Cooperating with the future:

Towards multiplying the multiple benefits of sustainable livestock production systems

Head of FAO AGAL, Henning Steinfeld, delivered the keynote presentation on Multiple Benefits from Sustainable Livestock to some 300 participants on the first of our five-day 7th Multi-Stakeholder Partnership Meeting in Addis Abeba.

Steinfeld's key conclusion was that while the livestock sector is a major driver of environmental change -- largely because of its large interface with common property resources – it was also much more than what could be expressed in economic terms and GDP. Yes, it provided income and employment but also less tangible though crucial benefits for cultural and social cohesion.
Steinfeld said that policymakers around the world should look at the diversity of livestock systems and interactions, keeping in mind that at times there would be clashes between private and public goods. We needed to bear in mind that sustainable livestock systems involve multiple objectives, change over time and are different in different locations. The only way to capture the multiple benefits of livestock was to integrate the tools we use. Finally, Steinfeld pointed out to the stakeholders that everyone needed to 'collaborate with the future'—to provide future generations, at a minimum, with the same level of opportunities that we enjoyed today.

Follows the basics from Steinfeld's presentation.

A look at the bio-physical dimensions of livestock production

Energy: The food sector currently accounts for 30% of the world's total energy consumption. *Land use:* Livestock systems occupy 29% of the global surfance area of the world, with 3.3 billion hectares covered by rangelands (25% of total land area). Half a billion hectares of the world's cropland (4% of total land area) is used to grow feed for livestock. *Biodiversity:* 75% of the world's food supply is generated from only 12 plants and 5 animal species. Livestock impact biodiversity not only directly through their grazing but also indirectly, for example, by deforestation of lands to make room for livestock or the growing of feed crops, by livestock's emission of greenhouse gases and by water polluted by livestock. *Water:* About 70% of fresh water is used for agriculture, with 31% of that used for livestock production. *Nutrients:* Livestock are an important source of soil nutrients in Africa and other regions where reliance on commercial fertilizer is low. *Climate change:* In 2010, livestock supply chains emitted 8.1 gigatonnes of carbon dioxide equivalents. Livestock

production in sub-Saharan Africa generates 5% of the total greenhouse gas emissions of the global livestock sector. *Diseases:* Current emerging infectious diseases are associated with forest clearing and other human modifications of environments. *Biomass:* It's striking that humans appropriate 25% of the total net primary production—that is, total vegetative growth. Agriculture is by far the largest user of biomass (84–86%, 42–46% on croplands and 29–33% on grazing lands).

A look at the socio-economic dimensions of livestock production

Food and nutrition: Agriculture has been very successful in feeding all of the world's population of 7.4 billion people, who consume food every day. But there are still almost 800 million people (793 million) who are undernourished and nearly 2 billion people (1.9 billion) who are overweight (600 million adults are obese). Livestock products make up 17% of total human calorie consumption and 33% of total human protein consumption. Nearly a quarter of people in sub-Saharan Africa (23%) and nearly a third of people in Ethiopia (32%) are undernourished, while nearly 17% of Ethiopians (16.8%) are overweight. *Agricultural value, income, employment:* Primary agricultural production only (excluding processing and trading) contributes 6%—some 5.2 trillion US dollars—to the world's gross domestic product (GDP). Livestock are a specially preferred form of capital—a global asset worth some 3.1 trillion US dollars. Livestock supply chains employ at least 1.3 billion people and directly support the livelihoods of 600 million poor smallholder farmers. Ethiopia has some 11.4 million households producing livestock, with the dairy sector suppling 40% of the country's agricultural GDP and 12–16% of the country's total GDP. *Rural growth and political stability:* Agricultural growth has multiplier effects, raising incomes by a factor of 1.7 to 2.7 in Africa and Asia, and helps to maintain political stability: increases in international food prices have led to unrest and conflicts (e.g. Arab spring). *Environmental services and cultural values:* Livestock landscapes are often attractive to tourists and valued for their aesthetics. Livestock-derived foods are also a central part of cultures and social interactions.

Outside pressures

Demand growth

Population: In just 35 years, from 2015 to 2050, the world population will grow by 32%—from 7.3 to 9.7 billion people. Sub-Saharan Africa will account for more than half of this growth, with the population growing by 120%—from 1 to 2.2 billion people. The Ethiopian population will grow by 90%—from 99 to 188 million people. *Diets:* A change in diets is occurring across the developing world. While the average milk consumption per person per year in Ethiopia is just 19 litres, in Addis Ababa and other urban areas it is 52 litres. *Urbanization:* The developing world is also fast urbanizing. Between 2015 and 2050, urbanization globally will rise from 54% to 65%; in sub-Saharan Africa, from 37% to 53%; and in Ethiopia, from 19% to 37%.

Climate change

Climate change is another big driver of change, with rising temperature and carbon dioxide levels, increases in climate variability and extreme weather events (droughts, floods), and new disease threats arising. There is probably no other sector so exposed to climate change as is the livestock sector.

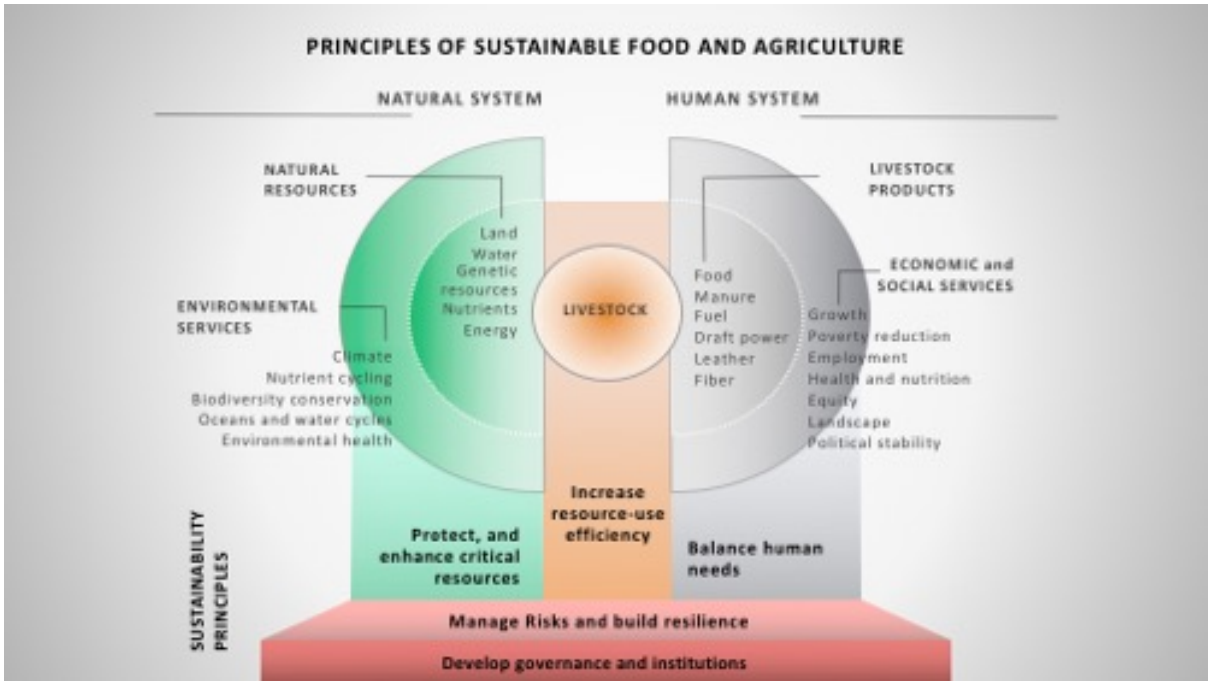
Resource competition and scarcity

As the world's water resources are depleted and land resources degraded, the competition for land and water as well as phosphorus and energy increases.

Principles of sustainable food and agriculture

As these matters are integrated, we need to conduct integrated analyses; we need to think of environmental health, of animal health and of human health in conjunction.

At FAO, in 2014 we derived five approaches from these food and agriculture considerations. We said: (1) We need to improve resource-use efficiency; (2) We need to protect and enhance critical resources, such as habitats critical for biodiversity; (3) We need to balance these concerns with humans needs—to enhance benefits for people; (4) To do the latter, we need to manage risks and build resilience and (5) we need to develop new governance and institutional mechanisms.



(1) Increase resource-use efficiency

Resource efficiency means different things in different livestock systems.

- In *extensive livestock systems*, it requires providing multiple benefits from livestock, focusing on eco-system services and, often, ensuring pastoral mobility.
- In *labour-intensive livestock systems*, resource efficiency requires making land use as efficient as possible, often through diversification.
- In *capital-intensive livestock systems*, resource efficiency can be achieved through efficient use of external inputs and integration with other sectors and forms of agriculture, often in the form of commercial links.

(2) Protect and enhance critical resources

- *Extensive systems:* Focus on the resource integrity of unmanaged or lightly managed environments.

- *Labour-intensive systems:* Maintain resource productivity, e.g. prevent degradation and restore fertility (on farms).
- *Capital intensive systems:* Prevent pollution and over-exploitation of water and other natural resources (within landscapes).

(3) Balance human benefits

- *Extensive systems:* Maintain the rights of indigenous/traditional users; provide alternative livelihoods where necessary.
- *Labour-intensive systems:* Optimize food security, income and employment for low-income populations and reduce livestock losses and disease pressure.
- *Capital intensive systems:* Avoid overconsumption and waste of milk, meat and eggs; focus on urban consumption and food safety.

(4) Manage risks and build resilience

- *Extensive systems:* With exposure to natural risks and climate variation, adaptation will be through mobility and exits from livestock systems.
- *Labour-intensive systems:* With exposure to disease risks and climate shocks, adaptation will be through diversification. With exposure also to over-exploitation and resource pressures, adaptation will also be through resource restoration, livestock exits and collective action.
- *Capital intensive systems:* With exposure to market and disease risks, adaptation will be through insurance schemes and changes in business models.

(5) Governance and institutions

Much can be achieved in developing new governance and institutional models through policy dialogues, multi-stakeholder consultations like this one, and regulatory frameworks.

- *Extensive systems:* Regulate access to common property resources: land, water and biodiversity; provide payment for environmental services and social protection programs.
- *Labour-intensive systems:* Encourage collective action to address high transaction costs; ensure access to critical natural resources such as water and grazing land.
- *Capital intensive systems:* Address negative environmental and health externalities through regulations and fees.

The multiple benefits to be gained from integration

There are multiple benefits to be gained from integration at various levels.

- *Integrating stakeholders* (e.g. the Global Agenda, achieved through dialogue, consensus building and joint action.
- *Integrating objectives* (e.g. by enhancing multiple benefits and reducing trade-offs).
- *Integrating technical domains and scientific approaches* achieved through transdisciplinary approaches combining, for example, bio-physical transformations [via life-cycle analysis], value generation and distribution [via value chain analysis], and connecting human, animal and environmental health approaches [One Health].

By then connecting life-cycle, value chain and One Health analyses, we can cover the most important aspects of optimizing livestock production. The purpose here is very much to shift away from maximizing livestock production and productivity to generating and capturing multiple benefits from livestock.

About Henning Steinfeld
Steinfeld is an agricultural economist who did his doctoral work at the Technical University of Berlin (now Humboldt University) on the subject of livestock development in mixed farming systems. He started his career as an agricultural extension worker in northern Ghana before going on to conduct farming systems research here in Ethiopia as well as in Zimbabwe. He joined the Food and Agriculture Organizations of the United Nations (FAO) as a statistician in 1990, from where he quickly moved to FAO's Animal Production and Health Division to cover social, economic and environmental dimensions of livestock development.

Along with Carlos Seré, former director general of the International Livestock Research Institute (ILRI), Steinfeld developed in 1996 a livestock production systems analyses in wide use to this day.

With other colleagues at the International Food Policy Research Institute (IFPRI), FAO and ILRI, he also drew attention to the so-called 'livestock revolution' in a seminal publication published in 1999, *Livestock to 2020: the Next Food Revolution*.

In 2000 Steinfeld became chief of FAO Livestock Information, Sector Analysis and Policy Branch (AGAL). In 2006, he summarized the insights and experiences he gained from his work in an FAO-led Livestock, Environment and Development initiative (LEAD) in a widely quoted publication, Livestock's Long Shadow: Environmental Issues and Options, which he co-authored with five colleagues.

In 2010, he helped establish the Global Agenda for Sustainable Livestock. He's published widely and is closely associated with Stanford University in the USA and with Uppsala Agricultural University in Sweden.

Sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Report, 1987). Cooperating with the future means meeting the needs of all within the means of the planet. The problem with the future generations is that they don't have a voice. The good news is that humanity is organized in a way that most of us are what we call 'conditional collaborators or cooperators'. There's a minority of people that want to grab everything, and not share.

We have natural resources that are used in livestock processes—land, water, genetic resources, nutrients, energy. We transform these resources through livestock into commodities—feed, manure, fuel, draught power, leather, fibre. But this picture is not complete. Regarding natural resources, we have coming in to play such matters as climate, nutrient cycling, biodiversity conservation, water cycles and environmental health. Regarding human benefits, we are not content with those commodities. We want growth, we want poverty reduction, we want employment, we want health and nutrition, we want equity, we want landscape maintenance and we want political stability.