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# Sustainable Agricultural Development for Food Security and Nutrition: What Roles for Livestock?

*A multidisciplinary report by the CFS High  
Level Panel of Experts on Food Security and  
Nutrition*

*AES Annual Conference 2017, Dublin*  
**Pathways to Enhance Sustainable  
Livestock Systems**

**Wilfrid Legg**  
Project Team Leader HLPE



# What is the goal of sustainability?



**Sustainable agricultural development is agricultural development that...**

**improves resource efficiency,**

**strengthens resilience, and**

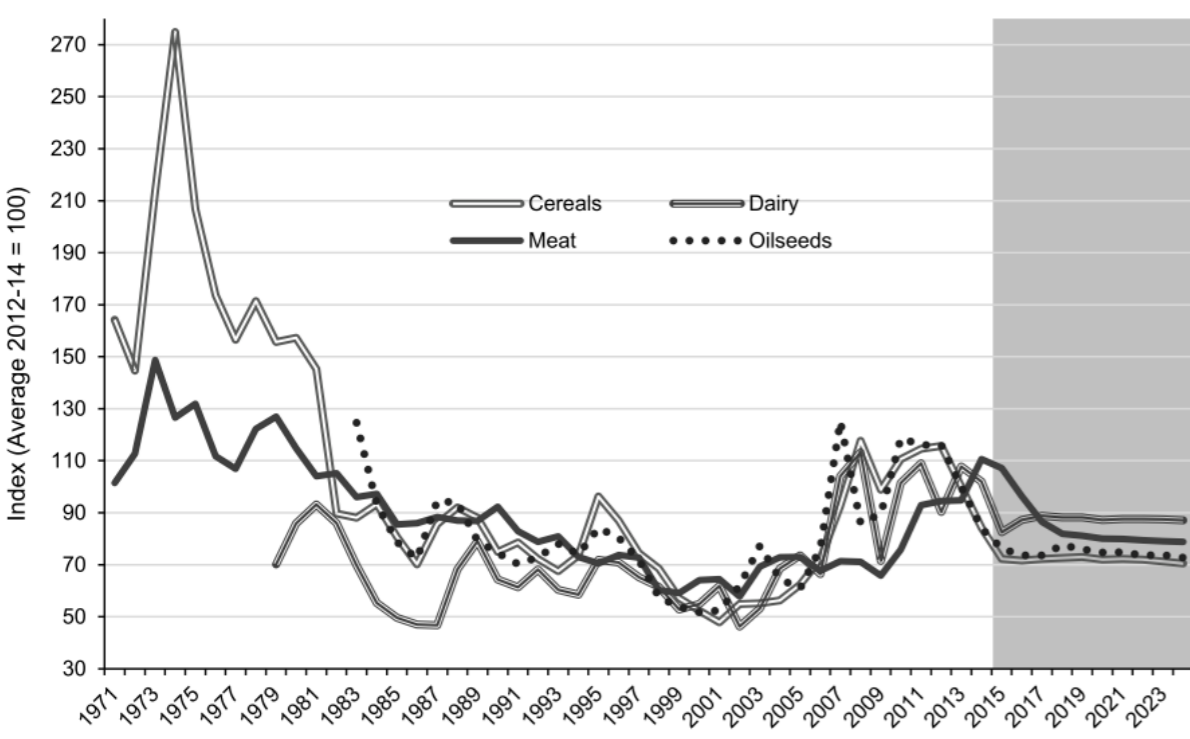
**secures social equity /  
responsibility**

**...of agriculture and food systems in order to  
ensure food security and nutrition for all, now and  
in the future**

# Projection trends by 2050

- Population increase from 7.5 to 9.7 billion
- Global *agricultural* production would need to increase by 60% in volume (demographics, income)
- Global *meat* production could increase by 76% (mostly in developing countries)
- Global *milk* production could grow by
  - ✓ 1.8 % pa in developing countries
  - ✓ 0.3 % pa in developed countries
- But that possible future is uncertain:
  - ✓ Consumption of ASF in richer countries slows down
  - ✓ Demographic, dietary patterns and farming system transformation, especially in Africa

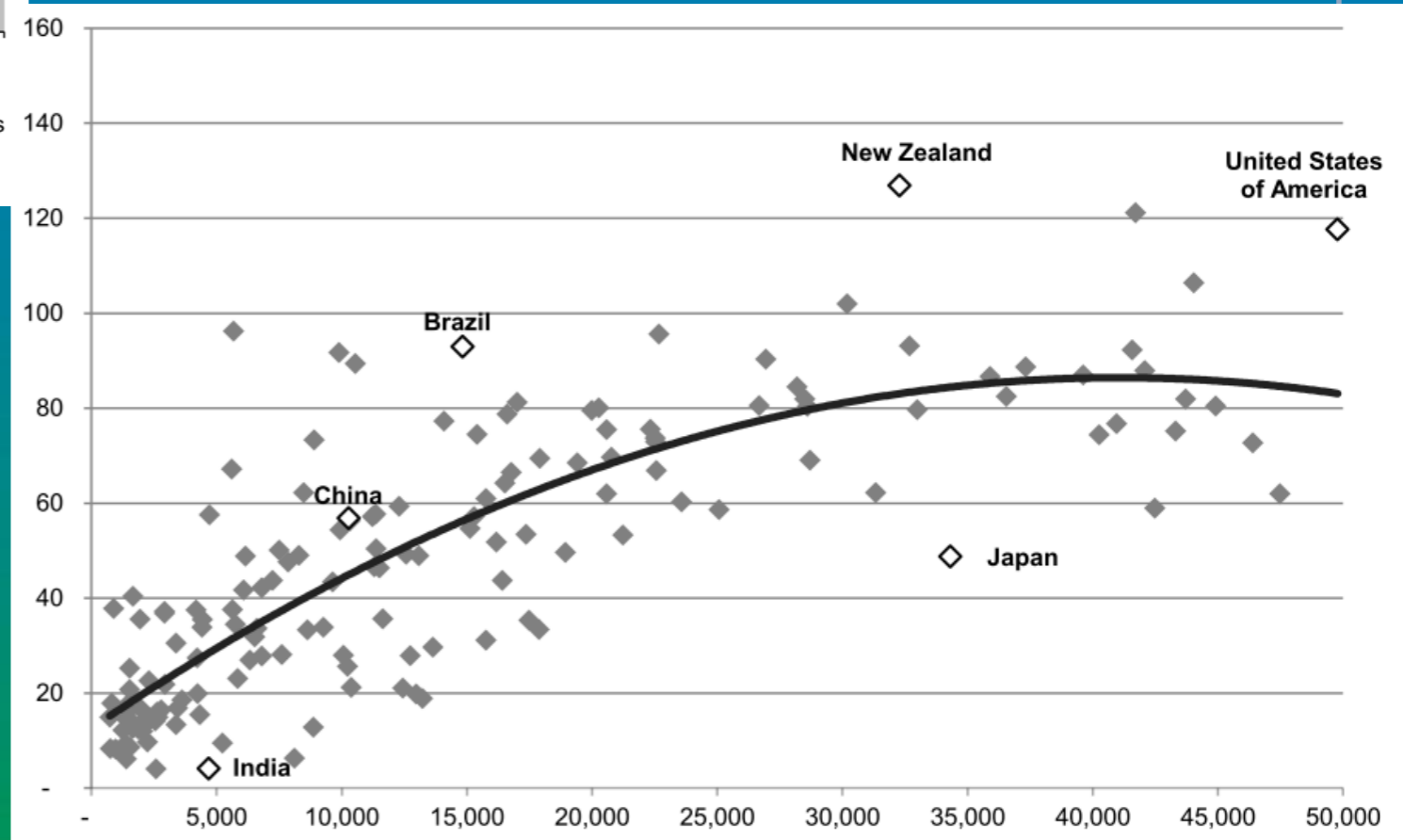
# Evolution and transformation – 2 examples



Source: OECD.Stat (<http://stats.oecd.org/>). Note: Index calculated by a constant weighting of commodities within each aggregate. The weight is calculated by the average 2012–14 real terms production value. 2015 figures are provisional.

## Income and meat consumption

## Evolution of real commodity prices



Source: Adapted from FAO (2009a). Based on data from FAOSTAT (FAO, 2015a) for per capita meat consumption and the World Bank for per capita GDP. Note: GDP per capita (horizontal axis) is measured at purchasing power parity (PPP) in constant 2011 US dollar. Per capita meat consumption (vertical axis) is measured in kg/capita/year.

# Why a focus on livestock?

## Livestock is a:

- key sector, undergoing significant structural change, especially in developing countries
- important and increasing contributor to nutrition
- major driver of land use and consumption of feed crops
- sector which has experienced rapid growth in production and consumption in the past, but many livestock systems are not on a sustainable track.....
- ....although livestock is a powerful engine to illustrate possible sustainable agricultural pathways in the future

# Why concerns about sustainability of livestock systems?



- **Environment:** pressure on land (pasture and feed crops: 80%), water (use and pollution), biodiversity, GHGs (14.5% of total) and risks of livestock adapting/resilience to environmental shocks, lack of addressing environmental externalities and public goods
- **Economic:** wide disparities in levels of productivity, and poor functioning and connection to domestic and international markets
- **Social:** vulnerability of communities, women and children, indigenous peoples, immigrant workers; poor working conditions; inequities in property rights; corporate responsibility; ethics
- **Health:** significant *malnutrition* (“under” and “over” nutrition around ½ of global population), rise in food-borne diseases and zoonoses
- **Animal Welfare:** patchy implementation of OIE standards

# Livestock farming systems

- **Smallholder mixed farming systems**
- **Pastoral systems**
- **Commercial grazing systems**
- **Intensive livestock systems  
(close links with crop systems)**



**But not static, continually evolving, and  
different systems coexist within countries**



## Smallholder mixed farming systems:

- Access to resources, markets and services
- Resource efficiency and resilience

## Pastoral systems:

- Conflicts for land and water
- Discrimination / Social and gender inequity
- Human and animal health challenges

## « Commercial » grazing systems:

- Grassland degradation, biodiversity loss
- Conflicts for land and resources
- Working conditions

## Intensive livestock systems:

- Water, soil and air pollution
- Pressure on land (feed production)
- Antimicrobial resistance
- Working conditions & occupational hazards

## Market orientation or food sovereignty?

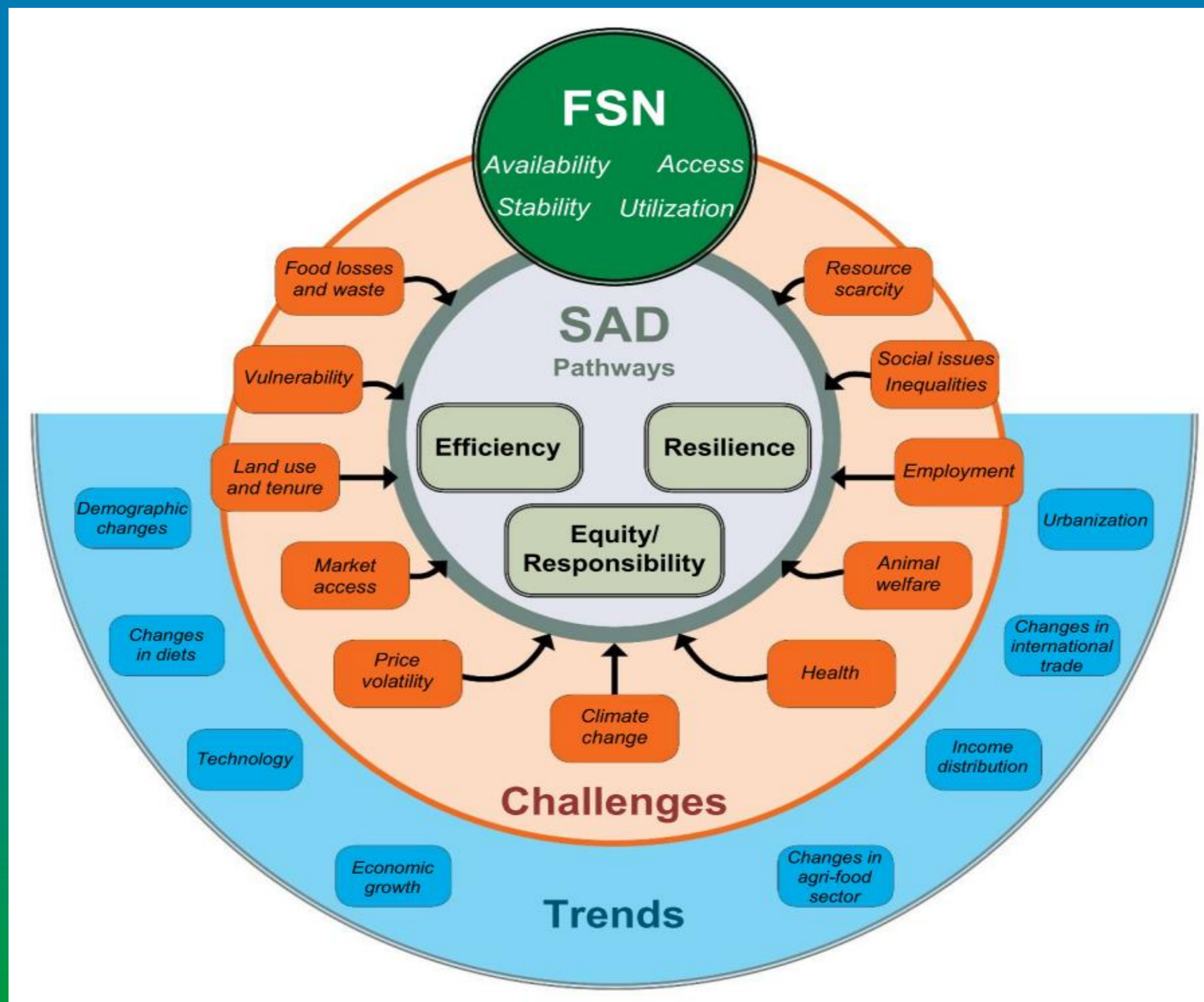
- Globalisation or localisation?
- How much trade liberalisation?
- Whose decisions matter?

## Sustainable intensification or agro-ecology?

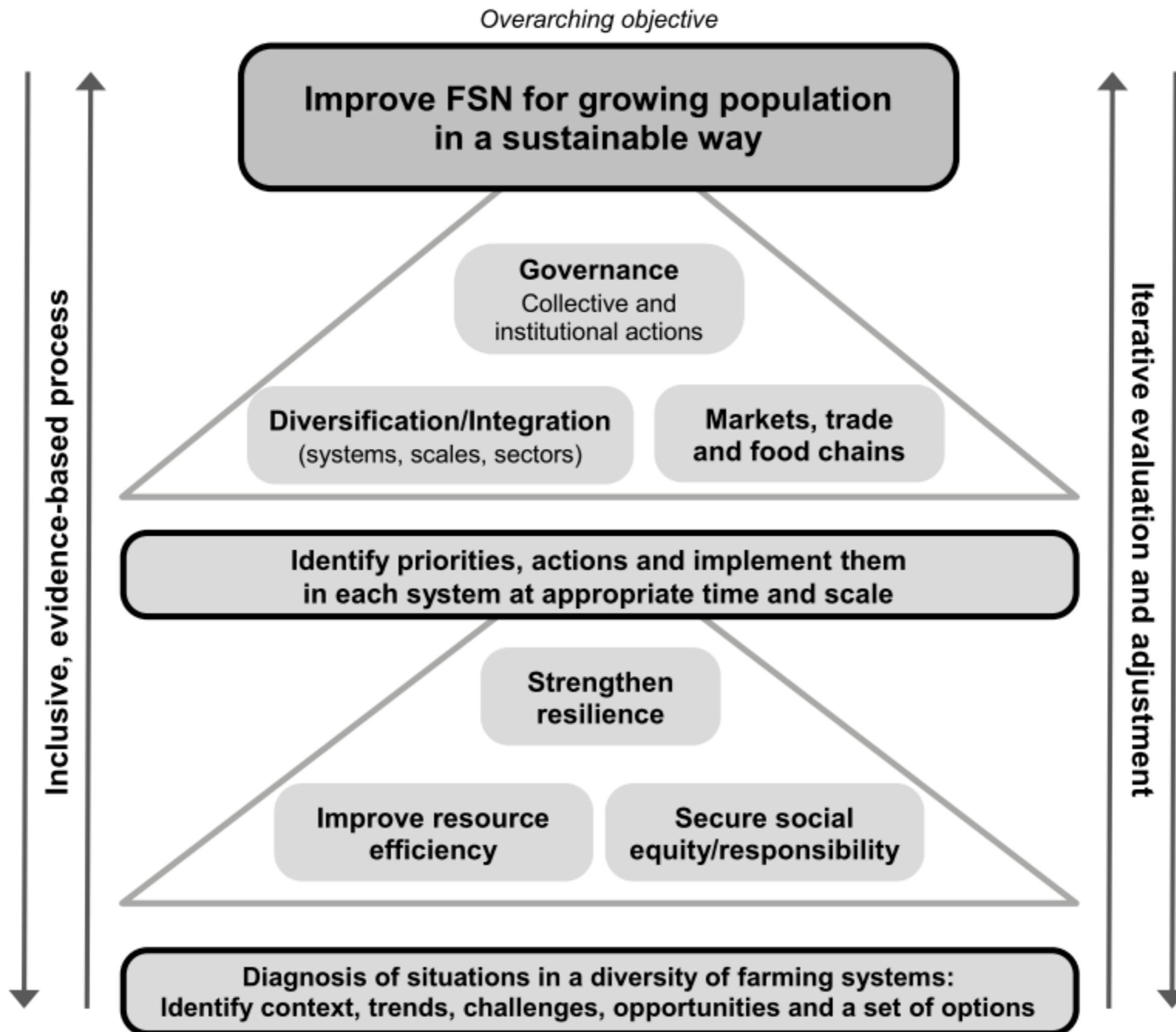
- Priority to a “productivist” or environmental/social focus?
- Both attempt to internalise externalities?
- Two approaches that lead to the same goal?

**Report argues for a pragmatic, evidence and results-based approach!**

# Framework for pathways to Sustainable Agricultural Development



# Common approach for pathways (1)



# Common approach for pathways (2)



## Pathways towards SAD for FSN will have to:

- address multiple challenges at the same time and cover all the dimensions of sustainability and FSN
- be context specific and vary across countries / farming systems
- combine technical actions, investments and enabling policy instruments

The HLPE proposes a **common and iterative approach** to achieve SAD pathways

- Improve **resource efficiency** (of production, natural resources and the environment)
- Strengthen **resilience** (ability to respond and adapt to shocks)
- Secure **social equity/responsibility** (addressing and respecting the diversity of social issues)

- Reduce animal mortality (improve access to veterinary services in developing countries)
- Reduce yield gaps **and** environmental footprint (GHG emissions could be reduced by 18-30% if all producers adopted best practices in a given system and region)
- Improve animal feed efficiency
- Close nutrient cycles
- Reduce food losses and waste
- Embrace technologies tailored to different situations and scale



# Strengthen resilience through



- **Adapting to climate change**
- **Protecting and managing genetic resources**
- **Strengthening actions to improve animal health**
- **Widening application of risk management tools**

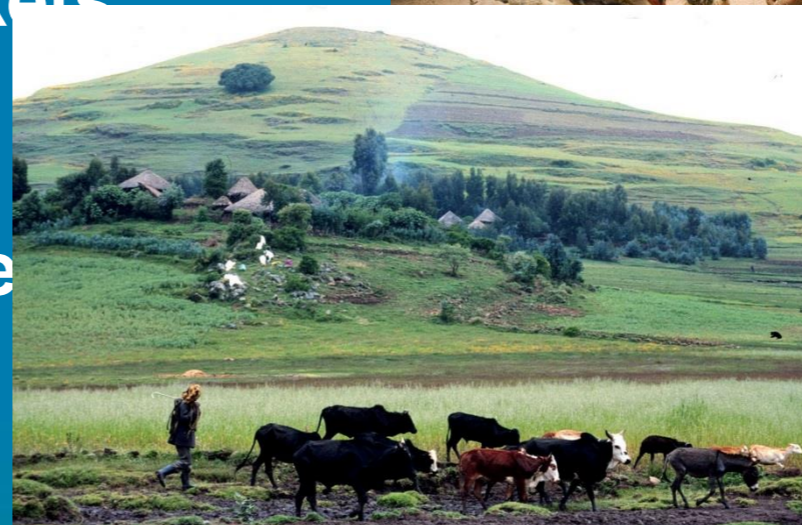
**Covers a wide range of social issues: income distribution, human rights, gender, tenure and property rights, discriminations, involvement and responsibility of all actors (individual, corporate, collective, NGOs)...**

**Among the operational priorities for action:**

- **Developing social protection systems, in particular for smallholders**
- **Improving working conditions (legislation, law enforcement, practical guidelines)**
- **Enhancing animal welfare (OIE standards, technical innovations)**

## Smallholder mixed farming systems

- Enhance productivity and access to resources, markets and services
- Create an enabling environment for collective organization



## Intensive livestock systems

- Identify options to raise production while minimizing harmful environmental effects
- Explore and implement approaches to reduce antimicrobial resistance
- Ensure decent working conditions



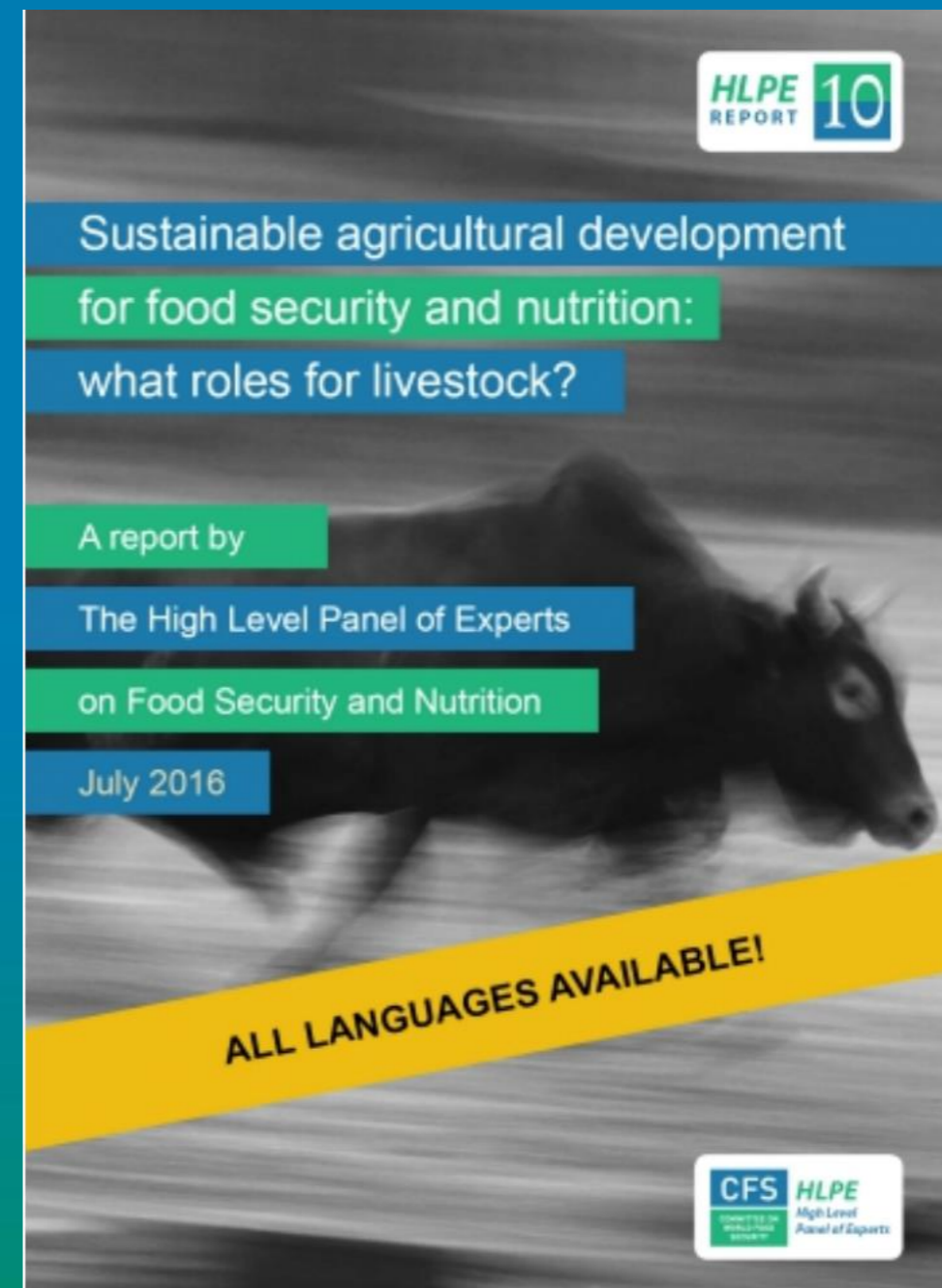
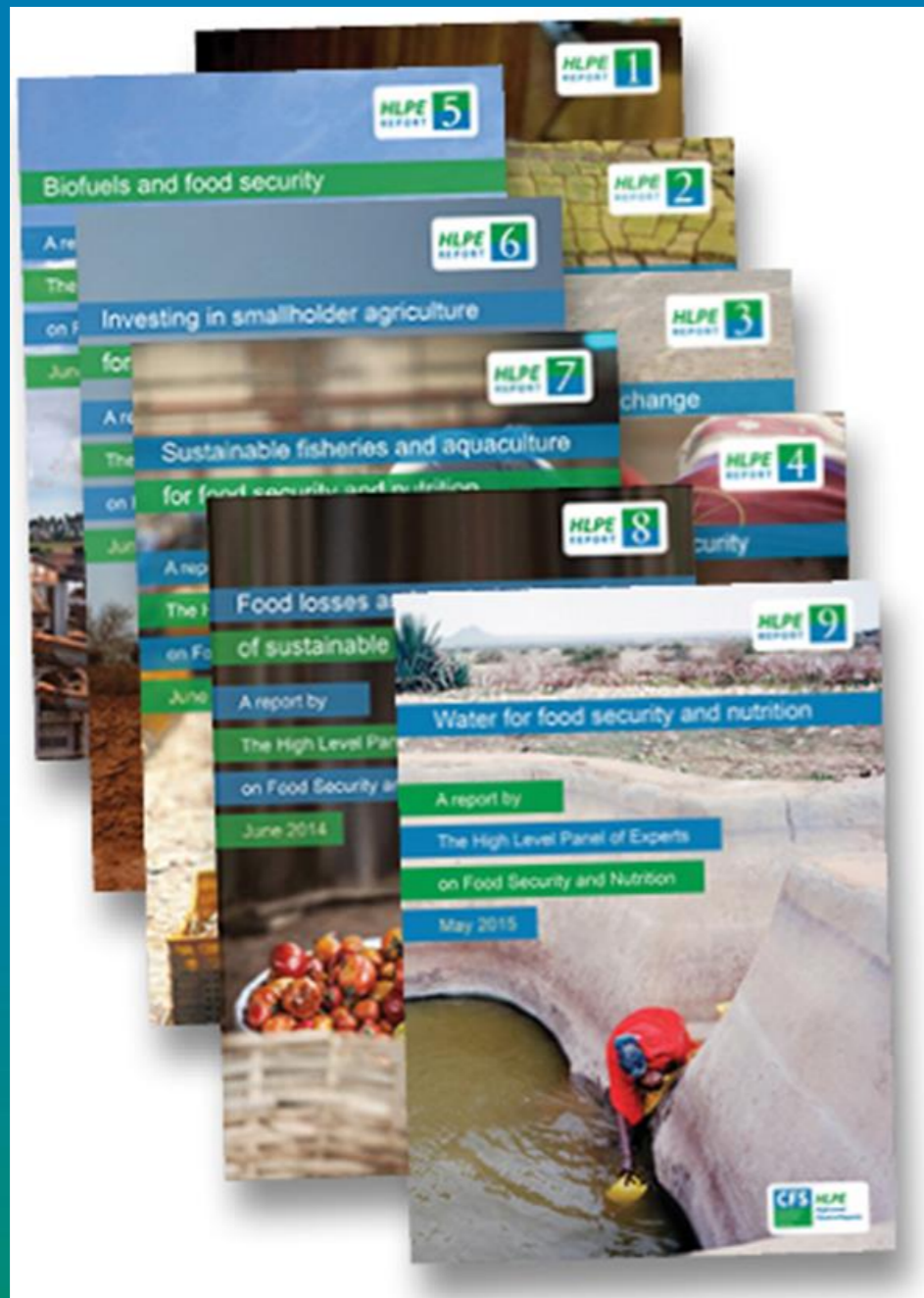
Photo credit: ILRI/Fred Unger

# Key messages



- **Business as usual is not a sustainable option**
- **All farming systems face challenges to improve sustainability: no one system provides the “silver bullet” but harnessing and sharing appropriate R&D and on-the-ground experiences helps!**
- **Adapting the “pathways” framework in specific contexts recognises the diversity, evolution and linkages across livestock systems**
- **Urgent need by policy makers and actors in the agri-food chain, at all levels of governance, to transform recommendations into actions**
- **Research agenda – integrated systems analysis along agri-food chain, costs and benefits of trade offs among sustainability criteria, identifying “good policies for good practices”, undertaking regular monitoring and evaluation**

# Thank you for your attention



For more information about the HLPE and to download the reports, please visit the HLPE website at: [www.fao.org/cfs/cfs-hlpe](http://www.fao.org/cfs/cfs-hlpe)

# The HLPE and the CFS

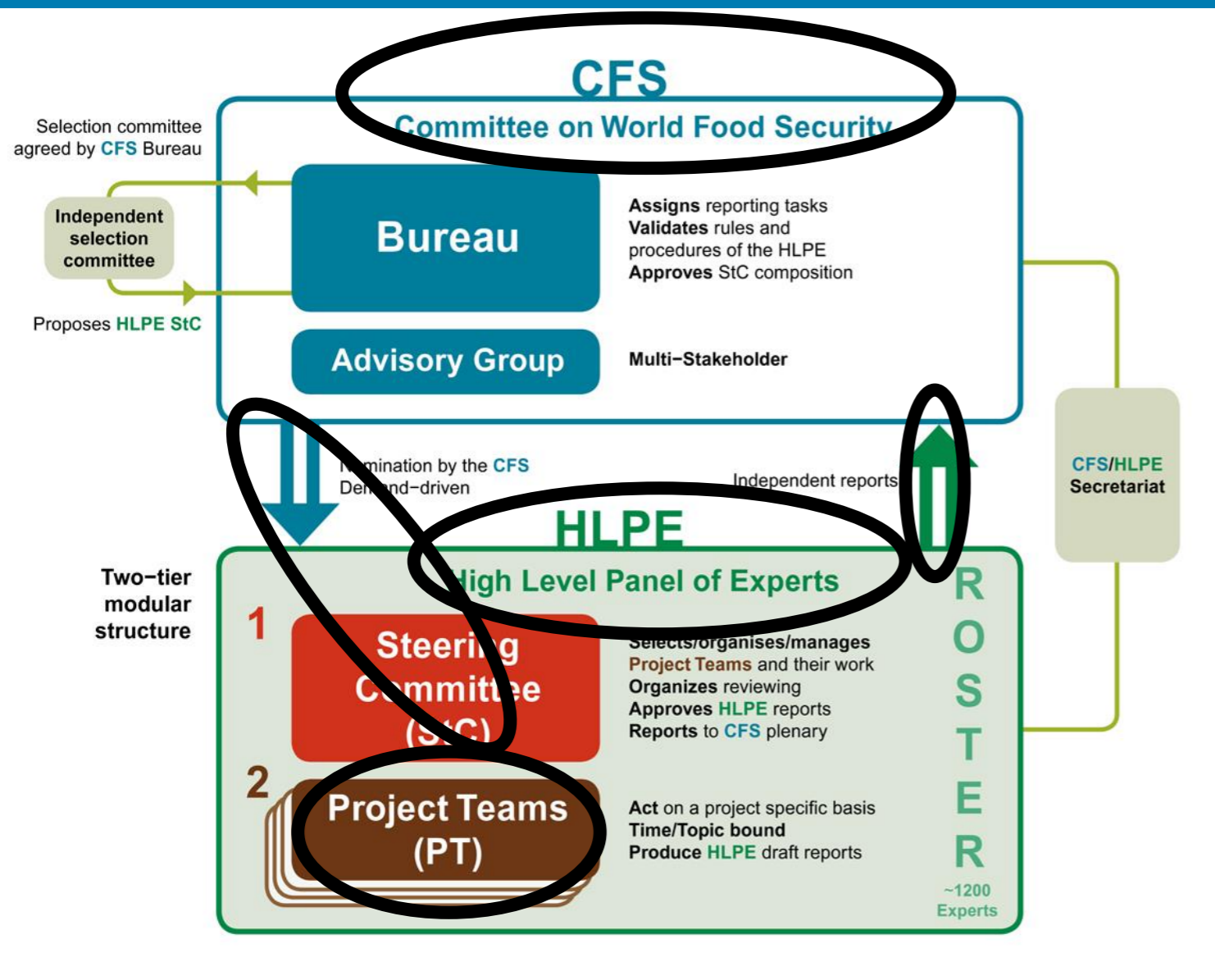
An expert panel created in 2010 as part of the CFS reform, to contribute to food security debate – like the IPCC with regard to climate change

## HLPE Functions (as per the CFS)

(i) Assess and analyze the current **state of food security and nutrition** and its underlying causes.

(ii) Provide **scientific and knowledge-based analysis and advice on specific policy-relevant issues**, utilizing existing high quality research, data and technical studies.

(iii) Identify **emerging issues**, and help members prioritize future actions and attentions on key focal areas.



# A collective process over 2 years



## HLPE Steering Committee members

Patrick Caron (Chair)  
Carol Kalafatic (Vice-Chair)  
Amadou Allahoury  
Louise Fresco  
Eileen Kennedy  
Muhammad Azeem Khan  
Bernardo Kliksberg  
Fangquan Mei  
Sophia Murphy  
Mohammad Saeid Noori Naeini  
Michel Pimbert  
Juan Ángel Rivera Dommarco  
Magdalena Sepúlveda  
Martin Yemefack  
Rami Zurayk

## HLPE Project Team members

Wilfrid Legg (Team Leader)  
Khaled Abbas  
Daniela Alfaro  
Botir Dosov  
Neil Fraser  
Delia Grace  
Robert Habib  
Claudia Job Schmitt  
Langelihle Simela  
Funing Zhong

16 peer reviewers  
117 contributions on V0  
draft (429 pages)

# Key roles of the livestock sector



- About 1/3 of global agricultural value
- In 2010, animal products globally provided 16 % of total calories and 31 % of protein
- In developing countries most rural households keep livestock, especially in Africa
- Livestock generates co-products and benefits (wool, skin, manure, draught power, store of wealth and safety nets, landscapes)
- Largest user of land resources (pasture and feed crops: 80%) and a big user of water
- Generates 14.5% of GHGs, but also sequesters carbon in grasslands



## All agricultural systems:

- Foster policy coherence for food security and nutrition
- Address nutrition, food safety, working conditions and services
- Foster gender equality and women's empowerment
- Foster youth empowerment
- Protect the environment and promote sustainable management and efficient use of natural resources
- Enhance resilience against risks and variability
- Promote co-operation and collaboration in innovation, R&D, and address data needs

## All livestock systems:

- Improve animal health and welfare (OIE standards)

## Specific livestock systems:

- Recognize, protect, and support pastoral systems for livelihoods and sustainable resource management (enhance resilience, access to resources and services, pastoral organizations)
- Promote and support sustainable grazing systems (enhance provision of ecosystems, restore degraded land)
- Promote and support mixed systems (strengthen crop-livestock integration, leverage livestock as a means for sustainable livelihoods for smallholders)
- Promote the sustainability of intensive systems (promote efficiency of feed crops, protect the environment, share innovative technologies and practices, improve working conditions and animal welfare)

# Elaboration of key messages



- Impossible to look at livestock sustainability and livestock development without looking at the whole agricultural sector
- Need to assess and balance benefits and undesirable consequences from a wide range of criteria and expectations and not the only production
- Need to promote integration and complementarities of crop and livestock at all scales, even more so as specialisation has led to disappearance of integration related benefits
- Impossible to look at livestock sustainability and livestock development related sustainability without looking at this issue at the world wide level
- Impossible to look at livestock sustainability and livestock development without taking into account local specificity... call for specific assessment at each level and definition of local specific strategies at each level by addressing complementarities and trade offs (local, sub national, national, regional, global)
- Need to align strategies among scales for consistency towards sustainable development (farm, local, sub national, national, regional, global)
- Need to grasp diversity and to build upon it to design strategies at all levels for resilience and sustainable development

# Structural transformation in agriculture

## From « Green » to « Livestock revolution »

### Over the last 50 years:

- Meat production x 4
- Milk production x 2
- Egg production x 4
- **Radical transformation of livestock farming systems through:**
  - ✓ Intensification and industrialization
  - ✓ Specialization at the farm and territorial levels
  - ✓ Evolution of crop-livestock linkages
  - ✓ Greater complexity and globalization of food supply chains
  - ✓ Growing market concentration in agro-food
  - ✓ Main changes in developing countries
  - ✓ Rapid technological changes
  - ✓ Enhanced impact of environmental, animal welfare and health/nutrition policies, standards and advice, especially in OECD countries

Population heads (percent)						
	Grazing	Mixed	Feedlots	Backyard	Intermediate	Industrial
Cattle & Buffaloes	32.7%	64.0%	3.3%	n.a.	n.a.	n.a.
Small Rum.	44.2%	55.8%	n.a.	n.a.	n.a.	n.a.
Pigs	n.a.	n.a.	n.a.	45.2%	16.6%	38.2%
Chickens	n.a.	n.a.	n.a.	18.5%		81.5%
Production (percent)						
	Grazing	Mixed	Feedlots	Backyard	Intermediate	Industrial
Cattle & Buffaloes Milk	32.5%	67.5%	n.a.	n.a.	n.a.	n.a.
Cattle & Buffaloes Meat	30.7%	57.0%	12.2%	n.a.	n.a.	n.a.
Small Rum. Milk	37.6%	62.4%		n.a.	n.a.	n.a.
Small Rum. Meat	44.3%	55.7%	n.a.	n.a.	n.a.	n.a.
Pork	n.a.	n.a.	n.a.	26.2%	17.6%	56.2%
Chicken meat	n.a.	n.a.	n.a.	1.8%	n.a.	98.2%
Eggs	n.a.	n.a.	n.a.	7.9%	n.a.	92.1%

Yet huge diversity as illustrated in the table  
(source: GLEAM, 2010)