basis of improved quantification of short term price volatility and long term drivers of FNS, in close interaction with stakeholders;
- (c) guidance to stakeholders which will allow them to take effective and sustainable actions including the identification of the critical pathways for policies, technological and institutional change for sustainable agricultural growth and enhancement of food and nutrition security.

The targeted audience consists of policy makers and other stakeholders in the EU and regional organisations in developing countries facing food insecurity. Dissemination work is bundled into an easy to use interface between stakeholders and state-of-the-art research results (“Navigator”). The Navigator is primarily oriented towards EU decision makers, by informing them on an EU policy mix that is in line with the goals of reducing hunger and malnutrition.

The expected impact of FOODSECURE has been channelled into three design directions for the Navigator, which emerged from a user-oriented context mapping exercise: 1) FOODSECURE provides “The bigger picture” in a complex policy domain; 2) the project allows users to “Be inspired” by visions and scenarios; 3) the project “Adds value” by focus on socioeconomic and policy drivers in a domain that is dominated by technological perspectives.

The Navigator can be accessed via: <http://navigator.foodsecure.eu>

Address of project public website and relevant contact details:

www.foodsecure.eu/www.foodsecure.eu/navigator

or: <http://navigator.foodsecure.eu>

Figure 3. Design directions of Navigator and added value of FOODSECURE

