

# **LNV - Meerjarig Missiegedreven Innovatie Programma (MMIP)<sup>1</sup> - Voedselzekerheid / Food & Nutrition Security<sup>2</sup>**

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## **Definition FNS**

Food & Nutrition Security (FNS), as defined by the United Nations' Committee on World Food Security, means that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life.

## **Aim of this MMIP**

The LNV/ MMIP 'Food & Nutrition Security' contributes to socially, ecologically, and economically sustainable and resilient food systems in which hunger and malnutrition are eradicated.

This MMIP aims to achieve the Sustainable Development Goal 2 'Zero Hunger' and to implement the current Dutch food security policy (BZ and LNV) as outlined in the 2019 letter to the parliament<sup>3</sup>. The main objectives of this policy are:

1. Eradicate current hunger and malnutrition
2. Promote inclusive and sustainable growth in the agricultural sector
3. Realize ecologically sustainable food production systems

## **Why this MMIP**

Food & Nutrition security is one of the great challenges of our time. If agricultural policies remain the same, there will be insufficient food to feed everyone, and pressure will increase on the already stressed resource base. Over the coming decades, a changing climate, growing global population, rising food prices, and environmental stressors will have significant yet uncertain impacts on FNS. Adaptation strategies and policy responses to global change are urgently needed, including options for handling water allocation, land use patterns, food trade, postharvest food processing, and food prices and safety.

The recent FAO SOFI report (2021)<sup>4</sup> highlighted the fact that the world is off track in achieving SDG2 Zero Hunger by 2030. This is partly related to recent challenges imposed by the COVID-19 pandemic, the associated economic downturns and increased conflicts, and the faster speed of climate change including climate variability and extreme events.

Some key findings:

- More than half of the world's undernourished are found in Asia (418 million) and more than one-third in Africa (282 million).
- Compared with 2019, about 46 million more people in Africa, 57 million more in Asia, and about 14 million more in Latin America and the Caribbean were affected by hunger in 2020.
- There has been a significant dip in people's affordability for healthy food due to a loss in income.
- Nearly one in three people in the world (nearly 3 billion) did not have access to adequate food in 2020.

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<sup>1</sup> MMIP aanpak LNV thema volgt werkwijze KIA MMIP Landbouw, Water, Voedsel [Documenten \(kia-landbouwwatervoedsel.nl\)](https://www.kia-landbouwwatervoedsel.nl)

<sup>2</sup> MMIP Voedselzekerheid is not part of the KIA 'Landbouw, Water, Voedsel' but is prioritized as a LNV MMIP. The MMIP FNS has started in 2020.

<sup>3</sup> Kamerbrief 'Op weg naar een wereld zonder honger in 2030: de Nederlandse inzet' (juni 2019). Het kabinet geeft hierin aan hoe het werk op het thema wereldwijde voedselzekerheid wordt voortgezet binnen de kaders van het vernieuwde BHOS- en landbouwbeleid. SDG 2 blijft leidraad voedselzekerheidsbeleid (Kamerstuk 33 625, nr. 147)

<sup>4</sup> FAO - 'The State of Food Security Nutrition in the World 2021 (SOFI)' has studied the impact of Covid-19 pandemic-induced income loss on food intake and malnutrition.

- External (e.g. conflicts or climate shocks) and internal (e.g. low productivity and inefficient food supply chains) factors affecting food systems are pushing up the cost of nutritious foods which, combined with low incomes, are increasing the unaffordability of healthy diets.

So the challenges in view of the global FNS and the goals set in the SDGs towards 2030 are huge, here are a few:

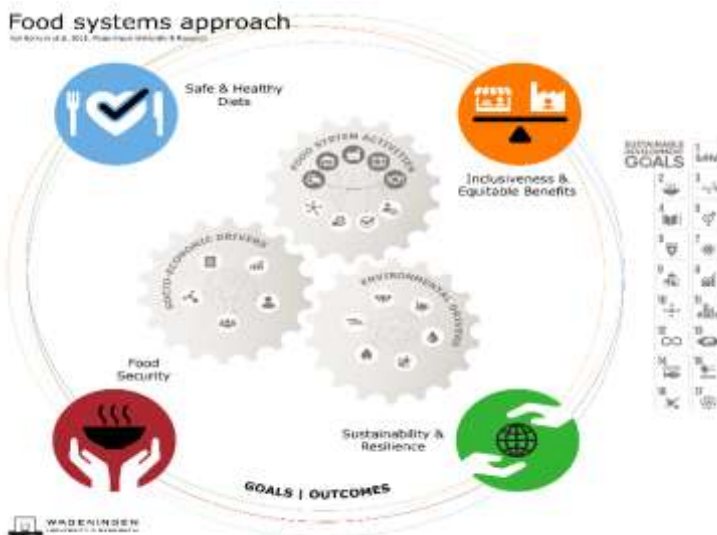
1. the need to produce 60% more food to feed a growing world population
2. the need to produce healthier food as half the global population suffers from various forms of malnutrition. Both hunger and obesity are growing.
3. the need to produce more sustainable as the system leads to severe biodiversity loss, degrades soils and natural resources, heavily overuses fresh water resources and contributes significantly to climate change,
4. the need to achieve zero waste as far too much food is lost or wasted.

### FNS as part of a Food Systems Approach

In the past 4-5 years the interdependencies in the Food System have risen prominently on the global agenda. Taking a food systems approach has been recognized (CFS/HLPE, 2017) as crucial to address the current challenges and drivers of food insecurity and malnutrition.

Wageningen University & Research developed the Food Systems Concept. The essential idea is that there is no single solution when it comes to tackling food problems. If you solve one problem – by increasing food production, for example – you risk creating another, such as pollution or loss of biodiversity. By taking a “Food Systems approach”, WUR is looking at all aspects of the food system, with a focus on 4 “domains”:

1. Food and nutrition security: sufficient affordable, nutritious food for everyone
2. Promote healthy diets
3. Fair distribution of costs and revenues
4. climate change, sustainability and biodiversity



Within this MMIP /FNS we use the concept of food system as an overarching analysis framework for each MMIP activity to be implemented.

### Geographic focus

The geographic focus of this program is outside the EU, more specifically those countries with which LNV maintains diplomatic or trade relations via the agricultural counsellors network where the FNS policy is implemented. However, opportunities for co-creation of knowledge and innovation do not stand alone and are not limited to a set of countries. This is especially true for large international

initiatives and consortia. Therefore, the program is not limited to a predefined selection of countries but will follow two lines: a pragmatic approach linking to the agricultural attaches network and a strategic approach connecting to large international initiatives and consortia both aiming at impact on the SDGs linked to the four domains and 12 actions tracks.

### Impact Areas and Actions Tracks (Deelprogramma's)

To define the 'deelprogramma's within the MMIP FNS a programming study was carried out by WUR. In this study results and ambitions of the Food System Summit, the Convention on Biological Diversity and Framework Convention on Climate Change, the impacts of COVID combined with the three LNV policy goals were recast into four impact areas and 12 action tracks.

Impact areas are high-level domains related to policy goals and societal challenges or concerns. The following were defined:

- A. Sustainable production and consumption
- B. Equitable & Inclusive food systems
- C. Biodiversity and sustainable use of natural resources
- D. Climate change adaptation & Resilient food systems

Where the impact areas define the broad picture, the action tracks provide a framework for LNV to define concrete (new) knowledge, inputs and actions to achieve the aim of the MMIP FNS

In table 1 below, the action tracks for each impact area are presented. In order to keep the overview manageable and comprehensible, a maximum of three action tracks per impact area was set.

**Because of the limited MMIP budget one theme per action track per impact area will be on the MMIP FNS agenda for 2021-2022 (see orange boxes in table 1). In view of international developments and dynamics, new accents or actions may be introduced on a yearly basis.**

Table 1 Proposed Impact Areas and Actions Tracks

IMPACT AREAS	A .	Sustainable production and consumption	B .	Equitable & Inclusive food systems	C .	Biodiversity and sustainable use of natural resources	D.	Climate change adaptation & Resilient food systems
Action Tracks	A 1	Sustainably increase food production.	B 1	Enhancing incentives for actors in the food system.	C 1	Respecting planetary boundaries (soil, water, biodiversity).	D 1	Adaptation of the food system to slow onset change related to actual or expected climatic change, including climate variability.
	A 2	Reducing and preventing food losses & waste	B 2	Identify services needs for different target group: ranging from subsistence to commercial farmers, youth, consumers, traders, governments.	C 2	Explore nature inclusive agriculture	D 2	Designing for resilience in society combining social, economic and environmental systems
	A 3	Increasing availability of healthy and safe food	B 3	Design new value chains for affordable supply of nutritious food.	C 3	Soil Health/Quality	D 3	Strengthen resilience of the food system to fast onset shocks (economic, climate, weather extremes, diseases / pests, conflict and political crises)

The concept of Technology Readiness Levels (TRLs) covering the entire innovation chain, from research (TRL 1) to implementation (TRL 12) (see table 2). It is built on the idea that technologies rooted in research after several steps is mature enough to be implemented. Although the approach doesn't provide a concrete timeline of the path from fundamental research to implementation, it

does imply that there it is a linear process, and the end station is implementation of a technology or method.

Table 2 Technology Readiness Level (TRL)

Research	Development	Demonstration	Implementation
<b>TRL 1-3</b>	<b>TRL 4-6</b>	<b>TRL 7-9</b>	<b>TRL 10-12</b>
<i>NWO, KNAW, EU, KB, PBL, CGIAR, e.d.</i>	<i>Toegepast onderzoek, BO, april call topsectoren</i>	<i>MIT, POP, fieldlabs, OBN, IBP</i>	<i>Subsidies, investeringen, regelgeving, kennisverspreiding, campagnes</i>

### Impact Area A: Sustainable production and consumption

#### Action track: Reducing and preventing food losses & waste

##### Why ?

The adoption of SDGs made food loss and waste (FLW) reductions a global concern, with targets to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses by 2030 (UN, 2019, SDG12.3).

Therefore a vital step in the transition to a sustainable food system is the prevention of food loss and waste (FLW). Globally, around 14 percent of food produced is lost between harvest and retail, while an estimated 17 percent of total global food production is wasted (11 percent in households, 5 percent in the food service and 2 percent in retail). FLW undermine the sustainability of our food systems. When food is lost or wasted, all the resources that were used to produce this food - including water, land, energy, labour and capital - go to waste. Reducing post-harvest losses and consumer food waste is therefore an important strategy for improved resource efficiency, enhanced food security and reduced environmental impacts.

Quantifying FLW is essential for identifying hotspots in FLW and assessing effectiveness of FLW reducing interventions and system changes. Measuring is one of the means to identify the hotspots to select the most appropriate FLW reducing interventions. However, measuring is time, data and resource intensive, which prevents broad implementation of FLW monitoring. Moreover, FLW measuring is often disturbed by lacking data and systemic faults. This hinders good comparison of chain configurations. For instance, an intervention may shift losses from one stage to another stage along the supply chain. Adequate monitoring of both stages is essential for evaluating effectiveness of the intervention.

Furthermore we need more clarity on potential trade-offs and regional/local diversity in effects of interventions aiming at reducing food losses – losses of food occurring on the farm, trade and logistics, and processing level up to the retail where food is sold to (end-)consumers.

##### The aim of this track is to

- (i) measuring and monitoring FLW,
- (ii) assess the tradeoffs involved,
- (iii) advice on how to design FLW-related policies and interventions ,
- (iv) understanding how interactions between stages along food value chain and across countries affect outcomes of FLW reduction efforts,
- (v) preparing for income transitions and the shifting relative importance of losses and waste as economies develop.

##### How?

Table 3: Action track: Reducing and preventing food losses & waste

	Action tracks	Research phase TRL 1-3	Development phase TRL 4-6	Demonstration phase TRL 7-9	Implementation phase
A 2	Reducing and preventing food losses & waste	<ul style="list-style-type: none"> <li>Breeding for shelf live.</li> <li>Improve protein handling and protein storage (room temperature stable protein)</li> <li>the distributional effects of FLW interventions: reducing losses could harm producers because of lower prices.</li> </ul>	<ul style="list-style-type: none"> <li>Reuse of waste in the food system</li> <li>Improved storage methods</li> <li>Identify effective entry points for policies and actions to reduce food losses.</li> <li>Identifying indirect causes that need to be addressed as part of broader agri-food value chain development policies.</li> <li>Improving the assessment of efficiency, environmental and food security benefits of interventions, since there is very limited knowledge about societal benefits of reduction in FLW.</li> <li>Identify trade-offs between different objectives associated with FLW reduction.</li> </ul>	<ul style="list-style-type: none"> <li>Pilot in 2 countries on Reduce post-harvest losses &amp; reuse of waste in food systems</li> <li>Link-up with agro-international start-ups - packaging agricultural products, food processing and adding value</li> <li>Link up with FLW coalitions as follow-up on the UN Food Systems Summit - <a href="https://foodsystems.community/food-is-never-waste-halving-food-loss-and-waste-by-2030/">https://foodsystems.community/food-is-never-waste-halving-food-loss-and-waste-by-2030/</a></li> </ul>	Actively disseminate the available knowledge via Groen Kennisnet, LBR newsletter, blogs, seminars....

Examples of already started MMIP activities:

- NWO/SIA call (applied Science) – two sub themes:
  - Post-harvest management ACTION
  - Food security, quality guarantee and traceability ACTION
- BO- research: Nigeria - Design and Investment of Vegetable drying System using Solar Energy. Drying vegetable through solar powered driers is an approach that is circular and resource efficient by its nature. This approach helps reduce the loss of vegetable to spoilage resulting from un-favourable prices, poor logistics infrastructure, over production and low demands. ACTION
- BO 43-113-02: What are the economic/social/environmental effects of reducing food losses/post-harvest loss (FL/PHL)? We take an actor perspective in the value chain and analyze the impact of interventions at farm level, on traders/logistics services and in the processing phase of agricultural commodities. ACTION

**Impact Area B: Equitable and inclusive food systems**

**Action Track: Enhancing incentives for actors in the food system.**

Why?

The food system is an interconnected complex network of activities and sectors in which food is grown, manufactured, transported, sold, prepared, consumed, and disposed of. It encompasses a great variety of enterprises with varying capacities and financing needs. A wide number of people, products, and places contribute to, and are affected by, our food system. The current food system doesn't work for all communities. Hunger and malnutrition remains an important development goal. Lack of access to healthy food and work limit the ability poor communities to build wealth.

The need for fundamental transformation in our food systems is clear – but in order for that transformation to leave no one behind- we must ensure everyone's meaningful participation in it and approaches that take into account the cross-sectoral nature of food systems. A food system is equitable and inclusive when also the most vulnerable can participate and benefit from the

activities in the food system. It connects to the organisation, service provision and the roles of consumers, governments and private sector in organising and sharing responsibilities and benefits.

Aim:

The aim is to identify transformation pathways that can serve as guidance to policy makers and investors and incentivize and enable stakeholders across the agri-food sector. How can food system be changed so that it harnesses opportunities while avoiding or limiting trade-offs and reducing inequalities? What policy instruments can support such transformation processes?

How?

Table 4 Action Track: Enhancing incentives for actors in the food system

	Action tracks	Research phase TRL 1-3	Development phase TRL 4-6	Demonstration phase TRL 7-9	Implementation phase
B.1	Enhancing incentives for actors in the food system.	<ul style="list-style-type: none"> <li>Assessment of methods, mechanisms, tools and policies aiming at knowledge and innovation system development</li> <li>Barriers and drivers for development of innovations (technical, social) and for making these innovations available</li> </ul>	<ul style="list-style-type: none"> <li>Design strategies to overcome trade-offs between fair price for producers and affordability for consumers.</li> <li>Improve local / regional processing, packaging, transportation.</li> <li>Advice to redesign international trade and business models (given circular agri in EU/ NL)</li> </ul>		Actively disseminate the available knowledge via Groen Kennisnet, LBR newsletter, blogs, seminars....

Examples of already started MMIP activities:

- Kennis basis: KB-35-006-001: Transition pathways Food system models and methodologies within WUR: opportunities for deepening our food systems work and Assessment of methods, mechanisms, tools and policies aiming at knowledge and innovation system development **ACTION**

**Impact Action Track: Explore nature inclusive agriculture  
Area C: Biodiversity and sustainable use of natural resources.**

Why?

The concept of using natural processes to design more biodiversity friendly food systems is gaining momentum. The underlying assumption is that nature-inclusive agriculture brings more diverse, nature, natural features and processes and at the same time is able to deliver food and other products to provide a fair income to the farmer. However evidence based science on what works why and where is not yet directly available.

The claims related to Nature-Based Solutions (NBS) and Ecosystem Approaches (EA) are manifold and diverse: sequester carbon, improve the resilience of an area, contribute to biodiversity restoration and development and generate greener and healthier environments.

A challenge is the unclear definitions and concepts, for example the regenerative, organic and agroecology movements share many concerns, and offer seemingly similar solutions. It is not clear if

they are perhaps repeated attempts to articulate the same things, or whether there are substantive differences. What does one movement offer, that another doesn't? And what makes one movement more prominent than another in certain geographical, economic or historical contexts? Do they compete for space, or does their co-existence allow them to collaborate and advance their shared goals on a larger scale?

**Aim:**

- The aim is to look for a better understanding of the different concepts of Nature Based Solutions for sustainable agriculture and food systems. We start with providing clarity on the NBS definitions and identify barriers, challenges, and opportunities around NBS in relation to food systems.
- To come up with an overview of the most promising types of NBS (best practices)
- Options for sustainable management, use and marketing of genetic resources and institutional development for up-scaling of viable options in the Global South (Africa, Asia, Latin America)
- What kind of businesses within the food system can be promoted as Dutch front runners on NBS in food production

**How?**

Table 5: Area track: Biodiversity and sustainable use of natural resources.

	Action tracks	Research phase TRL 1-3	Development phase TRL 4-6	Demonstration phase TRL 7-9	Implementation phase
C.2	Promote nature inclusive agriculture	<ul style="list-style-type: none"> <li>• Develop methods and tools for the assessment and evaluation of nature inclusive agricultural practices and technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Defining Nature based solutions</li> <li>• Evaluation of effectiveness of nature inclusive agricultural on biodiversity and production</li> <li>• Next-level agriculture (use of certain key enabling technologies in primary food production, respecting and making better use of biodiversity and natural resources for improved growth and resilience)</li> </ul>	Field lab scaling NBS in food systems	<p>Actively disseminate the available knowledge via Groen Kennisnet, LBR newsletter, blogs, seminars...</p> <p>Lessons learned.</p>

**Examples of already started MMIP activities :**

- Link to KB 35 “Food Security and Valuing Water” motif Nature Based Solutions and Food & Biodiversity - a cross over project between the KB34 and KB 35 programmes. **ACTION**
- BO-43-113-026 : NL-Masr PharosFarm: Exploring future lighthouse farms in Egypt. The project contributes to the development of innovation pathways for the purpose of sustainable agricultural production systems in three regions in Egypt, addressing quality production, nature inclusive principles, integrated and responsible farming practices **ACTION**
- BO-43-113-033 Food Systems Approach: Nature based solutions. Defining NBS in the food system context. **ACTION**

**Impact Area D: Climate change adaptation & Resilient food systems**  
**Action Track: Designing for resilience in society combining social, economic and environmental systems**

Why?

The UNFCCC Paris Agreement is a legally binding international treaty to address climate change. It was adopted by 196 Parties at the COP 21 in Paris, on 12 December 2015. Its goal is to limit global warming (climate change mitigation) to well below 2 and preferably to 1.5 degrees Celsius, compared to pre-industrial levels. The agreement also aims to strengthen the ability of countries to deal with the impacts of climate change that already take place (adaptation).

Climate change affects agricultural production and food security through increasing temperatures, changing rainfall patterns and greater frequency and intensity of extreme weather events. Especially smallholder farmers have a lower adaptive capacity to climate change. More than 570 million farmers are affected by climate change, of which 83% are smallholders. Droughts, floods, unpredictable rainy seasons, heatwaves and hurricanes destruct livelihoods and infrastructure, and affect human and animal health and cropping patterns. In coastal areas, climate change causes coastal erosion, coastal flooding, and saltwater intrusion. Climate change and shifting cultivation patterns also affect global food markets, translating into price increases of food, which highly affect smallholders and poorer households depending on cash income to buy food.

Transforming food systems requires tackling old assumptions and finding new leverage points. This requires the realization that global trends of market connectivity, population growth, urbanization and dietary shifts have impacts beyond national borders. Pollution and greenhouse gas emissions, but also trade policies and tax regulations in most developed nations have consequences for least developed nations. Consumer habits, particularly the consumption of meat and dairy, have a significant impact on climate change. Unequal ownership of and access to production capital, information and financial investments have put in place power imbalances in the local, national, and global food systems.

Aim: to design resilient systems is a specific way of adapting. The starting point is that surprises and shocks will not go away, and specific designs can absorb these shocks or lead to less damage. Examples of shocks that may impact the functioning of the food systems are not only environmental including climate shocks but also economic or price shocks, and social shocks or conflicts.

How?

Table 6: Action Track: Designing for resilience in society combining social, economic and environmental systems

	Action tracks	Research phase TRL 1-3	Development phase TRL 4-6	Demonstration phase TRL 7-9	Implementation phase
D . 2	Designing for resilience in society combining social, economic and environmental systems	<ul style="list-style-type: none"> <li>Design for resilience in natural and human systems.</li> <li>Understand FS interactions and trade-offs for short-term long term resilience/ rural-urban demands/ diversifying and specialising functions/ self-sufficiency and import dependency/ intensified versus sustainable and regenerative use of natural resources</li> <li>Leverage point to increase Food System resilience</li> <li>To what extent is it possible to</li> </ul>	<ul style="list-style-type: none"> <li>Coping with climate, weather extremes, diseases / pests, and economic shocks</li> <li>What are effective soil and water management options?</li> <li>What is the potential to development and up-scaling digital technologies and control systems?</li> </ul>	Pilot in 2 countries  Link with KNOWLEDGE LAB ON CLIMATE-RESILIENT FOOD SYSTEMS - IFPRI	Actively disseminate the available knowledge via Groen Kennisnet, LBR newsletter, blogs, seminars....



	Action tracks	Research phase TRL 1-3	Development phase TRL 4-6	Demonstration phase TRL 7-9	Implementation phase
		breed stress-tolerant crops/varieties? (aimed at salt and drought stress).			

Examples of already started MMIP activities :

- BO-43-113-007: Improved PGR conservation and access through peer review -Global Crop Diversity Trust (GCDDT): De expertise van het Centrum voor Genetische Bronnen, Nederland (CGN) wordt ter beschikking gesteld aan de Global Crop Diversity Trust om gezamenlijke activiteiten te ontwikkelen. Op basis van het CGIAR Genebank Platform dat wordt gecoördineerd door de Global Crop Diversity Trust, wordt een wereldwijd netwerk van genenbanken gecreëerd. **ACTION**
- Digitalisation in Agriculture – study carried out by The Netherlands Food Partnership (NFP). **ACTION**

**Strategic MMIP Food & Nutrition partnerships**

Within this LNV MMIP we work together and / or align activities with:

- WUR
- KB programme 35
- Topsectoren A&F and T&U
- Min BuZa
- The Netherlands Agricultural Network at the embassies
- RVO (team International & SDG Facility)
- NWO-WOTRO
- The Netherlands Food Partnership (NFP)
- CGIAR
- WEF GCS