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# FOOD SYSTEMS AND NATURAL RESOURCES

## Building Resource-Smart Food Systems for Sustainable Development

Food systems fundamentally depend on natural resources, such as land, soil, water, biodiversity, minerals, biomass and fossil fuels. Key statistics show that in many cases these resources are not currently managed sustainably or efficiently: an estimated 33% of soils are moderately to highly degraded due to erosion, at least 20% of the world's aquifers are overexploited, over 80% of the input of minerals (e.g. phosphate) do not reach consumers' plates and 29% of 'commercial' fish populations are overfished. Due to population growth, changes in dietary patterns driven by growing wealth (more meat, dairy and fish consumption) and climate change, the pressures on natural resources are expected to increase over the coming decades. This will lead to risks for future food production. A fundamental transformation of our food systems is required if we are to meet future demands of food and quality of life for present and future generations.

### 1. Resource-Smart Food Systems are needed to achieve Sustainable Development

Food systems are at the heart of the 2030 Agenda for Sustainable Development, a historic global commitment to eradicate poverty and hunger while ensuring healthy, prosperous and fulfilling lives. The food we grow, harvest, process, trade, transport, store sell and consume is the essential connecting thread between people, prosperity, and planet. Attaining food security will require ensuring the sustainable use of natural resources and lowering the environmental impacts of food system activities. Moving towards Resource Smart Food Systems is fundamental to achieving the Sustainable Development Goals.

### 2. What is a Food Systems Approach and Why is it Important?

A food systems approach "gathers all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation and consumption of food, and the outputs of these activities, including socio-economic and environmental outcomes". (HLPE, 2014a)

The food system concept provides a framework for an integrated description of the 'food' two-way interaction with both natural resources and socio-economic conditions. A thorough analysis of existing food systems can assist in identifying the most important issues regarding natural resources, as well as the opportunities for effective policy, social and/or technical interventions.


### 3. Food Security and Human Health both depend on our Natural Resource Base

Current food systems are not delivering food security and healthy food for everyone nor are they sustainably using the limited natural resource inputs. While food production has more than doubled and diets have become more varied (and often more energy-intensive); over 800 million people are hungry, over 2 billion suffer from micronutrient deficiencies (in particular of vitamin A, iodine, iron and zinc) and over 2 billion people are overweight or obese.

### 4. Current Food Systems are unsustainable and the pressures on natural resources are expected to increase

The food sector is globally the dominant user of a number of natural resources. Food production in particular, is also a major driver of a number of environmental impacts, such as the loss of terrestrial and marine biodiversity, soil degradation, water depletion and greenhouse gas emissions. Key statistics show the crucial role of food systems in the degradation or depletion of natural resources and provide evidence of unsustainable and/or inefficient practices at the global level. A number of global developments will have important consequences on the use, quality, and availability of natural resources in food systems in the future:

- ▶ The expected **population growth**, especially in Africa and Asia, implies a higher base-line demand for food.
- ▶ The **increase in wealth** in a large number of developing countries, implies a much larger middle-class, typically leading to diets that are richer in resource-intensive products (e.g. red



meats, fish, fruits and vegetables) and ultra-processed foods. This process is intermingled with the effects of urbanization.

- **Climate change** will impact both average weather conditions, as well as climatic extremes, which will have a large impact on the natural resources needed for food production.

Current food systems vary worldwide from 'modern' food systems in industrialized and emerging regions to more 'traditional' food systems in rural areas of developing countries.

This variety, combined with the socioeconomic and natural environments in which they operate, has important implications for the possible pathways towards sustainable food systems and for the potential for policy, social and/or technical interventions.

## 5. How to 'Decouple' Food System Activities from Environmental Degradation?

There are a lot of opportunities, both biophysical and institutional, to decouple food system activities from resource use and environmental impacts and move towards more Resource Smart Food Systems. While these are very context-dependent, some are listed below.

### 5.1 Biophysical Options

- **Sustainable land and water management** (e.g. preventing land degradation and limiting water extraction while improving land and water productivity).
- **More effective use of ecosystems services** (e.g. integrated pest management to reduce pesticide use).
- **'Sustainable intensification'** of crop production (higher yields without increasing environmental impacts), especially in regions with low crop yields.
- **Better feed conversion** (while not impacting animal welfare) and higher productivity of pastoral systems.
- **Higher nutrient efficiency** including better recycling of minerals in animal manure, in food processing waste, and recycling of minerals from cities.
- **More efficient aquaculture systems** with lower nutrient losses and less impact on coastal systems.
- **Reduction of food losses** at farms and fisheries, and of **food waste** along the supply chain and by consumers.
- **More sustainable consumption and healthier diets**, including a shift in affluent societies from animal-based to more plant-based diets, away from ultra-processed foods.

#### Benefits for human health and the environment

Implementation of these options could in many cases have other important benefits, such as improvement in water quality (lower nutrient losses), better human health (reduction of overconsumption) and cleaner cities (collection and composting of food waste). Although the individual options are often well known, it is important to implement these from a holistic point of view.

### 5.2 Institutional Pathways

The people who directly or indirectly manage our food systems are also the largest group of natural resource managers in the

world and could become critical agents of change in the transition towards more Resource Smart Food Systems. The food system approach expands the focus of attention from farmers and fisherfolk to include other actors, such as food companies, retailers and consumers. This is important, as food system actors often have the knowledge and skills, but lack the opportunity to invest in more sustainable activities.

This is not only the case in poorer countries as in richer countries food traders, processors, whole-sellers, retailers, restaurants and caterers have a central role in many food systems and, therefore, in their transformation. For example, by making investments in supply chains that reward farmers, fisherfolk and other actors for the sustainable and efficient management of natural resources, or creating incentives for consumers to make healthy and sustainable food choices. In developing countries, special attention should be paid to the role of smallholder farmers, given their large contribution to food production, and the importance of farming and fishing for rural communities. In more developed economies, other food system actors should also be considered.

#### Role of governments

Governments can stimulate and enable private actors to undertake more effective actions. In many countries, a large number of laws, financial, trade agreements and other regulations exist that are 'implicitly' influencing food systems and the use of natural resources. Aligning these policies in such a way that they contribute to more sustainable food systems is thus an important mission for authorities at various levels of government.

Governments could implement the following concrete actions:

- **Elimination of subsidies (or tax arrangements)** that encourage unsustainable production or practices.
- Creation of adequate legal frameworks to **secure property rights and land tenure and regulate access** to and use of water, biodiversity and ecosystems services.
- Creation of adequate legal frameworks to **regulate environmental impacts from food systems**, for example to prevent nutrient losses at all stages, especially in the livestock sector.
- Investment in technology and research development for **locally suitable seeds** and breeds (with proper infrastructure, distribution system, quality assurance and certification schemes).
- Attraction of **investment in rural infrastructure, small enterprise development** (e.g. inputs, local storage and processing facilities, logistic and transport).
- **Facilitation of links between different food system actors** (e.g. cooperation agreements among retailers to establish marketing codes of conduct).
- Use of **cities as innovation incubators** where ideas on sustainable food systems are tested (urban farming, education campaigns, sustainable sourcing, food environment regulations, etc.).
- Adoption of **consumption-oriented policies** to stimulate healthy and sustainable eating patterns (for example the creation of a healthy food environment).
- Adequate **monitoring of the status** of the natural resources needed in food systems, as well as of environmental impacts.
- Development of **education programmes** on the links between natural resources, consumption patterns, and health.

**For more information please contact the Secretariat of the International Resource Panel at: [resourcepanel@unep.org](mailto:resourcepanel@unep.org)**

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