

# ***Issue Brief: Scenarios and drivers to explore global food security up to 2050***

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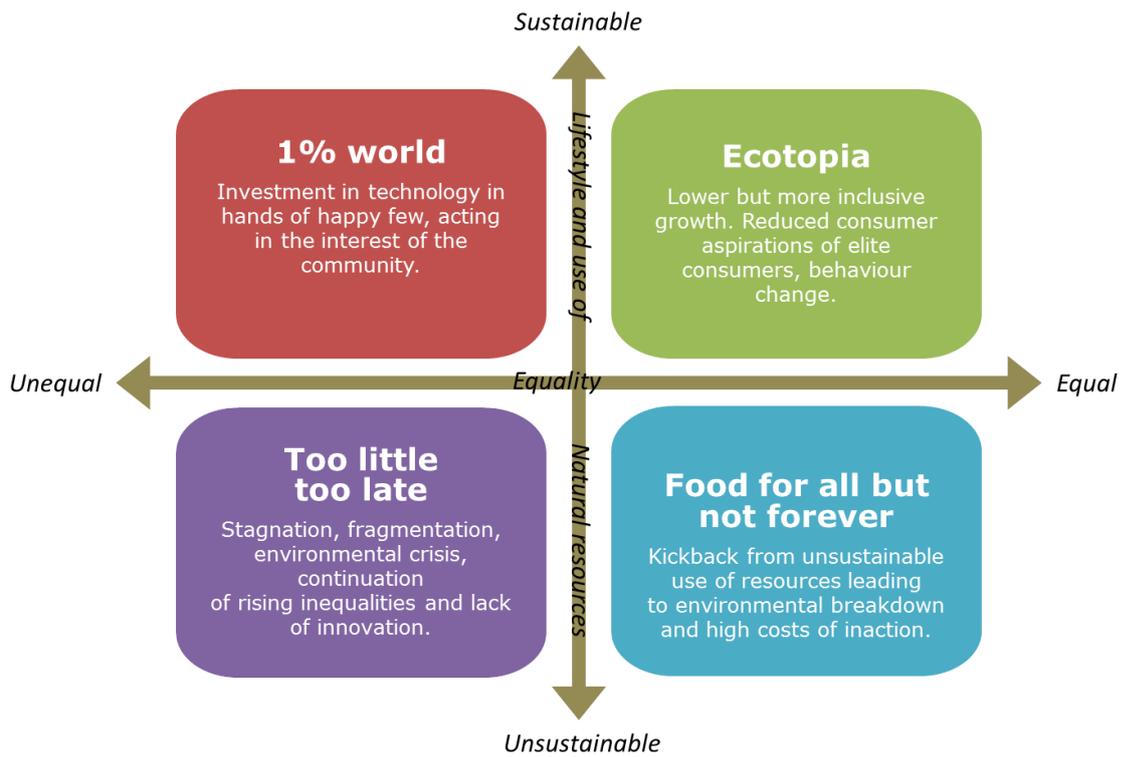
Participatory scenario development together with stakeholders in combination with thorough validation, is a useful approach to develop realistic storylines and drivers for (long-run) food security modelling.

## **Short summary**

To guide policymaking, decision makers require a good understanding of the long-term drivers of food security and their interactions. Scenario analysis is widely considered as the appropriate tool to assess complex and uncertain problems, such as food security. To this extent, four new global scenarios were developed that are specifically designed for food security assessment and modelling. To ensure the relevance, credibility and legitimacy of the scenarios a participatory process is used, involving a diverse group of stakeholders. The scenarios show four different but possible future worlds, defined along two axes: (in)equality, and lifestyle and natural resources, reflecting contrasting food security conditions (Figure 1). The scenarios can be used as input in global integrated assessment models to assess the impact of aid, trade, agricultural and science policies on global food and nutrition security or as input to policy formulation and discussion that aim to anticipate potential long-run future development.

Several conclusions can be drawn from the scenario development process. First, a participatory approach towards scenario development, involving a diverse group of stakeholders, combined with a professional management and planning of the process, leads to the creation of innovative and diverse scenarios. It is unlikely that the derived scenarios would also have resulted from an exercise that mainly involved scientists. Second, the adaptation of already existing scenarios (the so called 'fast-track' approach), that was initially proposed, is not without risk. Stakeholders indicated they wanted to develop new scenarios and therefore a completely new set of scenarios was developed, which, however, led to delays. Finally, participatory 'trend mapping', in combination with thorough validation, proved to be a useful tool to derive realistic trends of long-term driving forces of global food and nutrition security.

**Figure 1: FOODSECURE scenario matrix**

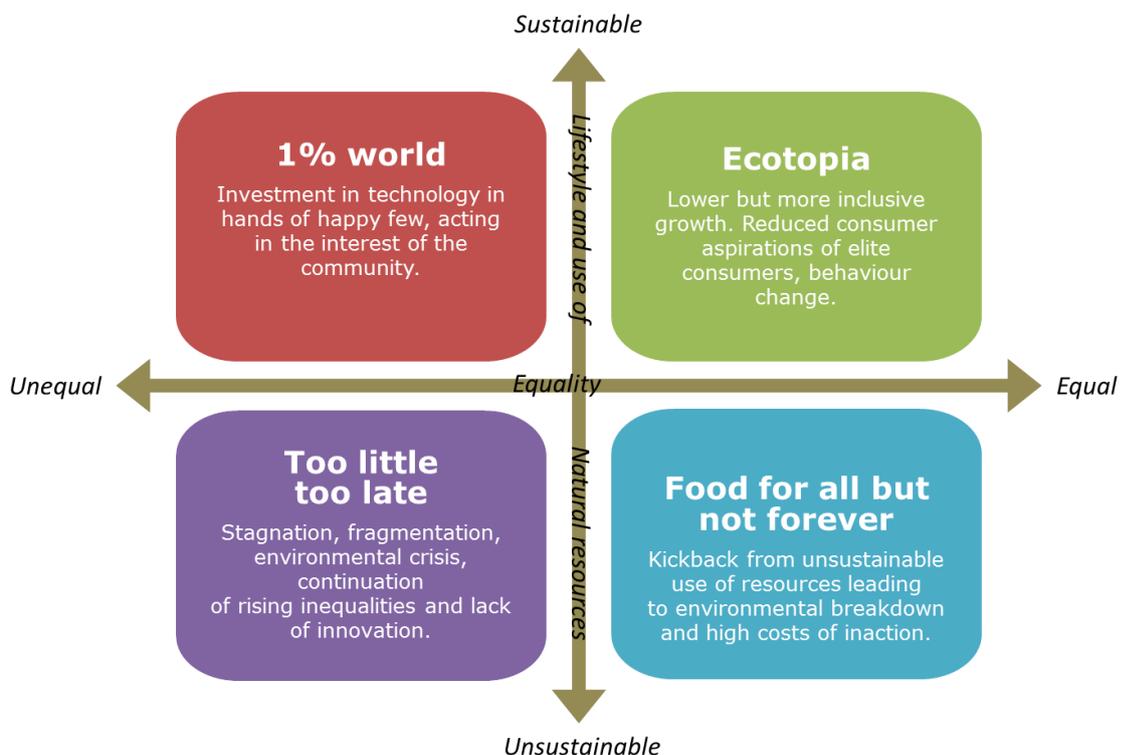


## Full summary

### Introduction

Understanding long-term food and nutrition security is a complicated issue, since it is determined by the interaction of a wide number of highly uncertain drivers that operate at the household (e.g. income and education), national (e.g. agricultural and social protection policies) and global (e.g. climate change and trade policy) level. Scenario analysis has become the standard approach to assess climate change, ecosystems and biodiversity but only recently emerged as a tool to assess global food security (e.g. Dorin and Paillard 2009). Scenarios are “plausible and often simplified descriptions of how the future may develop based on a coherent and internally consistent set of assumptions on key driving forces and relationships” (Carpenter et al. 2005). It has been demonstrated that scenarios can support linking science and policy (Chaudhury et al. 2012) and guide action (Vervoort et al. 2014). As part of the FOODSECURE project, a set of four new exploratory scenarios was developed that are specifically designed for food security analysis and modelling. The storylines and drivers presented in this paper will be quantified by means of a number of well-known global integrated assessment models to assess global food security up to 2050.

Figure 1: FOODSECURE scenario matrix



### Approach and Results.

To ensure relevance, credibility, legitimacy and creativity, a strong participatory approach has been adopted to guide the design of the storylines and inform the quantification of drivers. The core of the process consisted of two two-day workshops and two webinars, which brought together around 20 different stakeholders that included policy makers, researchers and representatives from NGOs and business with an interest in food security issues. The process to develop the scenarios consisted of three main steps: (1) the development of the scenario logic and storylines, (2) the quantification of key drivers, and (3) the validation of results. The result were four scenarios that are positioned around two axes: (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 that are summarised below. For all scenarios a rich storyline was developed that describes the state of food and nutrition security in 2050. The scenarios are

accompanied by a database of quantified drivers (i.e. GDP, population and crop yield) that can be used as input in the global assessment models.

### *Conclusions*

Several conclusions can be drawn from the scenario development process. First, the participatory scenario approach, involving a diverse group of stakeholders, combined with a professional management and planning of the process, resulted in the creation of a set of innovative and diverse scenarios. A comparison with other scenarios (van Vuuren et al., 2012) shows that the FOODSECURE scenarios capture a wide range of possible future pathways that have similar characteristics as other scenarios but also include innovative elements. Similarly, the comparison demonstrated that the quantified drivers were in the range of others without being excessive.

Second, following Kok et al. (2011), the initial idea was to use an existing set of scenarios (so-called 'fast-track' scenarios), as a basis for the storylines to speed up the process and leave more room for the quantification of drivers. However, during the process, stakeholders raised the concern that the proposed shared socioeconomic pathways (SSPs) scenarios (O'Neill et al., 2014) did not cover all plausible futures, were too strongly geared towards climate change and were not able to adequately take into account the relevant aspects of future food and nutrition security. To accommodate these concerns, a complete new set of scenarios was developed from the bottom up. The lesson that can be drawn from this is that stakeholders are likely to be unwilling to accept scenarios that have been created for a different subject and purpose. Therefore researchers and scenario developers should be careful in using existing storylines as basis for scenario development.

Finally, a novel approach – participatory trend mapping – was used to obtain projections for a number of important long-run drivers of food security. This approach was found to be very useful in discussing and assessing a relative large number of driving forces with stakeholders in a relatively short time. The use of pictures with historical trends proved a simple, intuitive and effective way of quickly informing stakeholders about indicators they were previously not familiar with and helped to generate realistic future trends. A positive side effect was that in several instances the mapping of drivers led to a renewed discussion about the internal consistency of the scenarios and consequential adjustment. Participatory trend mapping is an interesting and new tool that can also be used in other scenario building exercises that require the quantification of drivers.

## References

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