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

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

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Structure of the report

1) SAD for FSN: Approach and conceptual framework

2) Trends and drivers of agricultural development

3) Sustainability challenges for livestock in agricultural development

4) Pathways towards SAD focusing on livestock

Recommendations

1) SAD for FSN: Approach and conceptual framework

Definition

Sustainable agricultural development (SAD) is agricultural development that contributes to improving **ressource efficiency**, strengthening **resilience**, and securing **social equity / responsibility** of agriculture and food systems in order to ensure food security and nutrition for all, now and in the future

Ag. development: key figures

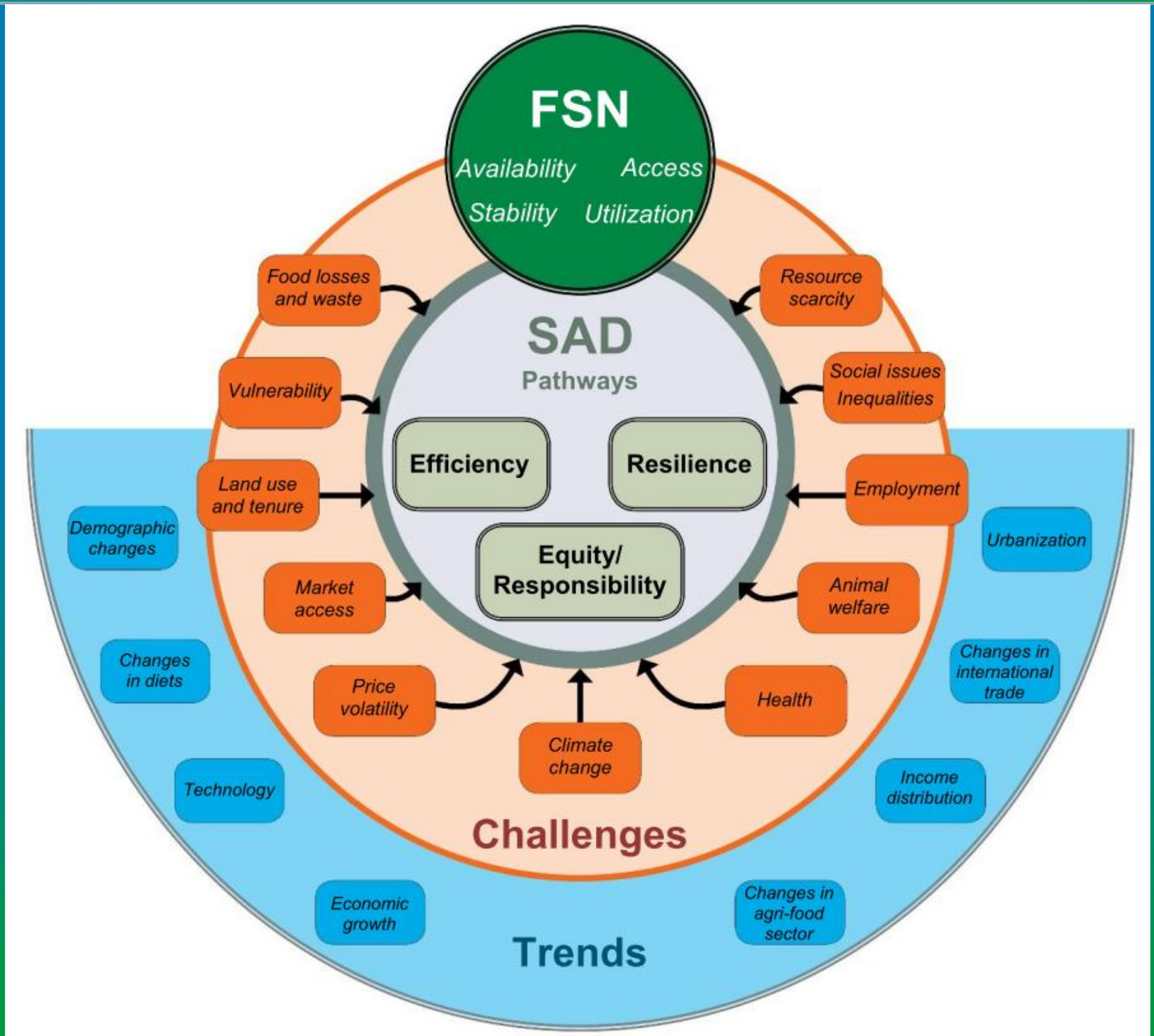
Over the last 50 years:

Ag. Production has increased 3 fold with only 12 % of ag. land expansion (Green Revolution)

Today:

Ag. sector employs 1.3 billion persons (38 percent of the world's total labour force), 97 percent of which are in developing countries

Conceptual framework



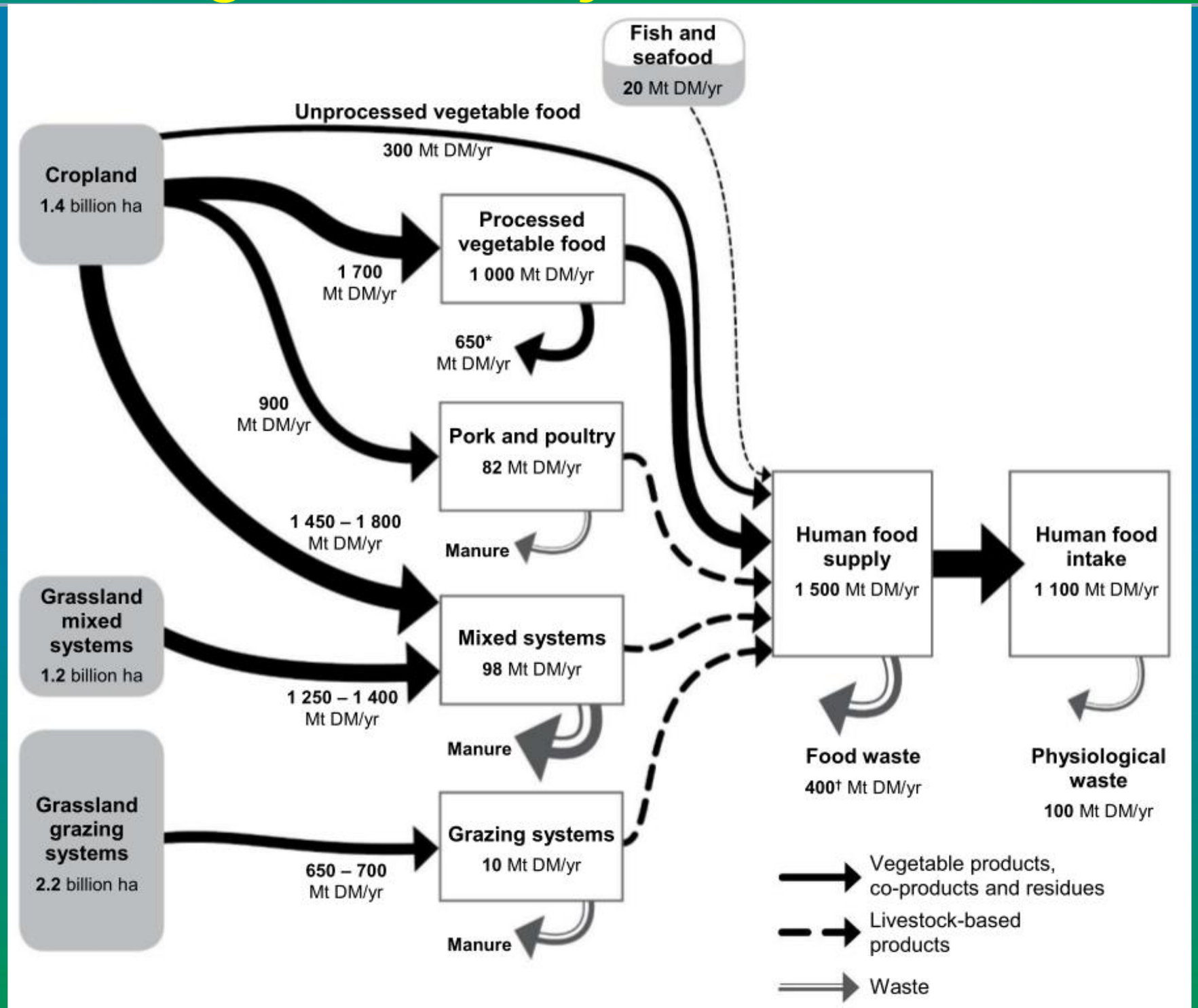
Key role of the livestock sector (1)

- Around 1/3 of global agricultural gross production value
- Most rural households keep livestock in developing countries (between 44 and 79 % in seven African countries)
- In 2010, animal products (excluding fish and seafood) globally produced 16 % of total calories and 31 % of protein.
- Beyond ASF, livestock generates co-products and benefits (wool, skin, manure, draught power, store of wealth and safety nets, landscapes…)

Key role of the livestock sector (2)

- **Largest user of land resources :**
  - ✓ **Pastures = 26 % of global land area**
  - ✓ **Pastures + feed crops = 80 % of ag. land**
- **Major user of water resource, including irrigation for feed crops.**
- **14.5 % of GHG emissions:**
  - ✓ **45 %: feed production and processing,**
  - ✓ **39 %: enteric fermentation of ruminants,**
  - ✓ **10 %: manure storage and processing, and**
  - ✓ **6 %: processing/transporting animal products**

Land-use, major flows of biomass in food and agriculture system



Source: Adapted from Herrero *et al.* (2015). Mt DM/yr = million tonnes of dry matter per year. *Of which 250 million tonnes are used as feed. †Of which 50 million tonnes are used as feed.

Typology of livestock farming systems

- Smallholder mixed farming systems
- Pastoral systems
- Commercial grazing systems
- Intensive livestock systems
- (Links with plant-based systems)

Animal population and ASF production by livestock systems

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%

Source: FAO (GLEAM).

2) Trends and drivers of agricultural development

External trends affecting Ag. Devpt.

Over the last 50 years:

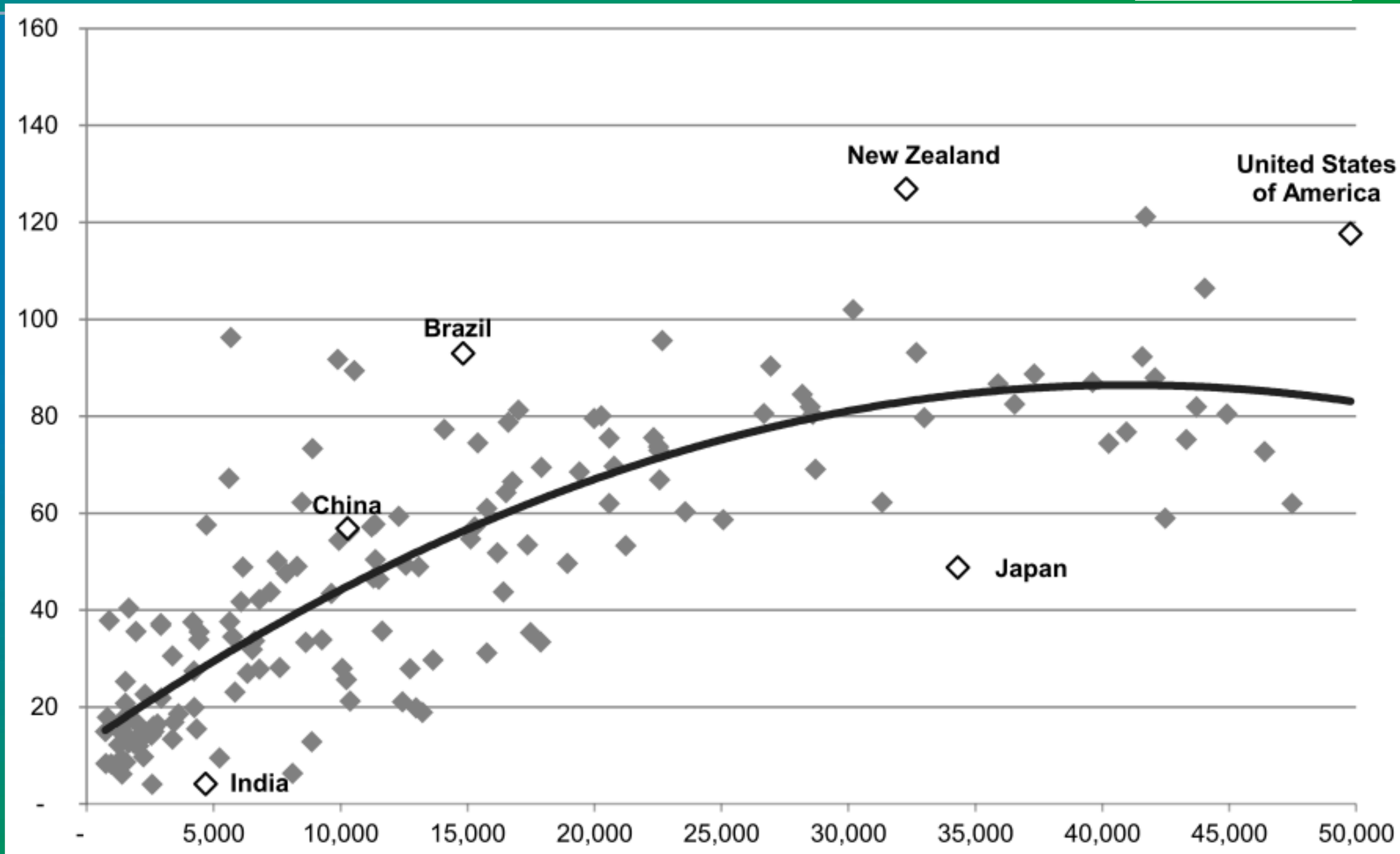
- Population growth: from 3 to 7.3 billion
- Global GDP increased more than 5 fold
- Global agriculture GPV increased 3 fold
- Urbanization: urban population increased from 30 % to 54 % of the global population.
- Long term decline in real prices of agricultural products but short-term volatility
- Increase in international trade of agricultural products, including ASF

Changing diets: ASF consumption

Over the last 50 years:

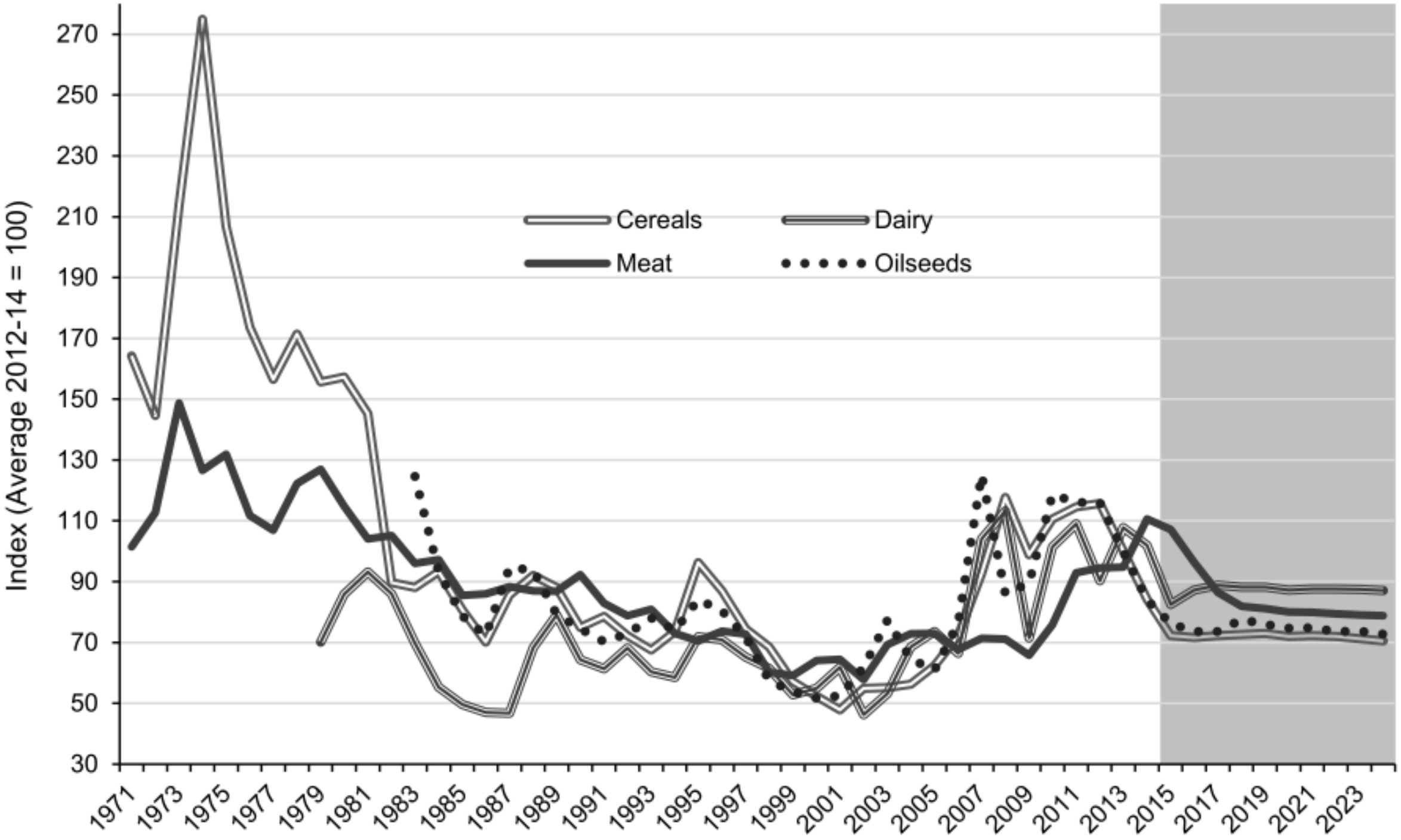
- Global meat production has quadrupled from 71 to 292 million tonnes,
- Global milk production has more than doubled from 342 to 720 million tonnes
- Egg production rose from 15 to 69 million tonnes
- Share of ASF and vegetable oils in total calorie intake increased from 13 to 22 percent since the early 1970s

Income and meat consumption



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.

Evolution of commodity real prices



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.

Structural transformation in agriculture

- **From « Green » to « Livestock revolution »**

- **Radical transformation of farming systems through:**
  - ✓ **Intensification**
  - ✓ **Specialization at the farm and territorial levels**
  - ✓ **Evolution of crop-livestock linkages**
  - ✓ **Increasing complexity and globalization of food supply chains**
  - ✓ **Growing market concentration in the agro-food industry**

Projections of key trends by 2050

- Global population is expected to reach 9.7 billion (and to double in Africa)
- 66 % of people will live in cities (rapid urbanization of Asia and Africa)
- Rural population will continue to grow in Africa, Oceania and in the least developed countries.
- ASF consumption will grow in developing countries but remain stable or decrease in developed countries

Given this trends, to meet the demand

- Global agricultural production is expected to increase by 60 % in volume
- Global meat production could increase by 76 % (mostly in developing countries)
- Global milk production could grow at an annual rate of 1.8 % in developing countries and 0.3 % in developed countries

3) Sustainability challenges for livestock in agricultural development

Environmental challenges

- Reduce environmental footprint of livestock and feed crops
- Pressure on land, including deforestation and land degradation and water
- Biodiversity loss
- Climate change (mitigation / adaptation)

Economic challenges

- **Better functioning of markets (internalize externalities)**
- **Lack of consensus on how to integrate FSN concerns in trade agreements**
- **Low levels of investment in agriculture and R&D**
- **Concerns about corporate concentration in agri-food, including livestock sector**

Social challenges

- **Working conditions (in particular in meat packing and processing industry)**
- **Child labour (of 215 million child labourers, about 60 % are engaged in agriculture)**
- **Gender inequalities (in developing countries, 43 % of agricultural labour force are women)**
- **Ageing labour force in some countries – need to make farming more attractive for young people**
- **Conflicts and protracted crises (number of countries facing food crises has doubled since 1990)**

Health challenges

- ***One Health* approach: better prevent zoonoses by taking into account the links between human health, animal health and the environment**

- **Animal diseases (in Africa, 35 highest priority diseases cost USD9 billion a year – 6 % of livestock production value)**

- **Human health**
  - ✓ **Complex links between ASF, nutrition and health**
  - ✓ **Food-borne diseases: 420 000 deaths per year, developing countries bear 98 % of the burden.**

- **Antimicrobial resistance**

Animal welfare challenges

Recognize that animal welfare is variously addressed across countries and production systems

Implement OIE's international animal welfare standards based on the « five freedoms »:

- ✓ **Freedom from thirst, hunger and malnutrition,**
- ✓ **Freedom from discomfort**
- ✓ **Freedom from pain, injury and disease,**
- ✓ **Freedom to express normal behaviour,**
- ✓ **Freedom from fear and distress.**

Smallholder mixed farming systems

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

Photo credit: ILRI/Apollo Habtamu

Pastoral systems

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

Photo credit: ILRI/Zerihun Sewunet

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Commercial grazing systems

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

Photo credit: ILRI

Photo credit: ILRI/Susan MacMillan

Intensive livestock systems

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

Photo credit: ILRI/Fred Unger

4) Pathways towards SAD focusing on livestock

Common approach for pathways (1)

Pathways towards SAD for FSN will have to:

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

Common approach for pathways (2)

In 8 steps:

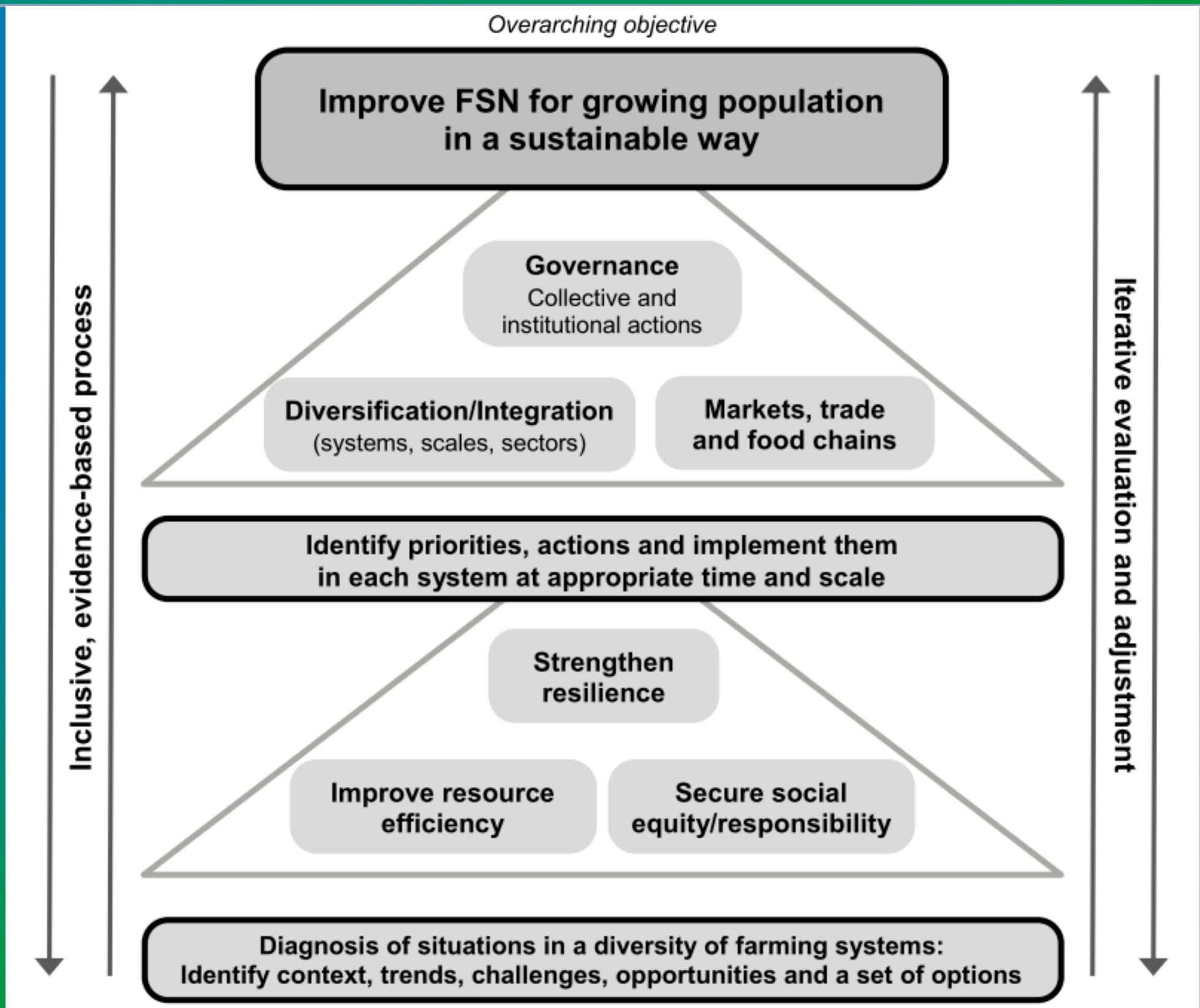
1. Describe the current situation in a specific context
2. Agree on long-term FSN goals and targets at the national level, in line with the SDGs
3. Identify challenges to move towards SAD for FSN
4. Define a set of operational priorities among these challenges
5. Identify available solutions that can be mobilized by stakeholders at different levels
6. Define the context specific responses and technical solutions
7. Establish an appropriate political and institutional environment at the national level to implement priority actions at the farm level and along the agri-food chain
8. Put in place methods to monitor and evaluate progress, to identify constraints, and to allow for a dynamic and iterative process of learning by doing

3 operational principles for SAD

Solution-oriented pathways towards SAD should be based on three interlinked operational principles:

- **Improve resource efficiency**
- **Strengthen resilience**
- **Secure social equity/responsibility**

Common approach for pathways (3)



Improve resource efficiency

- **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 region and system)
- **Improve animal feed efficiency**
- **Close nutrient cycles**
- **Reduce food losses and waste**

Strengthen resilience through

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

Secure social equity/responsibility

This covers a wide range of social issues: income distribution, human rights, gender, tenure and property rights, discriminations, responsibility of all actors (individual, corporate, collective)…

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 (standards, technical innovations)

How to address those 3 principles?

Coexistence of many (conflicting) narratives to move towards SAD for FSN:

- **Market-orientation or Food sovereignty?**
- **Sustainable intensification or Agro-ecology?**

…

How to move beyond controversies and design pathways towards SAD for FSN?

Enabling environment for SAD strategy

- Invest in agriculture and agricultural R&D
- Clarify the role (and limits) of markets in SAD strategies
- Enhance farm diversification and integration at different levels
- Enable stakeholder engagement and collective action, foster multistakeholder partnerships
- Ensure consistency of decisions among levels of governance
- Promote and adopt appropriate technologies, including ICTs, in farm systems to improve productivity and reduce environmental harm

Smallholder mixed farming systems

Operational priorities for action include:

- ✓ ensure better access to markets and more choice of markets;
- ✓ secure tenure rights and equitable access to land;
- ✓ design feasible growth pathways;
- ✓ recognize, empower and enable the role of women; improve animal health management;
- ✓ encourage the use of local, more resistant breeds; implement appropriate & participatory programmes;
- ✓ facilitate smallholders' participation in political processes; provide quality training programmes and information;
- ✓ redirect development policies and tax incentives towards the design of diversified and resilient farming and food systems.

Pastoral systems

Operational priorities for action include:

- ✓ improve governance and security by involving pastoral societies in participatory governance mechanisms;
- ✓ improve connection to markets and market choices;
- ✓ provide and protect access to public services, including for animal and human health, and access to pastoral resources (water and land);
- ✓ better target emergency assistance;
- ✓ devise development strategies that take into account the specific needs of pastoral systems, including mobility.

Commercial grazing systems

Operational priorities for action include:

- ✓ maintain and improve grassland management practices to improve resource efficiency and contribute to climate change mitigation and adaptation;
- ✓ develop integrated crop–livestock–forestry systems that enable several kinds of production on the same land and allow synergies between those productions;
- ✓ protect native forests from deforestation.

Intensive livestock systems

Operational priorities for action include:

- ✓ invest in R&D along the complete food chain to strike a balance between increasing production and reducing environmental harm, including food losses and waste;
- ✓ expand precision livestock farming;
- ✓ reduce the prophylactic use of antibiotics in animal care and to improve animal welfare;
- ✓ reduce the environmental impact of intensive systems including systems that promote more recycling of animal waste to promote efficiency and reduce the harm caused by unbalanced nutrient cycles
- ✓ increase the sustainable production of feed while improving the ratio of feed to animal conversion.

Recommendations

Cross-cutting recommendations

1. Elaborate context-specific pathways to SAD for FSN
2. Strengthen integration of livestock in national SAD strategies
3. Foster coherence between sectoral policies and programmes
4. Develop gender-sensitive livestock policies and interventions
5. Better integrate SAD issues for FSN in trade policies

Cross-cutting recommendations

6. Limit and manage excessive price volatility

7. Protect, preserve and facilitate the sharing of livestock genetic resources

8. Improve surveillance and control of livestock diseases

9. Promote research and development

10. Review and improve indicators and methodology and identify data gaps

System specific recommendations

11. Recognize the importance of smallholders mixed farming systems for FSN and support them

Photo credit: ILRI/Zerihun Sewunet

Systems specific recommendations

12. Recognize and support the unique role of pastoral systems

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Systems specific recommendations

13. Promote the sustainability of commercial grazing systems

Photo credit: ILRI/Perez

System specific recommendations

14. Address the specific challenges of intensive livestock systems

Thank you for your attention

Photo credit: ILRI/Susan MacMillan