



TRANSMANGO



**KBBE.2013.2.5-01
TRANSMANGO
Grant agreement 613532**

Deliverable number/Name: Deliverable D5.5 SYNTHESIS REPORT ON FNS PATHWAY SPECIFIC DRIVERS, POTENTIALS AND VULNERABILITIES

Dissemination level: Public (PU)

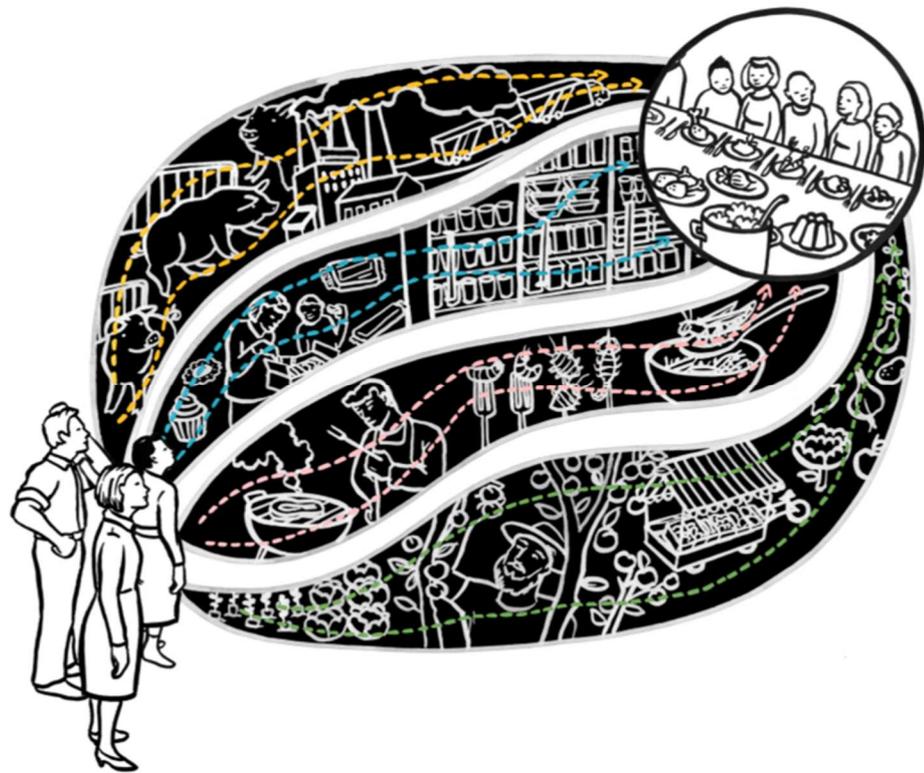
Delivery date: 24 April 2017

Status: Final

Authors: Ana Moragues-Faus, Roberta Sonnino, Terry Marsden

Cardiff University

WP5 SYNTHESIS REPORT



30-6-2015

Ana Moragues-Faus, Roberta Sonnino,
Terry Marsden

Wp5 Synthesis report

EXECUTIVE SUMMARY	4
1. INTRODUCTION	5
2. IDENTIFICATION OF GLOBAL DRIVERS OF THE FOOD SYSTEM AFFECTING EU FOOD AND NUTRITION SECURITY (DELPHI METHOD)	5
3. EU CASE STUDIES	8
4. TRANSMANGO SCENARIOS	12
5. TRANSITION PATHWAYS	16
6. CONCLUSIONS	18

EXECUTIVE SUMMARY

The European project TRANSMANGO aims to obtain a comprehensive picture of the effects of the global drivers of change on European and global food demand and raw material production, and specifically WP5 aims to analyse vulnerabilities and transitions at EU Level. This report summarises the work undertaken as part of WP5, specifically, the results of a Delphi method with experts to identify vulnerabilities and drivers of change in the European food system, the outcomes of analysing five EU case studies as key areas where different vulnerabilities to deliver FNS are expressed, the development of European scenarios and transition pathways.

The results of these four tasks taken together call for a place-based approach to progress FNS conceptualisations, but also to embrace the dynamic nature of vulnerabilities in current theoretical frameworks. A way forward is to progress further the concept of 'vulnerability pathways'. A key contribution of WP has been the identification of a rich set of policy recommendations. High-level experts participating in this WP and the TRANSMANGO team particularly highlight the need to create a Food Strategy Council to inform, support and provide feedback on policy supported by a European Food Systems Knowledge sharing platform that gathers knowledge and examples of practices, assures data availability around nutrition and food environments, works towards greater policy coherence and provides greater support for social innovation.

1. INTRODUCTION

TRANSMANGO aims to obtain a comprehensive picture of the effects of the global drivers of change on European and global food demand and on raw material production. The project focuses on the vulnerability and resilience of European food systems in a context of socio-economic, behavioural, technological, institutional and agro-ecological change and aims to enhance understanding of the new challenges and opportunities that the food sector will face in the future.

WP5 aims to analyse vulnerabilities and transitions at EU Level. The main objectives of WP5 are the following:

- Characterize how the different types of vulnerabilities are expressed at the EU level and map hotspots
- Elaborate stakeholder-developed conceptual models on scenarios about the functioning of EU food systems, identifying interrelations among key building blocks, vulnerabilities and global drivers.
- Develop normative transition pathways for desirable future EU food systems (2050)
- Design potential transition pathways

This section summarises the main tasks conducted throughout WP5. In the conclusion we discuss how they have contributed to address these main objectives.

2. IDENTIFICATION OF GLOBAL DRIVERS OF THE FOOD SYSTEM AFFECTING EU FOOD AND NUTRITION SECURITY (DELPHI METHOD)

As part of this WP, we conducted an analysis of alternative approaches to FNS (incorporated in the conceptual framework WP2 and recently published¹) and a Delphi method, where 45 international experts participated to identify global drivers of the food system affecting EU food and nutrition security (see deliverable 5.1 for a detailed discussion of the method and results). This method consisted of three rounds. The first round contained open-ended questions to gather as much diversity as possible. The analysis of the answers to these questions led to identify a set of drivers, vulnerabilities and policy priorities that participants ranked throughout the second round. The results of the second round were shared in the third and final round asking for reactions, comments or suggestions if any. In this executive summary we merge results from the first and second round.

A first set of results consists of definitions of FNS and the food system. By and large participants conform to the FAO definition, identifying access, availability and sustainability as key words to define FNS. There is a broad consensus around these key words, however more normative qualifiers also emerged in some responses, pointing out how a food system that delivers FNS should look like. There is also a growing

¹ This analysis is the main basis of the academic publication: R Sonnino, T Marsden, A Moragues-Faus (2016) [Relationalities and convergences in food security narratives: towards a place-based approach](#) *Transactions of the Institute of British Geographers* 41 (4), 477-489

concern around conflating FNS with right based approaches. There is less consensus around the definition of 'food system', with stakeholders proposing either an actor-oriented approach (making direct reference to the role and contribution of different agents), a food chain approach or a mixture of stakeholders, flows, material devices, institutions, norms, beliefs and activities. By and large respondents have a dynamic interpretation of the food system, using terms such as "processes", "activities", "flows" and "complex system". Few respondents make reference to "intangible" dimensions of the food system in their definitions – specifically, governance, culture, ecosystem services and knowledge.

The main global drivers of change at present and by 2050 are very similar according to the results of the first Delphi round where stakeholders responded to open-ended questions identifying as key climate change, changes in consumption patterns, population growth and technological innovation. However, when respondents were asked to prioritise, results changed considerably. At present the most important driver is changes in consumption patterns and practices, followed by population growth according to representatives of the private sector, the financial crisis according to the public sector or the financial crisis and the influence of the corporate/private sector according to civil society organisations. By 2050 the picture is very different, with access to resources and climate change being the main drivers of global change. While different types of stakeholders have distinct second or third choices, they all agree that by 2050 GM technology and technological innovation will be the least important drivers of the 10 options we offered them. Finally, there was less consensus around the main drivers of change for FNS in Europe by 2050. While consumer preferences and concerns ranks high, there are a mixture of elements including increase of obesity and overweight, high prices of quality foods, food safety, consumer and producer associations and effects of agricultural subsidies are almost equally important.

We also asked participants to identify threats and weaknesses affecting FNS in Europe. By and large the most recurrent issues were environmental threats such as climate change and loss of biodiversity, trade (including increased liberalisation and dependency rates) and EU's political and regulatory system. However, respondents listed many specific elements in the first round that were grouped into three main categories: environment and agriculture, policy and governance and socio-economic trends. Under these categories we also identified a set of policy priorities that emerged when we asked stakeholders for the origin and changes needed to address threats and weaknesses affecting FNS in Europe. We summarise the main results by topic around weaknesses and policy priorities below:

- Environment and agriculture: The main vulnerability is associated to loss of biodiversity (including agro-diversity). According to CSOs and the private sector, loss of soil fertility and water availability are also key, while the public sector emphasizes the industrialisation of the food and farming system as a priority. This vulnerability is one of the least important according to private sector representatives. The main policy priorities are implementing measures to support small food producers, reducing food waste and increase investment in sustainable agriculture. However, different groups of stakeholders emphasize different measures. Most interventions are envisioned at the national and European level, such as investment in sustainable agriculture, although the regional level is important to develop instruments to support small food producers. The time frame of policy priorities to address these environmental vulnerabilities is mostly short term (2015).

- Policy and governance: Respondents ranked policy and governance vulnerabilities that mostly affect Food and Nutrition Security, highlighting unequal power relations across the food chain as the main vulnerability, followed by the influence of multinationals on policy, the lack of a long-term perspective and subsidies that incentivize mass production. The standard deviation in this exercise is particularly high, showing a high level of controversy. The main priorities are measures to support small producers, the adoption of a more comprehensive approach to FNS at the EU level and an increased democratization and participation in the decision making process. Notwithstanding, the private sector highlights the regionalization of food policies as the main policy priority. Most interventions are envisioned at the European level, although the national level also plays a key role in integrating food sovereignty/right to food into policy, green public procurement and increase democratization and participation in the decision making process. The time frame of policy priorities to address these policy and governance vulnerabilities is mostly short and mid-term, by 2015 and 2025 respectively.

- Socio-economic trends: Respondents highlighted poverty and social exclusion as the main vulnerability followed by dominance of corporate interests, recession and austerity measures and changing consumption patterns. However, the standard deviation is high, indicating more dispersion and disagreement between participants. For example the private sector stakeholders highlight consumption patterns but also the EU dependence on imports; CSOs instead stress the high consumption of unhealthy foods alongside with the dominance of corporate interests as the main vulnerability, while public sector respondents point out poverty and social exclusion as key. The main policies priorities revolve around increasing transparency and ethics in the food chain, adoption of public procurement strategies that incentivize healthy diets and the adoption of market-based policy instruments to incentivize healthier diets. In this case there is also different emphasis depending on the group of stakeholders, for example the private sector stresses education and consumer engagement while CSOs also include the need to reduce meat consumption. Most interventions are envisioned at the European level, particularly in terms of revising the regulation on food labelling, advertisement campaigns and increase transparency and ethics. Public procurement and stronger social safety nets are generally devolved to the national governments, alongside with education and consumer engagement, where regional and municipal levels have also a key role to play. The time frame of policy priorities to address these socio-economic vulnerabilities is mostly short term; for more than 50% of the stakeholders, all policy priorities need to be implemented by 2015.

In the first round of the Delphi we also asked stakeholders about the origins of the threats and weaknesses affecting FNS in Europe. The current EU regulatory and political framework is considered the main origin of Europe's FNS vulnerabilities, jointly with political interests, geopolitics and governance issues. Respondents also point out an absence of coordination and insufficient European integration as well as describe the political system as outdated, unable to address internal diversity, non-democratic, segmented, incoherent and lacking leadership. There is also a general criticism towards ineffective or inconsistent policies, lacking a holistic and common vision on food related issues that ensure the right to food for all. But respondents also

raise issues about specific policies, including the Common Agricultural Policy incentivising mass production through subsidies, hindering gender equality or just treating symptoms; or economic and social policies such as austerity measures that also threaten FNS.

Finally, in the first round we asked participants to point out neglected factors in FNS debates. Respondents mostly acknowledge that specific perspectives are neglected in FNS debates in Europe, such as the lack of integrated and long term perspectives on the food system but also the linkages between sectors and environmental, socio-economic and political dimensions of FNS. Respondents also acknowledge the lack of consideration of multi-level perspectives and interdependencies among countries. According to stakeholders, debates are omitting the contradictions of EU's FNS policy framework with agricultural, trade and energy policies; as well as the tensions around technological advances and public opinion. On a more politicised vein, respondents identify the following issues as neglected in the debates: food as a public issue, food sovereignty, the right to food, food as commons and the recognition of alternatives. There are also specific issues related to agriculture, food chain, trade, policy and governance, consumption, environmental issues and socioeconomic trends neglected in public debates. According to respondents, the reasons associated to neglect these factors respond mainly to unbalanced geometries of power inside the food chain and political spheres (including geopolitical relations) that impose a dominant discourse around consumerism, free trade and neoliberal development. Furthermore, stakeholders point out other key motives such as the absence of shared holistic visions and political leadership, the inadequacy of data, the lack of solidarity between social classes and countries, the erosion of trust (including lack of independence of science and institutions), historical path-dependencies and lack of financial resources or incentives to promote sustainability and social justice.

3. EU CASE STUDIES

In order to further our understanding of European food system vulnerabilities we first conducted an EU level analysis of FNS trends and their variation across European countries. For that purpose, we combined three different methods:

- a) Exploratory factor analysis to synthesize FNS indicators
- b) Model (panel data) to identify trends in each country from the 2007-2009 crisis until nowadays;
- c) GIS techniques to explore spatial heterogeneities of EU FNS.

Results from these analysis depict a very heterogeneous FNS picture across EU countries. Existing FNS measures show a lack of reliable data and indicators to fully represent current challenges faced by the EU and existing threats within EU food systems that limit the delivery of FNS outcomes. This seems particularly relevant for the utilisation dimension, where, for example, there is a lack of indicators around food habits and their impact on health and safety. Observed trends highlight a strong reduction of concern for access dimensions, and moderate for availability and utilisation dimensions.

Secondly, we selected specific case studies to understand how current and future vulnerabilities of the EU food system interact with FNS outcomes. The characterisation of these interactions allowed us to identifying the emergence of distinct vulnerabilities pathways. In this context, the case studies are defined as hotspots, that is, the result from the convergence of several factors or activities which represent a risk or problem for the food system. Five key hotspots were chosen:

- competition for land use in relation to bio-energies;
- organic farming;
- genetically modified organisms;
- public procurement and
- food poverty

In order to characterise the vulnerability pathways that emerge within these five hotspots, we addressed the following questions: (1) what are the main internal and external drivers of change affecting the hotspot (2) What are the causal mechanisms the result in vulnerability pathways? (3) Which FNS dimension is affected by each vulnerability pathway, the degree of impact, the time frame and the scale. Each vulnerability pathway also presents a list of external shocks and stresses that particularly affect the delivery of FNS outcomes. Table 1 summarises the vulnerability pathways assessment for the different case studies. Two EU case studies – organic farming and biofuels - were also analysed under the scenarios identified in task 5.3 (see below) in order to understand how vulnerabilities are expressed in different contexts.

Table 1. Vulnerability pathways assessment

Hotspot	Vulnerability pathway	Dimension of FNS affected (1)	Degree (2)	Timeframe (3)	Scale (4)	Shocks & stresses (5)
Competition for land	1 Adequate level of agricultural production and food availability;	Stability of Availability	Medium-high	Medium	European	Increasing food and energy demand, urban sprawling, wrong policy designs and implementation; lack of coordination among sectorial policies;
	2a Dependence from subsidy and rental seeking behaviours;	Stability of Availability	High	Short	Middle	Reduction of off-farm income; External investors; wrong policy designs and implementation;
	2b Dependence from subsidy and rental seeking behaviours	Control of availability	Low - medium	Long	European	Reduction of off-farm income or alternatives External investors; ban to the food Import or reduction of free trade
	3a Volatility of Agricultural and food price;	Stability of Availability	Medium	Medium	Middle	Change in oil prices; demography changes, conflict in middle east.
	3b Volatility of Agricultural and food price;	Control of Availability	Low	Long	Local	Detrimental natural capital and high risk exposure at whether and market conditions; lack of free trade, barrier at import

	3c Volatility of Agricultural and food price;	Stability of Access	Medium	Short	European	Food Market concentration, speculations, demography and immigration; lack of redistributive policies.
	4a Maintenance of diversification of local and rural areas;	Stability of Availability	High	Long	Local	high exposure at hazards due to standardisation of the process and reduction of diversification
	4b Maintenance of diversification of local and rural areas;	Control of Availability	Medium	Long	European	high exposure at hazards due to standardisation of the process and reduction of diversification
	4c Maintenance of diversification of local and rural areas;	Stability of utilisation	Low	Short	Local	high exposure at hazards due to standardisation of the process and reduction of diversification
	5a Sustainability of biofuels	Stability of Access	Low	Short	European	Ecological shocks or market shocks; migration and change in food demand; market concentration
	5b Sustainability of biofuels	Stability of Availability	High	Short	European	Ecological shocks or market shocks
Conventional versus organic	1 Degrading natural resources	Stability of availability	High	Medium	European	Climate change, pest infestation, agriculture intensification, competition for natural resources from other industries, trade disruptions, population growth & consumption preferences
	2 Trading tacit with standardized knowledge	Control of availability	Low-medium	Short	Local	
	3a Dependence on external inputs and governmental subsidies	Stability of availability	High	Short	European	Disruption in availability of external inputs due to for example fossil fuels scarcity, geopolitical tensions, economic crisis, removal of subsidies, as well as disturbances that operate beyond the scope of fixes of external inputs such as unexpected and non-linear climate change and feedbacks
	3b Dependence on external inputs and governmental subsidies	Control of availability	High	Short	European	
	4 Latent instability on agri-food markets	Stability of access	Low-medium	Short	European	Sudden removal of subsidies, weather- or pest-related crop failures, increased price volatility, food scandals causing sudden drop in food consumption
	5a Striving for efficiency while losing resilience	Stability of availability	Medium-high	Long	Middle	All kinds of shocks and stresses originating from biophysical environments, economy and science & technology, e.g., food contamination, price volatility, resources scarcity, etc.
	5b Striving for efficiency while losing resilience	Control of access	Medium	Medium	European	
	5c Striving for efficiency while losing resilience	Stability of utilization	Medium-high	Short	Middle	
	5d Striving for efficiency while losing resilience	Control of utilization	Medium	Short	European	

GMOs	Regulation of the authorization of new events	Availability of GM food	High	Short	EU	EU/national authorisation procedures
	Regulation of the authorization of new events	Availability of non-GM food	Medium	Medium	EU	EU/national authorisation procedures
	Flexibilisation of coexistence rule	Availability of GM food	Medium	Short	EU	EU/national regulation of coexistence
	Flexibilisation of coexistence rule	Access to GM food	Medium	Short	EU	EU/national regulation of coexistence
	Flexibilisation of coexistence rule	Availability of non-GM food	Medium	Medium	EU	EU/national regulation of coexistence
	Regulation of global food trade	Access to GM and GM dependent food (meat)	High	Short	EU	Global trade agreements.
	European Citizens' reluctance to GM food	Access to GM and non-GM food	High	Short	EU	Food scandals, transparency of the food chain
	European Citizens' reluctance to GM food	Availability of GM food	High	Short	EU	Food scandals, transparency of the food chain
	European Citizens' reluctance to GM food	Control	High	Medium	EU	Food scandals, transparency of the food chain
	Environmental conditions	Availability of GM and non-GM food	High-medium	From short to long term	Regional/ National	Climate change, resistance to weed, pest and diseases
	Market concentration along the food value chain	Control	High	Medium	EU	Economies of scale, competition legislation
	Public procurement	Absence of political will and leadership	Access and stability	Medium-high	Medium	Local, regional and European
Low availability of healthy food		Access	Medium	Short term	Local, regional and European	Increase of food prices, extreme weather events, changes in food trade deals, food safety problems and food scares.
Inadequate infrastructure and budget constrains		Availability	Medium-high	Short and medium term	Local, regional and European	Financial crisis, austerity policies affecting investment in infrastructure and public services, public perception on sustainability and healthy food.
Lack of organizational culture, knowledge and skills around and about		Availability and stability	Medium	Medium and long-term	Local and regional	Public perception, inefficient governance frameworks, austerity policies affecting investment in public services and training.

	sustainable food chains					
Food poverty	Neo-liberal Food Policy	Control, Accessibility	High	Short	European	Individualization of failure and shortcomings factoring systemic shocks and stresses
	Social fragmentation tendencies	Stability, Availability	Medium	Short	Household	Expansion of vulnerable groups with food poverty problems factoring systemic stresses and shocks
	Welfare reforms, sanctions and cuts	Stability, Accessibility	Medium	Medium	National /Regional	Loss of social welfare-led protection mechanisms factoring systemic stresses and shocks
	Food pricing discrimination mechanisms	Control, Availability	Medium	Long	European /Global	Reproduction of poverty related health problems factoring systemic shocks and stresses
	Lack of policy awareness of wider systemic causes of food poverty	Control and Stability, Availability and Accessibility	High	Short, Medium and Long	All scales	Policy incapacity / unwillingness to address food poverty in more holistic ways factoring systemic shocks and stresses

The comparative analysis of the five case studies shed lights on sensitive factors of the food system, critical FNS dimensions and the drivers of change (exogenous and endogenous to the specific food) that are more likely to alter future provision of FNS outcomes. Results pinpoint that vulnerabilities may have different magnitudes and may affect different FNS dimensions. In the short-term the highest concerns relate to availability, while, in the mid-term and in the long-term all three FNS dimensions are affected. These concerns can be explained by a reduction in the adaptive capacities of the food system, mainly due to a reduction in natural and human resources as well as loss of diversity in the system (i.e. in terms of FNS outcomes). Results show that production and consumption spheres are deeply interrelated and without a provision of private and public goods by agriculture there will be higher exposure to shocks and stresses. The risks and stresses external to the food systems (e.g., migration, energy security etc.) highlight a very high exposure of European food systems to hazards and the negative effect of root causes of vulnerability. This high exposure to hazards, cannot be easily internalised by the European agri-food system and neither can be managed through existing common policy schemes. In fact, governing such pressures in the food system requires an adequate institutional environment and governance mechanisms that build resilience and enable successful adaptation to deliver FNS.

4. TRANSMANGO SCENARIOS

In order to better understand vulnerabilities and transitions at EU Level, as part of this WP, we developed with key EU stakeholders explorative scenarios of future food systems change in the context of global drivers. In order to develop these EU scenarios we designed a three stage process: 1) building scenario skeletons; 2) developing scenario narratives and 3) analysis of results and preparation to use scenarios in local and EU case studies.

The first stage comprised identifying a list the driving factors considered both most important and most uncertain in the future of European food and nutritional security. Online responses of 50 European food system stakeholders were compiled and compared with the factors identified through other TRANSMANGO work packages including an analysis of national media (Deliverable 2.4), a vulnerability framework design (Deliverable 2.5) and a Delphi process (Deliverable 5.2). From the combined lists of factors, a shortlist of the top eight factors was developed to be used as a frame to outline diverse scenarios:

1. Consumption patterns
2. Environmental degradation
3. Poverty and economic inequality
4. Social and technical innovation
5. Urban and rural population dynamics
6. Power and market concentration
7. Trade agreements
8. Basic resource availability (water, energy, raw materials)

For each factor, stakeholders identified different factor states (e.g: Urban and rural population dynamics: increase in both, decrease in both, increase in urban population and decrease in rural, decrease in urban and increase in rural) and also provided information around which combinations among states of different factors could plausibly happen at the same time. These compatibility matrixes were inputted into the software program OLDFAR that outputted highly diverse subsets of 8 scenarios skeletons, that is eight different combinations of states of the eight factors selected. The TRANSMANGO team reviewed these scenarios for consistency, plausibility and diversity and chose a final set of 4 most diverse scenarios to be developed into full narratives through a multistakeholder workshop.

This work fed into a one day workshop with EU experts held in Leuven the 10th of September of 2015. The aim of this workshop was to develop the scenarios narratives and identify causal mechanisms. Participants created a future vivid world for each scenario, developing a picture of that particular world in 2050 and later back-casting to the present, identifying key processes and events that might. The eight scenarios developed are summarised below:

- Fed-up Europe: Practices and business models leading to unhealthy diets and negative environmental impacts continue. The power of a crumbling EU and of national policy makers to change these trends decreases over time with a combination of decreasing funds and decreasing popular support. There is a lack of leadership in the face of climate and migration crises. Though inequality is high, consumers incomes are enough to avoid extreme food insecurity, but many lack the knowledge, incentives or budgets for healthy life styles. Migrants providing cheap labour throughout Europe are an increasingly vulnerable group. In governments and in the private sector, there are minorities interested in changing the trend, but they are fighting an uphill battle.

- The price of health: Global economic downturns, social problems and increasingly non-competitive EU economies have increased the cost of living. These factors have combined to make many city dwellers financially insecure, and many responded to increasing food insecurity by moving back to the countryside where they can produce some of their basic foods themselves. Many Europeans have been returning to rural lives out of necessity due to these global pressures, but also because of changing social norms, and facilitated by technological advances in communication. These changes are supported by policies focusing on self-reliance and sustainability. The localization of supply has limited economies of scale, but cheap communication technologies have allowed people to be part-time farmers while maintaining aspects of other, productive career activities. For many, the notion of well-being is increasingly decoupled from financial wealth and overall consumption. Not everyone, however, is happy to be returning to the land –and the wealthiest do not have to follow suit.

- Retrotopia: Fears of immigration, terrorist threats and increasing impacts of climate change trigger social movements and policies that aim to keep global problems out of a Europe balancing between nationalism and xenophobic European exceptionalism, between fragmentation and collaboration. Nostalgia-fueled politics create a brand of stronger environmental policies focusing on natural heritage and rural custodianship. Racism becomes more commonplace; migrants are kept out, creating employment problems in greying societies, which are partly solved by robotization of work; fear of migration from Europe's south to northern countries due to climate change prompts European policy makers to use highly innovative technologies help make Mediterranean countries more climate-resilient. Environmental concerns drive down consumption of animal products; otherwise, the improvement of diets is not a priority amid concerns of European security and self-reliance.

- The Protein Union: After a period of political crisis, the EU has reformed and reinforced its legitimacy. It has a strong and urgent mandate to respond to food system challenges –malnutrition and overconsumption the threat of climate change threatening food and feed production in Europe and elsewhere, and the global destruction of natural resources. Strategic action has been led by governments but supported by the private sector (large companies) and some incivil society (major health organizations), to the challenge of changing European diets and modes of production. The focus is on creating new sources of protein, including mainstreaming insect consumption and the production of artificial quasi-meats, supported by new, more integrated means of food production and processing based on a tech-driven sustainable intensification model. This is combined with strong action on reducing sugar in the years close to 2050, which nevertheless cannot avoid the legacy of unhealthier diets in earlier times. Europe seeks to export its sustainable FNS technologies and policies to other global regions. Even though basic food and nutrition security has improved, the top-down, command-and-control approach to food and nutrition security excludes many societal actors, leading to increasing dissent and attempts to create alternatives to the tech-focused, almost post-agricultural food system, which happens at the expense of the livelihoods of traditional farmers. The synthetic approach to food has also damaged local food cultures.

- The Gravy train: After years of economic instability, for which large companies and banks were primarily blamed, strong political action has been taken and economies have been re-organized to allow for much more local and regional diversity. Small and medium enterprises flourish; those with good ideas and entrepreneurial energy are much more likely to succeed. Inequality is high, since some manage to take their businesses very far, becoming the new elite. But standards of living for most of the population are good, at least in an economic sense. However, there is little political and economic interest in environmental conservation and sustainable business –after economically traumatic years, regaining prosperity is the focus. The prioritization of economic growth has also taken public attention away from health concerns. Instead, standards of what is considered healthy and socially desirable have shifted.

- Too busy to cook: By 2050, Europe is brimming with innovation. Facilitated by continued progress in communication technologies, local and regional initiatives and networks around energy, water, food and services have taken off, learning from innovations elsewhere in the world, and from each other. Governments are struggling to keep up with disruptive change in all sectors, and some individuals benefit far more than others. In terms of food consumption, environmental values are dominant. Meat consumption has become a social fauxpas. However, Europeans have more trouble taking care of themselves –life is moving fast in these competitive economies, and local products from bakeries and breweries might be sustainable, but that does not mean they are low in calories.

- Goodbye to all that: By 2050, relentless global and European economic instability, crises of migration and local conflicts at the edges of Europe, climate impacts affecting the southern countries, and a prolonged crisis of EU governance around these issues have taken their toll. The EU's power has been shattered. Economic shocks have led to high poverty and inequality. Natural environments decline, as they are exploited by international actors. Education and innovation have stagnated, due to a lack of funds and optimism in politics. Many have moved back into the countryside in search of more stable livelihoods, but they are struggling because their transition is chaotic and is not being facilitated - with problems arising over issues like land tenure. Many more stay in urban poverty

- The grass is greener: It is not too much of an exaggeration to say that Europe in 2050 is rather empty, apart from the sounds of birds and other wildlife. After worries of economic slowdown in the 2010s, the BRICs have taken off and outcompeted Europe in many ways. Accordingly they have created such attractive economic opportunities for many that a minor but still significant amount of the European population has migrated, at least temporarily or intermittently, to other parts of the world. Europe is struggling with economic growth because of this brain drain. Inequality is high. Pressure on land and natural resources has decreased, however, and natural environments have flourished.

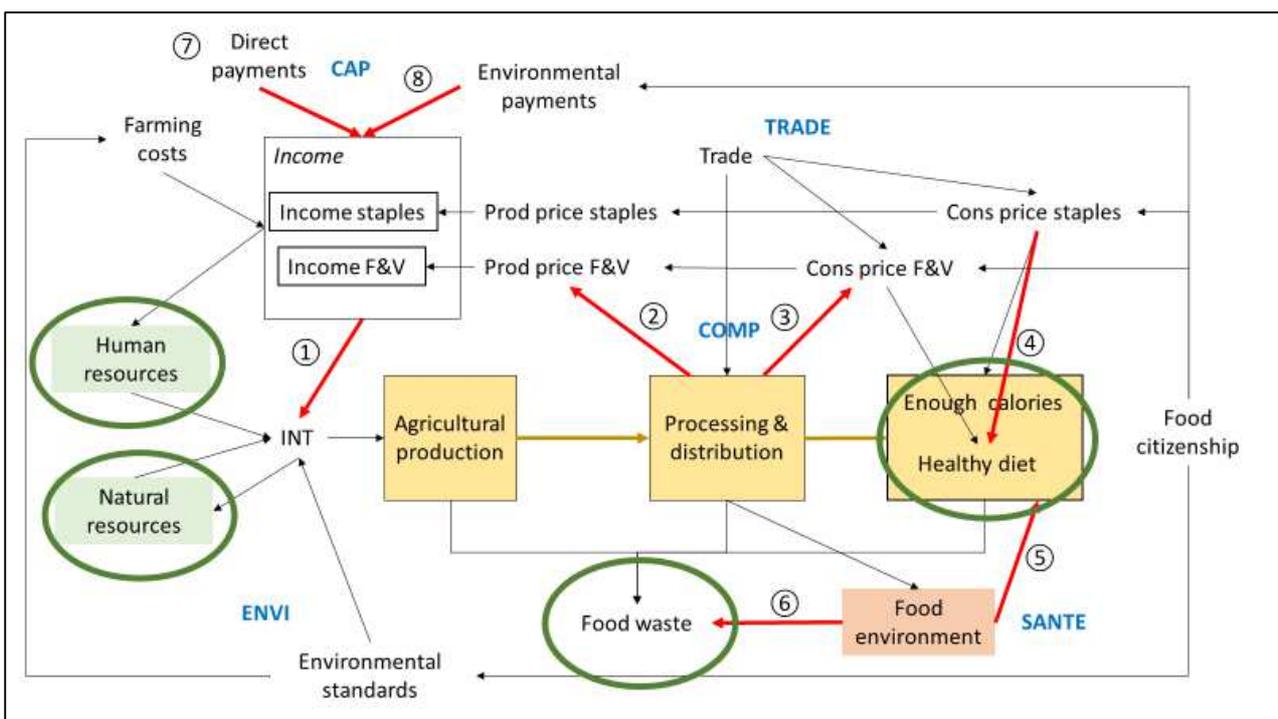
These scenarios were used in the local case studies and also in the second European workshop that took place the 9th of February of 2017 in Brussels. For a more detailed description of the process see Deliverable 5.3.

5. TRANSITION PATHWAYS

The last task of WP5 consisted of designing potential transition pathways through a multi-stakeholder workshop. The workshop entitled “Towards a sustainable and resilient food and nutrition security in Europe (FNS)”, took place in Brussels on the 9th of February 2017. The primary aim of the workshop was to develop and test European policy recommendations for a more resilient food system. FNS is a policy issue that cuts across several current policy domains in the EU. Contradictions and inconsistencies, gaps and overlaps are, thus, inevitable. Building on cutting-edge insights from TRANSMANGO research conducted over the last three years, a highly interactive participatory approach was used to develop recommendations for a more coherent landscape of EU policies allowing innovative food practices to thrive and lead to sustainable and resilient FNS.

Preparation of the workshop included the development of a conceptual model of the food system, building on previous findings of WP5 and WP6 (see figure 1 below).

Figure 1. Overview of food system including eight food system challenges



Source: Mathijs

Figure 1 represents interactions between key elements of the food system. It allows us to identify eight system challenges, mainly:

1. Farmers intensify both when income goes up (profit) and goes down (survival)
2. Market power to farmers

3. Market power to consumers / retail business model F&V margin
4. Cheap staples good for calories, bad for diet
5. Food environment doesn't enable healthy diets sufficiently
6. Food environment doesn't sufficiently prevent waste
7. Unequal direct payments, primarily to large staple producers
8. Environmental payments do not sufficiently cover cost increases

The figure also identifies (in blue) key European institutions and policies that are impacting on these system dynamics. This analysis leads to identify four main areas of intervention (green circles) where policies can be designed or modified to deliver FNS. These undesirable food system outcomes are mainly: *Obesity and other food-related diseases, Food loss and waste, Negative impacts on natural resources and Negative impacts on human resources*. A fifth area was included, *Food insecurity among vulnerable groups*, to capture holistic responses.

A questionnaire was sent to participants in order to capture existing European policy frameworks and their interconnectedness. The aim of this survey was to gain a comprehensive picture of unintended consequences and inconsistencies within and between the policy frameworks that address FNS challenges in the EU. The insights of the survey served as a basis for the workshop and also will contribute to formulate recommendations for a coherent EU policy landscape supporting transition to a sustainable and resilient food system in Europe (see also WP7). Consequently, participants were asked first to list existing EU policy intervention(s) that directly or indirectly aim to eradicate these five undesirable outcomes of the European food system and assess the effectiveness of each listed policy intervention. The second question revolved around identifying existing EU policy intervention(s) that unintendedly exacerbate the five undesirable outcomes of the European food system, as well as provide a short rationale for each identified policy intervention. Finally, experts were prompted to identify at least 5 inconsistent (conflicting)* policy interactions existing within or between EU policy frameworks² that affect functioning of the food system.

Building on this material, the workshop focused on several steps:

- 1) The design of policy recommendations to create greater coherence in EU policy relevant to the European food system. Group of experts reviewed the material generated and proposed policy recommendations for each undesirable food system outcome. For each policy recommendation the group identifies
 - potential trade-offs/consequences of this recommendation,
 - one longer-term action needed,
 - one shorter term action needed, and
 - a suggestion for how a food and nutrition security policy platform could play a role in achieving the recommended change.

² The key policy frameworks identified were the following: agriculture and rural development, maritime affairs and fisheries, food safety, health, environment, climate action, energy, competition, internal market, trade, research and innovation, education and culture, employment and social affairs, regional and urban policy, international cooperation and development, humanitarian aid and civil protection.

2) The review of these recommendations against the needs and design principles identified in the local cases and their associated transition pathways (see WP6). These design principles are:

- ReDP1: Re-enforcing food entitlements of traditional and newly emerging vulnerable groups
- ReDP2: Re-connecting sustainability and health
- ReDP3: Re-linking food systems that foster urban-rural synergies
- ReDP4: Re-balancing social-technological engineering
- ReDP5: Re-thinking resilience building

The design principles helped to incorporate the local perspectives in the policy recommendations and shorter and longer term actions (transition pathways).

3) The testing of these ideas against the eight TRANSMANGO scenarios (see section 4) at the European level. Experts discussed *how might recommendations have to change to be effective either in succeeding in the scenario, or, if the longer-term scenario is particularly problematic, to prevent elements of it to happen?*

In the final stage of the process consisting of sharing results and collective reflection participants identified a European Food Strategy Council (FSC) as a key pathways to address current challenges, composed of diverse private and public stakeholders across fields relevant to the European Food System, including those involved as active actors in the food system, those involved in health, environment, and social and technological innovation. Similar to food strategy and policy councils operating at city, region and national levels - and strongly connecting to these lower-level efforts – this food strategy council would offer the European Union and food system actors a mechanism for reflexive governance in which the FSC would inform, support and provide feedback on policy. A European Food Strategy developed by this FSC would allow for flexibility between different policy domains while encouraging coherence. This FSC can be supported by a European Food Systems Knowledge sharing platform that gathers knowledge and examples of practices, assures data availability around nutrition and food environments, works towards greater policy coherence and provides greater support for social innovation. The FSKS Platform could be organized by TRANSMANGO with other major knowledge networks – in order to provide ideas in a non-partisan fashion. More specific recommendations are presented in the Deliverable 5.4.

6. CONCLUSIONS

The combined work of WP5 has analyzed vulnerabilities and transitions at EU Level. The results of the Delphi method have allowed us to identify different types of vulnerabilities, that is, expressed weaknesses and threats to FNS in Europe. We have also linked these vulnerabilities to key drivers of change at the global and EU level, and to the structural or root causes of food insecurity. This work has been complemented through the identification of key policy changes at different levels that experts invariably posited as urgent changes. The results of the Delphi method are particularly valuable to characterise vulnerabilities in a context where key data is lacking. As described in section 3, data on FNS at the European level is not readily available and concentrates on issues of availability rather than access and utilisation. However, available data shows marked contrasts between European countries and regions and confirms the relevance of taking a place-

based approach to the study of FNS. Through a thorough analysis of FNS narratives we have delineated what are the key elements of this place-based approach (see section 2 and associated publication), which include a focus territorialisation processes; unpacking flows of material, resources and knowledge; and a deeper understanding of the dialectics between how places configure specific FNS dynamics and viceversa.

The analysis of EU case studies has contributed to identify how different elements that constitute vulnerabilities interact and affect particular hotspots – which can result in policy solutions or undesirable outcomes of the food system. The identification of vulnerability pathways that impact on the different FNS dimensions – access, availability, sustainability and utilisation – is particularly important to progress our understanding of vulnerabilities as dynamic mechanisms made up of particular articulations of actors, materials, discourses and multi-level processes. Consequently, the recombination of these elements can lead to a reduction or reinforcement of the capacity of the European food system to deliver FNS. Further work is required to understand the causal mechanisms involved in creating key vulnerability pathways in the broader European food system.

An important step in this direction has been the elaboration of stakeholder-developed conceptual models on scenarios about the functioning of EU food systems. These scenarios have proven useful to understand interrelations among key building blocks, vulnerabilities and global drivers, as well as provide an effective tool to deliver more robust plans and interventions at the local (see WP6) and EU level, as discussed in section 3. The scenarios confirm the dynamic nature of vulnerabilities and have shown how some scenarios - through the 4 year project – have become more feasible or real for practitioners with events such as refugee crisis or Brexit. Similarly, the multi-stakeholder approach taken in this WP shows the multiplicity of policy options and associated transition pathways for a desirable future EU food system, and the complexity associated to the number of stakeholders involved in creating those transitions. In order to investigate further these potential futures, the outcomes of the EU level scenarios and transition pathways with GLOBIOM projections (see WP3 and WP4). One of the reasons for quantifying scenario projections and pathways is to identify unintended consequences of projected stakeholder futures, and to confirm or check expected outcomes. The quantitative versions of the scenarios that correspond to stakeholder pathway inputs identify risks such as lower production and higher prices associated with some pathways (in the absence of other assumptions about possible future small-scale efficiency), but also demonstrate potential positive impacts on future land use as a result of changes in demand and environmental management. What is notable is that significantly different scenarios and pathways for Europe have little effect on the result of the world, with global scenario assumptions dominating developments in other global regions.

Finally, this WP has contributed to develop a rich set of policy recommendations – mainly through the Delphi method and multi-stakeholder workshops- that will be taken forward in WP7. A general observation is the inadequacy of current institutions to develop concerted multi-sectoral, multi-actor and multi-level interventions to deliver FNS. Not surprisingly, a key policy recommendation is to create spaces for reflexive governance that are able to share knowledge and assure if not policy integration at least policy coherence. For that purpose, a Food Strategy Council (FSC) has been proposed as a multi-stakeholder mechanism to inform, support and provide feedback on policy. A European Food Strategy developed by this FSC would allow for flexibility between different policy domains while encouraging coherence. However, and building of

WP5 results, an earlier step is required, specifically the establishment of a European Food Systems Knowledge sharing platform that gathers knowledge and examples of practices, assures data availability around nutrition and food environments, works towards greater policy coherence and provides greater support for social innovation.