

Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition

A report by the
High Level Panel of Experts on Food Security and Nutrition of the CFS
3 July 2019

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The Project Team



Introduction

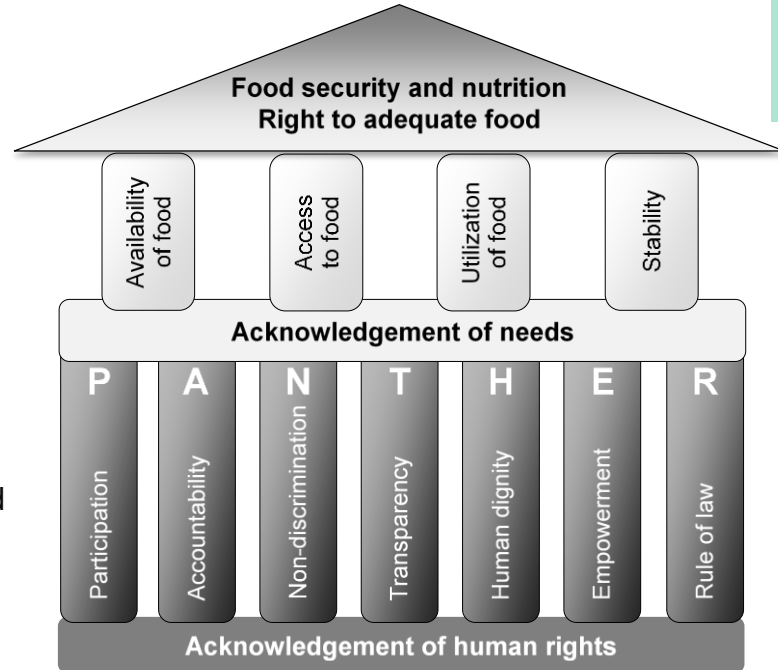
Current food systems result in **widespread malnutrition** and are a major driver of **exceeding planetary boundaries**.

Major transformation of food systems required – affecting what people **eat** and how it is **produced, transported, processed** and **sold**.

Transformation happens via series of **transitions**

Agroecological approaches rising in **prominence**

The report starts from a **recognition of human rights** as the basis for ensuring sustainable food systems - **PANTHER**



Agroecology

Dynamic concept, expanded from field and farm to whole food system:

- **Science**: transdisciplinary
- **Set of practices**: harness ecological processes in agricultural production – no prescribed set.
- **Social movements**: political, assert collective rights for smallholder farmers and advocate diversity in agriculture and food systems.
- **The report identifies 13 consolidated principles**
(next slides)
- Practiced by large numbers of farmers and other food system actors nationally in Cuba, at state level in India, regionally in France, in relation to specific heritage systems in China, and in various contexts across Africa;

Transdisciplinary science generates transformative outcomes by having:

- i) **a problem focus** (research originates from and is contextualized in 'real-world' problems);
- ii) **an evolving methodology** (the research involves iterative, reflective processes that are responsive to the particular questions, settings, and research groupings involved); and,
- iii) **collaboration**, including amongst transdisciplinary researchers, disciplinary researchers and external actors with interests in the research (Russel et al, 2008).

This has been interpreted in agroecology to involve integration of different academic disciplines as well as diverse forms of knowledge, including experiential, cultural, and spiritual (Méndez et al., 2015).

Agroecology 13 principles

1-7: Agroecosystem

1. **Recycling.** Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass.
2. **Input reduction.** Reduce or eliminate dependency on purchased inputs.
3. **Soil health.** Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and by enhancing soil biological activity.
4. **Animal health.** Ensure animal health and welfare.
5. **Biodiversity.** Maintain and enhance diversity of species, functional diversity and genetic resources and maintain biodiversity in the agroecosystem over time and space at field, farm and landscape scales.
6. **Synergy.** Enhance positive ecological interaction, synergy, integration, and complementarity amongst the elements of agroecosystems (plants, animals, trees, soil, water).
7. **Economic diversification.** Diversify on-farm incomes by ensuring small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers.

Agroecology 13 principles

8: Central

9-13: Whole food system

8. **Co-creation of knowledge.** Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.
9. **Social values and diets.** Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.
10. **Fairness.** Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.
11. **Connectivity.** Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies.
12. **Land and natural resource governance.** Recognize and support the needs and interests of family farmers, smallholders and peasant food producers as sustainable managers and guardians of natural and genetic resources.
13. **Participation.** Encourage social organization and greater participation in decision-making by food producers and consumers to support decentralized governance and local adaptive management of agricultural and food systems.

Transformational

Level 5 Build a new global food system based on participation, localness, fairness and justice

Level 4 Reconnect consumers and producers through the development of alternative food networks

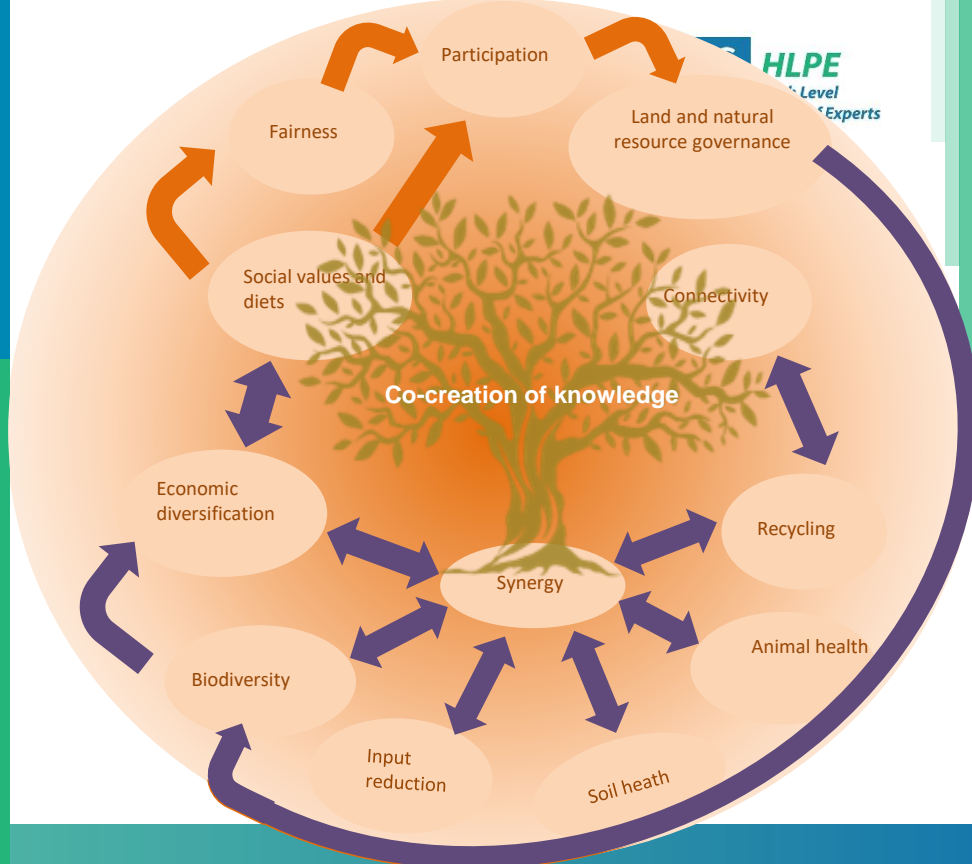
Level 3 Redesign agroecosystems

Level 2 Substitute conventional inputs and practices with agroecological alternatives

Level 1 Increase efficiency of input use and reduce use of costly, scarce or environmentally damaging inputs

Food system

Agroecosystem



Innovation (1)

Innovation that supports transformation involves **challenging the *status quo***, involving **changes to rules, institutions and practices**. ***The process of innovation (how change happens) is as important as the product (specific changes)***.

Conventional emphasis of innovation has been on introducing new technology but concepts of **democratizing and responsible innovation** are now gaining traction giving greater emphasis to **co-creation of knowledge**.

Innovation in agriculture is inherently **localized**.

Approaches are well articulated and widely practiced **sets of principles** and **methods** intended to **foster the transition** towards SFS for FSN, within an **overarching philosophy and strategic vision for the future**.

Principles are **statements that form a basis for a system of belief** or reasoning that **guide decisions and behavior**. They may be either **normative**; that is, they assert values (e.g. food systems should be equitable) or, **causative**, as in scientific usage; that is, they explain relationships (e.g. more equitable food systems are likely to be more sustainable). In either case, to be useful in guiding decisions and actions, they need to be fully explicit.

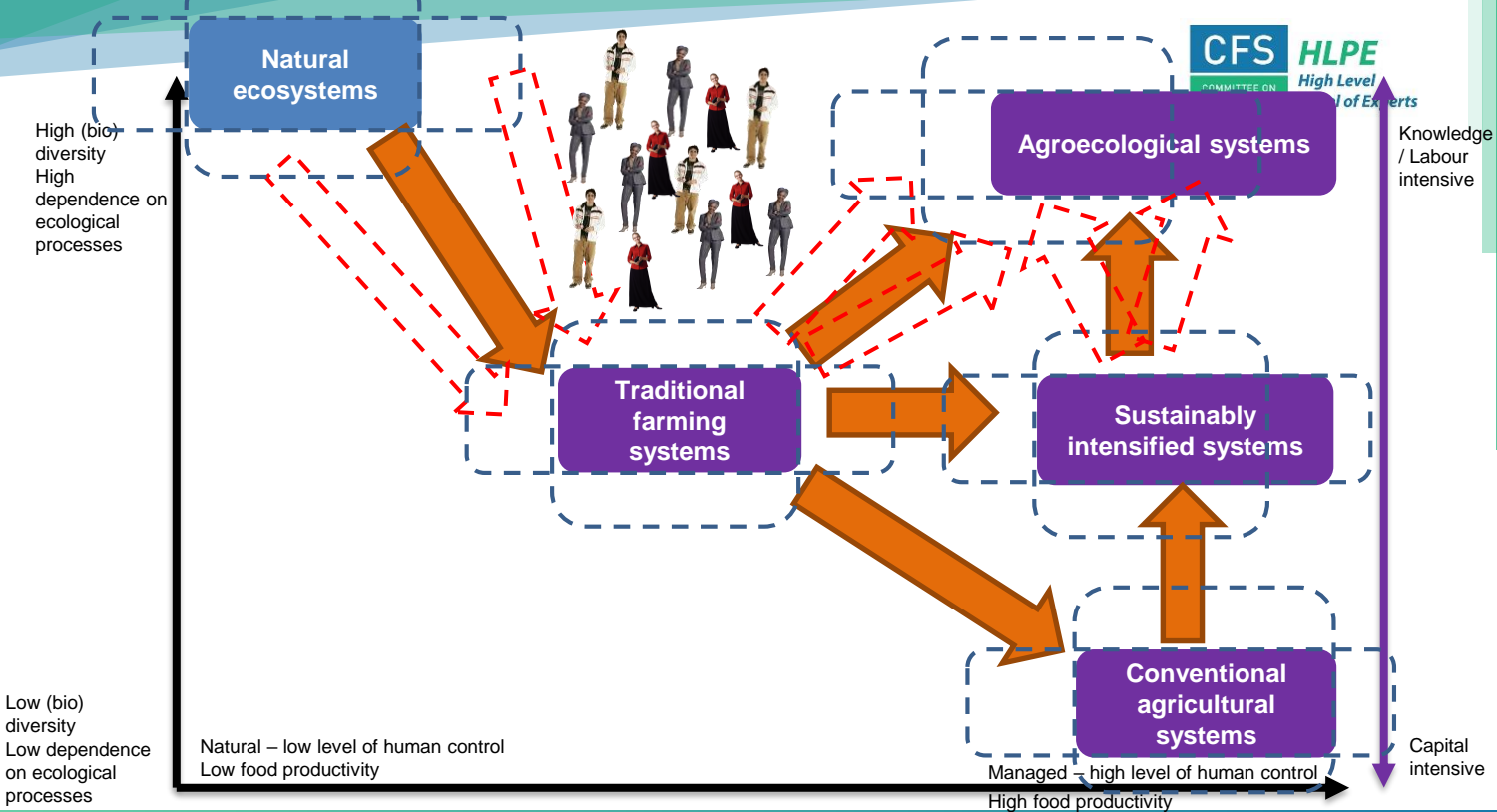
Innovation (2)

Sustainable intensification (**incremental**) and agroecological (**transformative**) approaches can be distinguished:

- **Sustainable intensification** approaches require **increasing production per unit of land**
- **Agroecological** approaches require **input reduction, natural processes and addressing power asymmetries**.

Approaches overlap, their **convergence and divergence** is evident from analysis of their principles.

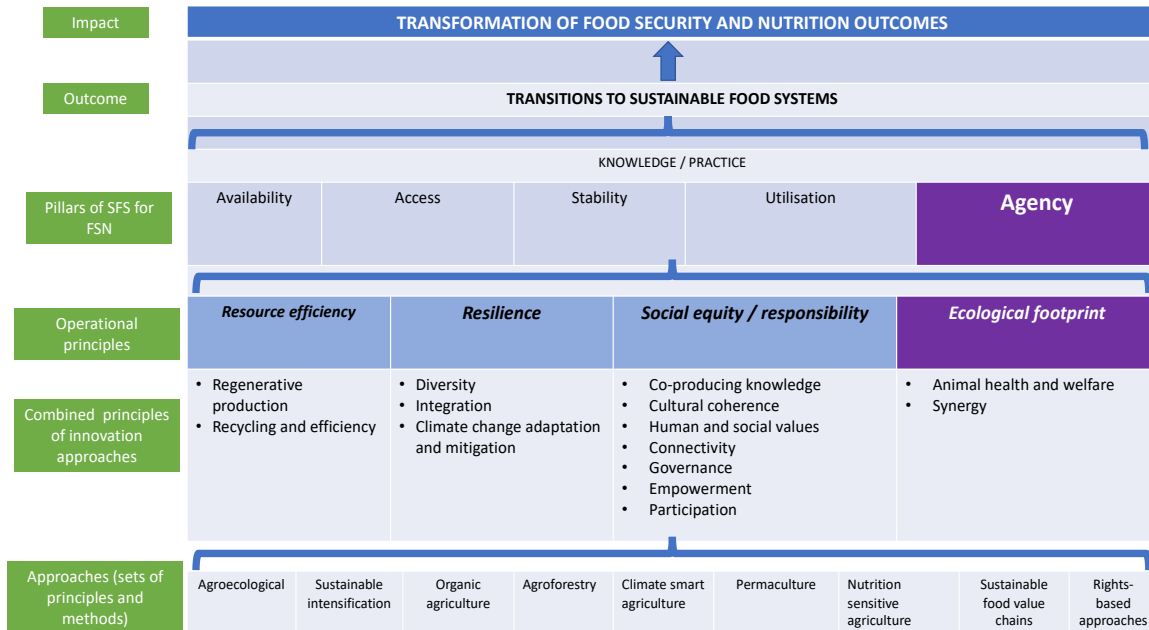
**There are many transition pathways
from different starting points, in different contexts.**



Innovation (3)

1. Adding a **fourth operational principle** of sustainable food systems of **“ecological footprint”** that connects consumption (*including all externalities*) to sustainable capacity to produce and the degradative or regenerative nature of production processes.
Ecological footprint of food systems expresses the impact of food consumed by a defined group of people (an individual, a village, a city, a country or the whole global population), measured in terms of the area of biologically productive land and water required to produce the food consumed and to assimilate the wastes generated.
2. Adding **“agency”** as a fifth pillar of FSN. Access currently covers asset-based agency in terms of people accessing food resources but not institution-based opportunity that people have to influence how food is produced, processed, transported and sold – their ability to participate in decisions about how food systems are organized through purchasing decisions and democratic governance mechanisms.
Agency is the capacity of individuals or communities to define their desired food systems and nutritional outcomes, to take action and make strategic life choices in securing these. This requires sociopolitical systems wherein policies and practices may be brought forth by the will of citizens and be reflected in governance structures to enable the achievement of FSN for all.

Innovation (4)



Diverging perspectives (1)

To what extent are biofortification or diversified production compatible with transitions to SFS and FSN?

Socio-cultural factors

Should biodiversity be conserved in agriculture or only in the wild?

Resource factors

Economic factors

Human health

Livelihoods

Rights as fundamental basis to SFS and FSN

Ecological footprint

Synthetic fertilizers and pesticides: eliminate use or use judiciously to transition to SFS?

To what extent can innovation approaches foster transitions to SFS that embrace both small and large-sized farms?

Knowledge and cultural diversity

Governance

To what extent can modern biotechnology contribute to SFS transitions and FSN?

Knowledge factors

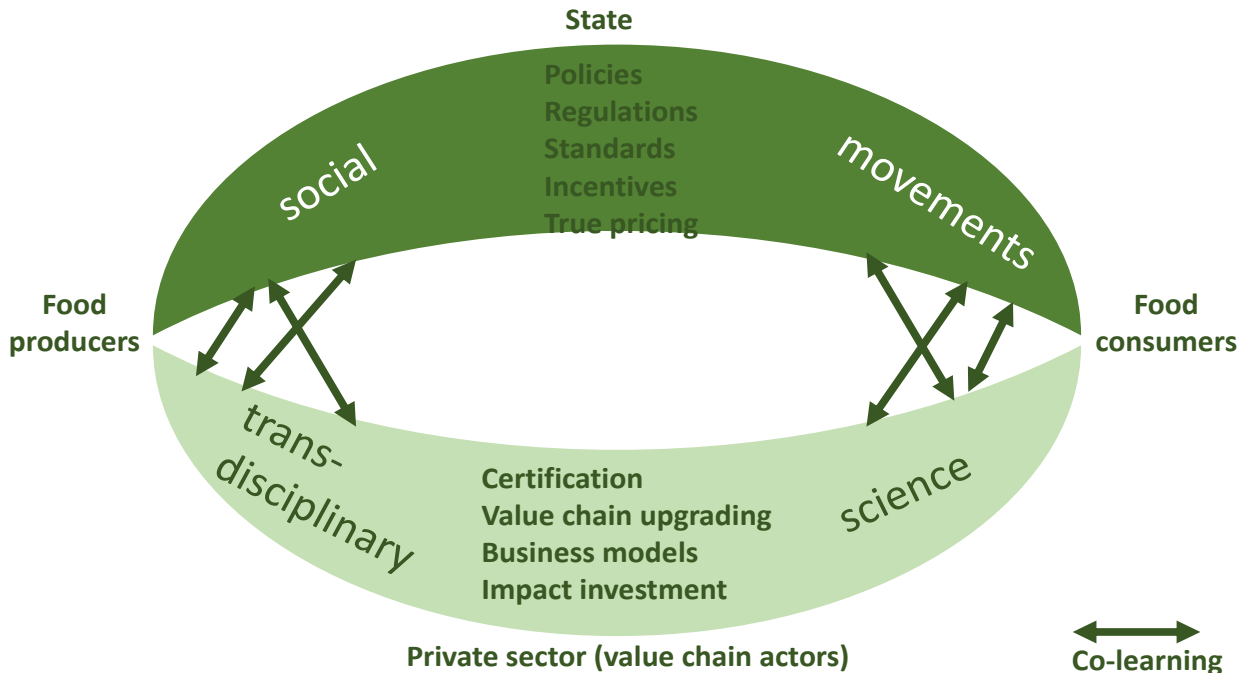
To what extent are digital agricultural technologies compatible with transitions to SFS and FSN?

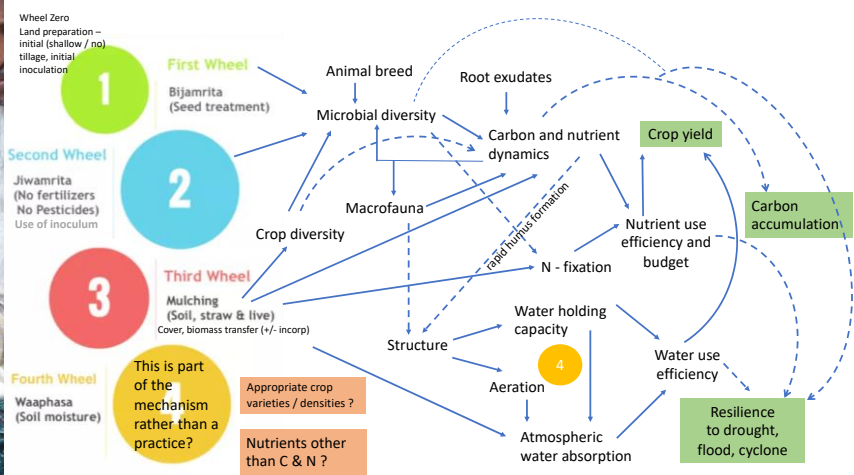
Governance factors

Diverging perspectives (2)

- Perspectives diverge more around **how** technology is accessed, **used and controlled** rather than the fundamental nature of technologies themselves
- **Moralization** of food increases motivation of policy makers to act but makes it more difficult for this to be done on the basis of evidence as opposed to weighing up the merits of competing convictions
- There is **need for clarity** on asserting *normative starting points* for transitioning to SFS for FSN *and then causative mechanisms* to **achieve transitions in different contexts**
- **Understanding the basis and nature of controversies** helps us to **get beyond the divisions**

A possible framework





Metrics

Current and future climate variability and underlying climate change

1. Agricultural practices (some targeting particular climate hazards) with performance measures related to purpose evaluated across contexts

2. Farm scale integration (total factor productivity and resilience of livelihoods)

3. Landscape scale integration (provision of multiple ecosystem services – land equivalent ratio multifunctionality metric)

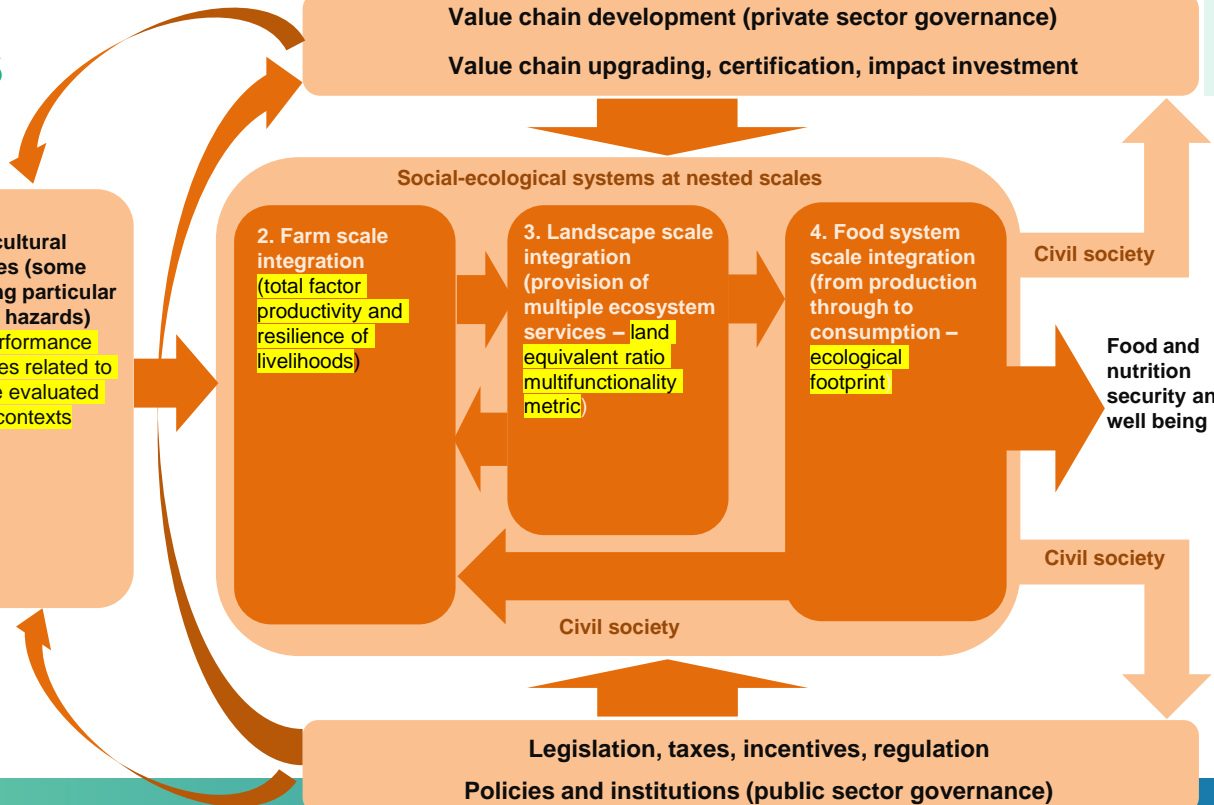
4. Food system scale integration (from production through to consumption – ecological footprint)

Food and nutrition security and well being

Value chain development (private sector governance)
Value chain upgrading, certification, impact investment

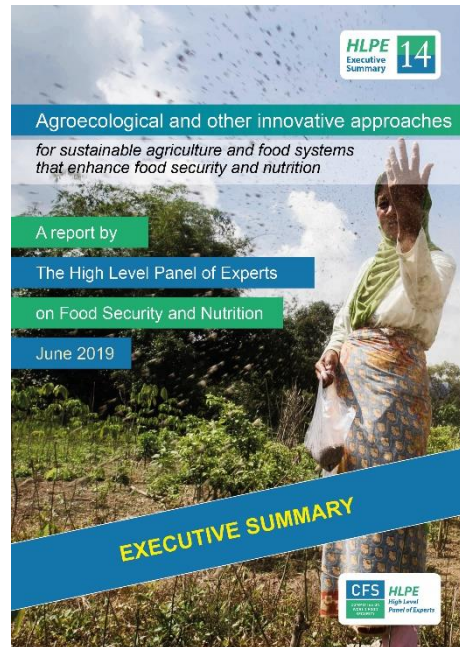
Social-ecological systems at nested scales

Legislation, taxes, incentives, regulation
Policies and institutions (public sector governance)



Recommendations

1. **PROMOTE AGROECOLOGICAL AND OTHER INNOVATIVE APPROACHES IN AN INTEGRATED WAY TO FOSTER TRANSFORMATION OF FOOD SYSTEMS**
2. **SUPPORT TRANSITIONS TO DIVERSIFIED AND RESILIENT FOOD SYSTEMS**
3. **STRENGTHEN SUPPORT FOR RESEARCH AND RECONFIGURE KNOWLEDGE GENERATION AND SHARING TO FOSTER CO-LEARNING**
4. **STRENGTHEN AGENCY AND STAKEHOLDER ENGAGEMENT, EMPOWER VULNERABLE AND MARGINALIZED GROUPS AND ADDRESS POWER INEQUALITIES IN FOOD SYSTEMS**
5. **ESTABLISH AND USE COMPREHENSIVE PERFORMANCE MEASUREMENT AND MONITORING FRAMEWORKS FOR FOOD SYSTEMS**



Key actions to foster transitions

1. **Take into account and value the diversity of food systems** and their contexts across scales when developing transition pathways
2. **Broaden performance metrics** for food systems
3. **Recognize improvement of ecological footprint** as an operational principle for transitioning to more sustainable food systems
4. **Encourage integration of transdisciplinary science and indigenous knowledge** to support local innovation; and,
5. **Consider the emerging importance of 'agency'** as a possible fifth pillar of food security and nutrition

Thank you for your attention