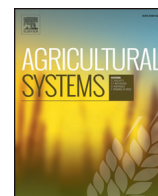




Contents lists available at ScienceDirect

## Agricultural Systems

journal homepage: [www.elsevier.com/locate/agsy](http://www.elsevier.com/locate/agsy)

## Metrics, models and foresight for European sustainable food and nutrition security: The vision of the SUSFANS project

Martine Rutten<sup>a,\*</sup>, Thom J. Achterbosch<sup>a</sup>, Imke J.M. de Boer<sup>b</sup>, Jesus Crespo Cuaresma<sup>c</sup>, Johanna M. Geleijnse<sup>b</sup>, Petr Havlík<sup>c</sup>, Thomas Heckeley<sup>d</sup>, John Ingram<sup>e</sup>, Adrian Leip<sup>f</sup>, Stéphan Marette<sup>g</sup>, Hans van Meijl<sup>a</sup>, Louis-Georges Soler<sup>g</sup>, Johan Swinnen<sup>h</sup>, Pieter van't Veer<sup>b</sup>, Joost Vervoort<sup>e,i</sup>, Andrea Zimmermann<sup>d</sup>, Karin L. Zimmermann<sup>a</sup>, Monika Zurek<sup>e</sup>

<sup>a</sup> Wageningen Economic Research, The Netherlands

<sup>b</sup> Wageningen University, The Netherlands

<sup>c</sup> IIASA, Austria

<sup>d</sup> Institute for Food and Resource Economics, University of Bonn, Germany

<sup>e</sup> Environmental Change Institute, University of Oxford, England

<sup>f</sup> EC-JRC, Italy

<sup>g</sup> INRA, France

<sup>h</sup> CEPS, Belgium

<sup>i</sup> Copernicus Institute of Sustainable Development, Utrecht University

### ARTICLE INFO

#### Article history:

Received 15 February 2016

Received in revised form 9 September 2016

Accepted 24 October 2016

Available online xxxx

#### Keywords:

Sustainable food and nutrition security

Diets

Food system

Metrics

Modelling

Foresight

Multi-criteria analysis

Policy

EU

### ABSTRACT

This paper defines the research agenda of the SUSFANS project, describes its history and its potential societal impacts. It contributes to balanced and encompassing views on how to strengthen food and nutrition security outcomes in the EU and how to improve the performance of the food system in the EU from the perspective of social, environmental and economic sustainability. The research is led by the notion that improvements in the diets of the European consumer must come from, and be supportive of, sustainable food systems. Its holistic, integrative approach builds a set of metrics, models and foresight tools, useable for navigation on sustainable food and nutrition security. This results in a coherent and supported vision on sustainable food and nutrition security in the EU and globally, and underpins a perspective on how EU policies on farming, fishing, food and nutrition could contribute to that vision with greater efficacy than today.

© 2016 Published by Elsevier Ltd.

### 1. Introduction

In the second half of the twentieth century, European agricultural and fisheries policies – aimed at fostering agricultural productivity, securing fair living standards for farmers and ensuring food availability for its population – resulted in massive productive capacity and a strong knowledge and innovation base in Europe. The EU agri-food sector, including fisheries and aquaculture, now delivers a wide variety of products, creating convenience for consumers, cushioning risks to producers and generating jobs in rural and urban areas. Access to safe and nutritious food is, however, not guaranteed for all of Europe's

consumers. Firstly, food quality and safety have sometimes been compromised, for example by outbreaks of BSE, salmonella, campylobacter and *E. coli* (Trienekens and Zuurbier, 2008). Secondly, despite improvements in overall living standards, food poverty is still experienced across certain sections of the population (Cockx et al., 2015). At the same time, a high and rising proportion of the European population, close to 50% in 2010, is overweight or obese (Elmadfa et al., 2009; Gallus et al., 2014), making them prone to chronic diseases (Finucane et al., 2011). As a flip side of increased European affluence, over a 100 million tonnes of food are wasted annually in the EU, a figure expected to rise to 126 million tonnes in 2020 (BIO Intelligence Service, 2013). This not only represents a waste of scarce resources, but also poses an ethical problem given the prevalence of hunger and undernutrition elsewhere. Moreover, environmental concerns are on the rise, with

\* Corresponding author.

E-mail address: [martine.rutten@wur.nl](mailto:martine.rutten@wur.nl) (M. Rutten).

climate change having differentiated impacts on agriculture in Northern and Southern Europe through changing land, water quality and yields (Leclère et al., 2013), but with agriculture also contributing to climate change, in the form of GHG emissions (Bindi and Olesen, 2011; Ciscar et al., 2010).

Maintaining the agri-food sector's beneficial services to society is increasingly challenging in the face of ever-changing economic, social, political and environmental conditions (Foley et al., 2011; Rockström et al., 2009). In the short-term, food crises – which may arise due to weather extremes or financial downturns – need to be guarded against, and the growing pressures on the natural resource base need to be reduced. In the long-term, the EU agri-food sector needs to be competitive and sustainable in the global setting of climatic, geopolitical and socioeconomic change if it wants to maintain a strong European production base. At the same time diets should become more healthy and nutritious, whilst remaining affordable and allowing for cultural diversity (Agrimonde, 2011; UK Foresight, 2011).

EU policy makers increasingly recognise that European diets need to become more environmentally and economically sustainable, and more healthy and nutritious, as evident from recent policy documents on the CAP (COM (2010) 672), nutrition, overweight and obesity-related health (COM (2007) 279), resource efficiency (COM 2011) 571) and the circular economy (COM (2014) 398). The majority of research on FNS has however historically been relatively disparate, either focusing on food production by agricultural and fisheries sciences, or on consumption patterns, diets and health by the nutrition sciences (Harris et al., 2013). Whereas there is a growing body of literature that calls for bridging this disciplinary divide to make agriculture more nutrition-sensitive (Chicago Council, 2011, 2015; Fan and Pandya-Lorch, 2012; FAO, 2013; Gustafson et al., 2016; Jaenicke and Virchow, 2013), and arguably vice-versa, common metrics, methods and foresight on the basis of which programs and policies can be designed and implemented that address the nexus of agriculture and health in support of sustainable FNS are thus far lacking.

This has led to the development of a new, transdisciplinary research project, SUSFANS, which develops metrics, identifies and analyses drivers, integrates data and modelling and formulates foresight for EU sustainable FNS, building on a common scientific evidence-base which

accounts for the perspectives of the various actors and factors that play a role in the food system.

This paper presents the vision of SUSFANS on how to advance research in support of policy and practice on sustainable FNS in the EU, as developed by its partners from academia, public and private sectors (Box 1), and how this vision came into being in response to and improves upon current approaches.

The structure of the paper is organised along the lines of the three pillars of SUSFANS (Fig. 1), each of which will be elaborated in the sections to come. A preparatory Section 2 gives a summary of how the SUSFANS project came into being, identifying key points where SUSFANS addresses shortcomings and/or improves upon currently available approaches. Section 3 discusses SUSFANS' approach to assessing sustainable FNS, including a conceptual framework, metrics and analytical tools for measuring, assessing and monitoring the current state of FNS in the EU and underlying drivers of change. Section 4 elaborates on new and improved models combined in a SUSFANS toolbox for quantification of future scenarios. Section 5 describes the process of foresight and policy guidance for effective EU-wide farm, fish, food and nutrition policies using both scenario analysis and case studies, with stakeholder engagement effectuated in the design of policy interventions and innovations as well as in the evaluation of outcomes via a participatory MCA. Section 6 illustrates how the project envisages to have impact by means of its outputs. The final section summarises and concludes.

## 2. History of the SUSFANS project: towards an integral, participatory and forward-looking assessment method of sustainable FNS in the EU

Sustainable food and nutrition security has been described as a key aspect in the research and innovation strategy for Europe. In the European Commission's work program for Horizon 2020, the concept pertains to securing food production from agriculture and marine resources for a healthy life and wellbeing while ensuring global competitiveness, nutrient availability, resource efficiency, environmental protection, and innovation potential in the EU in the long run. Call no. SFS-19A solicited proposals for analytical tools that support foresight on future reforms of the Common Agricultural post-2020, the management of short term food crises in European markets and regulation of supply chains, and consumer & health policy related to food and nutrition. Several directorates of the European Commission, notably Agriculture & Rural Development, Health and Food Safety (referred to as SANCO at the time), Growth, and International Cooperation and Development were foreseen to benefit from the knowledge and innovations developed under this grant.

Funded under this grant, the SUSFANS project brings together researchers from the more macro-oriented agri-food production and supply sciences and environmental sciences – who are increasingly interested in incorporating nutrition and health impacts into their integrated assessments – and researchers from the more micro-oriented nutrition and health sciences – increasingly interested in food systems and wider economic tendencies explaining nutrition and health outcomes. The team jointly developed the multidisciplinary research framework that is presented in this paper.

The macro-level orientation is well-established in policy research on food and nutrition security and sustainable food production systems in Europe. Researchers in the FOODSECURE project demonstrated that the drivers of European FNS and global FNS need to be analysed in a single framework in order to assess the impact of European 'policies on global food security (Pieters et al., 2013). Laborde et al. (2013) argue that a "toolbox" of integrated assessment models with harmonised data inputs provides a useful instrument for this purpose, in particular for analysing FNS in the long term under climate change. Pangaribowo et al. (2013) underpinned the toolbox with a basic theoretical model

### Box 1 SUSFANS project details.

**Objective:** To build the conceptual framework, the evidence base and analytical tools for underpinning EU-wide food policies with respect to their impact on consumer diet and their implications for nutrition and public health in the EU, the environment, the competitiveness of the EU agri-food sectors, and global food and nutrition security.

**Duration:** 2015–2019

**Coordination:** Wageningen Economic Research

**Partners:** Wageningen University and Research Centre (WUR); Institute for Food and Resource Economics, University of Bonn (ILR); the French National Institute for Agricultural Research (INRA); Centre for European Policy Studies, University of Oxford (CEPS); International Institute for Applied Systems Analysis (IIASA); Czech National Institute of Public Health (SZU); French Agency for Food, Environmental and Occupational Health & Safety (ANSES); Consiglio per la Ricerca e la sperimentazione in Agricoltura (CRA); Technical University of Denmark (DTU); International Life Sciences Institute (ILSI)-Europe; Swedish Institute for Food and Biotechnology (SP); European Commission – Joint Research Centre (JRC); National Taiwan University (NTU), National Resources Institute Finland (Luke); DSM Nutritional Products; Dutch Dairy Association (NZO); and Unilever (R&D).

**Funding:** €5 mln. under contract H2020-SFS19A-2014, Grant 633692

Download English Version:

<https://daneshyari.com/en/article/8874998>

Download Persian Version:

<https://daneshyari.com/article/8874998>

[Daneshyari.com](https://daneshyari.com)