Mainstreaming Biodiversity into the Agriculture Sector

17 November 2015

Goals of the Session

Identify

- Key elements
- Challenges
- Opportunities

to mainstream biodiversity into the agriculture sector

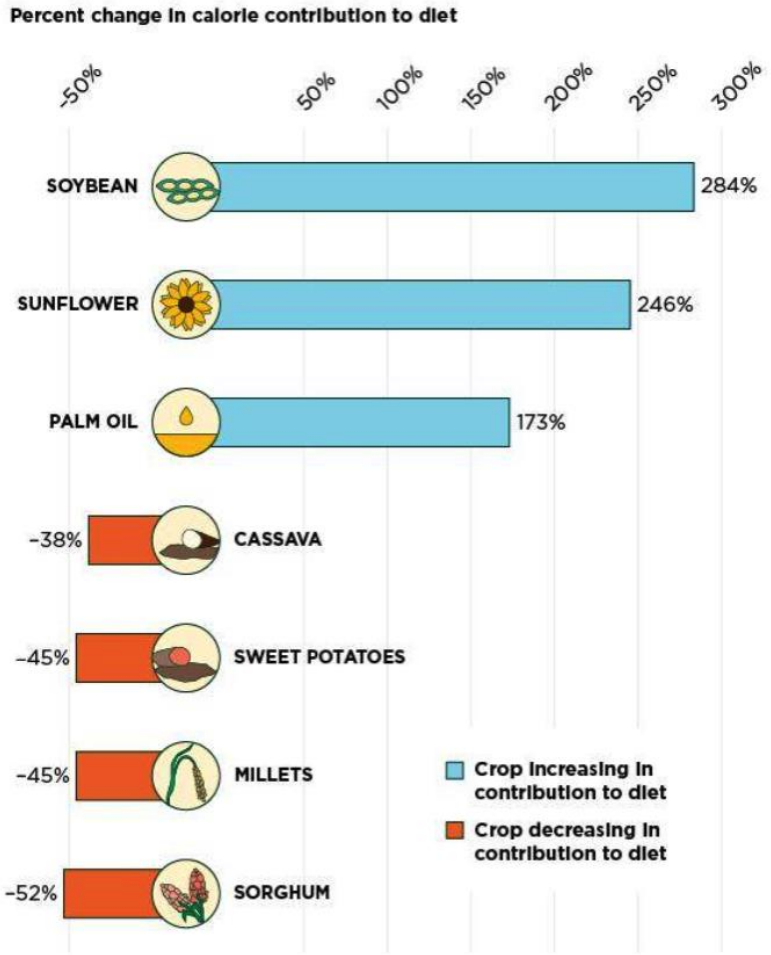
- **Every statement on the future of agriculture acknowledges that a transformation is needed in the way the sector is conducted and how it impacts on the environment, even if and while production is increased to meet food security needs**

- **Agriculture looms as the major global threat to biodiversity; as noted in the recent Global Biodiversity Outlook 4 (CBD 2014) agriculture is thought to be the driver for around 70 percent of the projected loss of terrestrial biodiversity.**

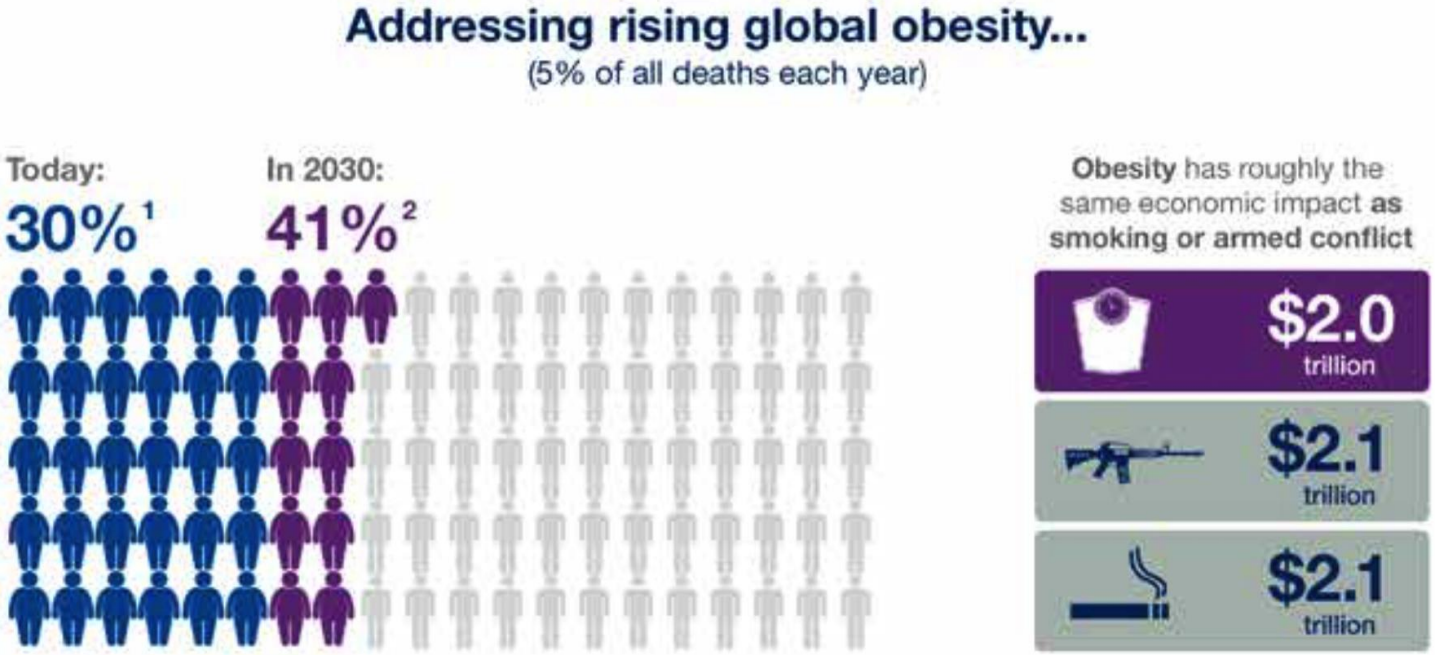
Broader recognitions that the global food system is not functioning effectively

Over the last 50 years, the global diet has shifted dramatically, including greater amounts of major oil crops and lesser quantities of regionally important staples.

Average change in the calories from crops in national diets worldwide, 1961–2009



Source: Khoury et al. 2014. Proc. Natl. Acad. Sci. USA.



Broader recognitions that the global food system is not functioning effectively

Figure 1

Levels of dissolved oxygen in the Gulf of Mexico measured between July 27 and August 1, 2014. Image courtesy of N.N. Rabalais (Louisiana Universities Marine Consortium) and R.E. Turner (Louisiana State University).

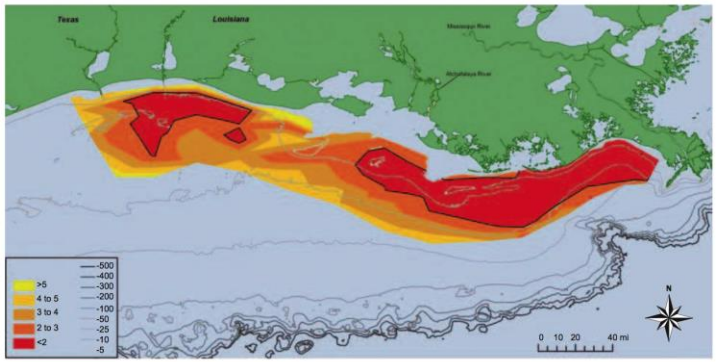
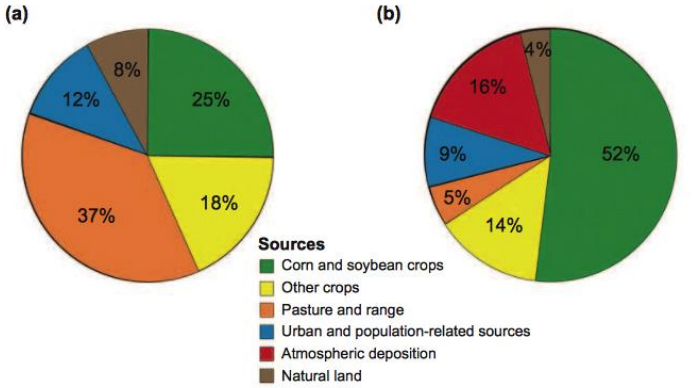


Figure 2

Primary sources of (a) phosphorus and (b) nitrogen delivered to the Gulf of Mexico. Image courtesy of Alexander et al. (2008), US Department of Interior and US Geological Survey.



Broader recognitions that the global food system is not functioning effectively

In many parts of the developing world, resource-poor farmers contend with issues of marginal high-risk environments, and experience poor yields just where food security is most vulnerable.

Approaches which can address the heavy negative externalities of conventional production systems and the challenges of resource-poor farmers have a central common thread: they recognize that agriculture and food systems are biological and social systems.

They can be designed to build upon and harness the forces of biodiversity and ecosystem services such that the processes that underpin agricultural production - soil fertility, natural pest control, pollination, water retention - are optimized and encouraged.

Key Challenges and Opportunities to Make Agriculture Regenerative

Centrality of the Convention on Biological Diversity and Aichi Target 7

FAO's Sustainability Initiative, and CGRFA State of the World of Biodiversity for Food and Agriculture

Ecological approaches to agricultural production

- Knowledge management
- Evidence base
- Monitoring systems

- Agricultural biodiversity was not originally conceived as a critical element of biodiversity, when the Convention on Biological Diversity was originally negotiated.

In 1996 the Third Conference of Parties to the United Nations Convention on Biological Diversity established a programme of work on Agricultural Biological Diversity (III/11).

Dimension of agricultural biodiversity

1) Genetic resources for food and agriculture:

2) Components of biodiversity that support ecosystem services upon which agriculture is based. These include a diverse range of organisms that contribute, at various scales to, *inter alia*, nutrient cycling, pest and disease regulation, pollination, pollution and sediment regulation, maintenance of the hydrological cycle, erosion control, and climate regulation and carbon sequestration.

3) Abiotic factors

4) Socio-economic and cultural dimensions. Agricultural biodiversity is largely shaped and maintained by human activities and management practices

Aichi Targets

Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation
of biodiversity.

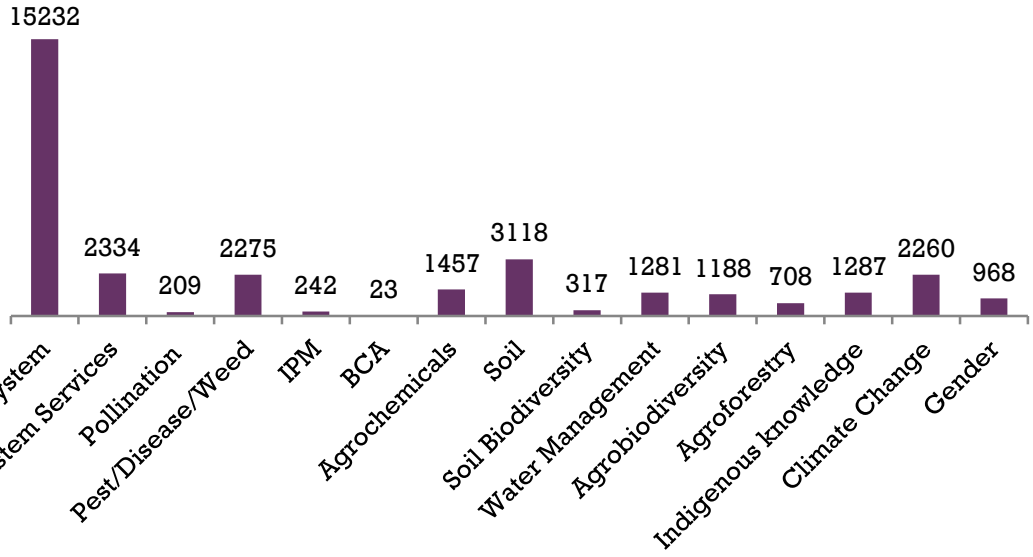
Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Aichi Targets

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Keyword analsyis from 166 NBSAPs 1995-2014



Key Challenges and Opportunities

FAO's Sustainability Initiative

Principle 1. *Improving efficiency in the use of resources is crucial to sustainable agriculture*

Principle 2. *Sustainability requires direct action to conserve, protect and enhance natural resources*

Principle 3. *Agriculture that fails to protect and improve rural livelihoods, equity and social well-being is unsustainable*

Principle 4. *Enhanced resilience of people, communities and ecosystems is key to sustainable agriculture*

Principle 5. *Sustainable food and agriculture requires responsible and effective governance mechanisms*

Key Challenges and Opportunities

Ecological approaches to agricultural production

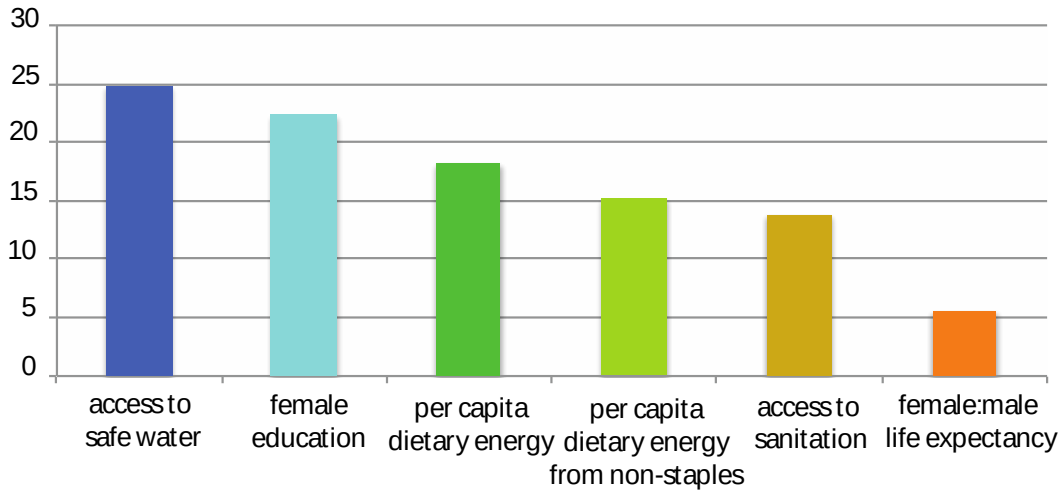
- Reinforcing links to alleviation of hunger and malnutrition
- Knowledge management (low percentage of funding given to ecological approaches in agriculture- from science to extension)
- Evidence base- tradeoffs and synergies
- Monitoring systems

Key Challenges and Opportunities

Ecological approaches to agricultural production

Reinforcing links to alleviation of hunger and malnutrition

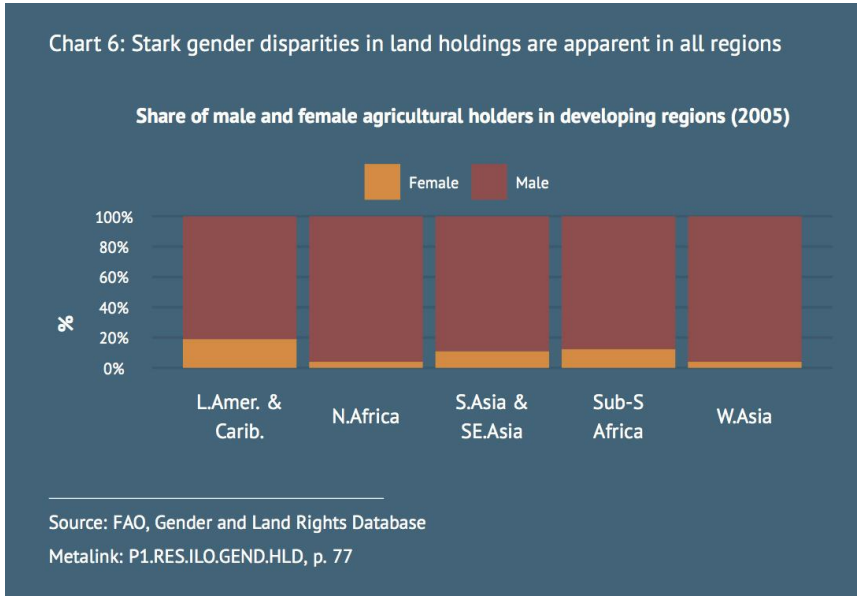
Key Challenges and Opportunities



Contributions of underlying determinants to reducing hunger
IFPRI study (Smith and Haddad 2014) across 116 countries from 1970 to 2012

Ecological approaches to agricultural production

Reinforcing links to alleviation of hunger and malnutrition



Many unrealized opportunities in linking women's access to resources with their relationships to local biodiversity.

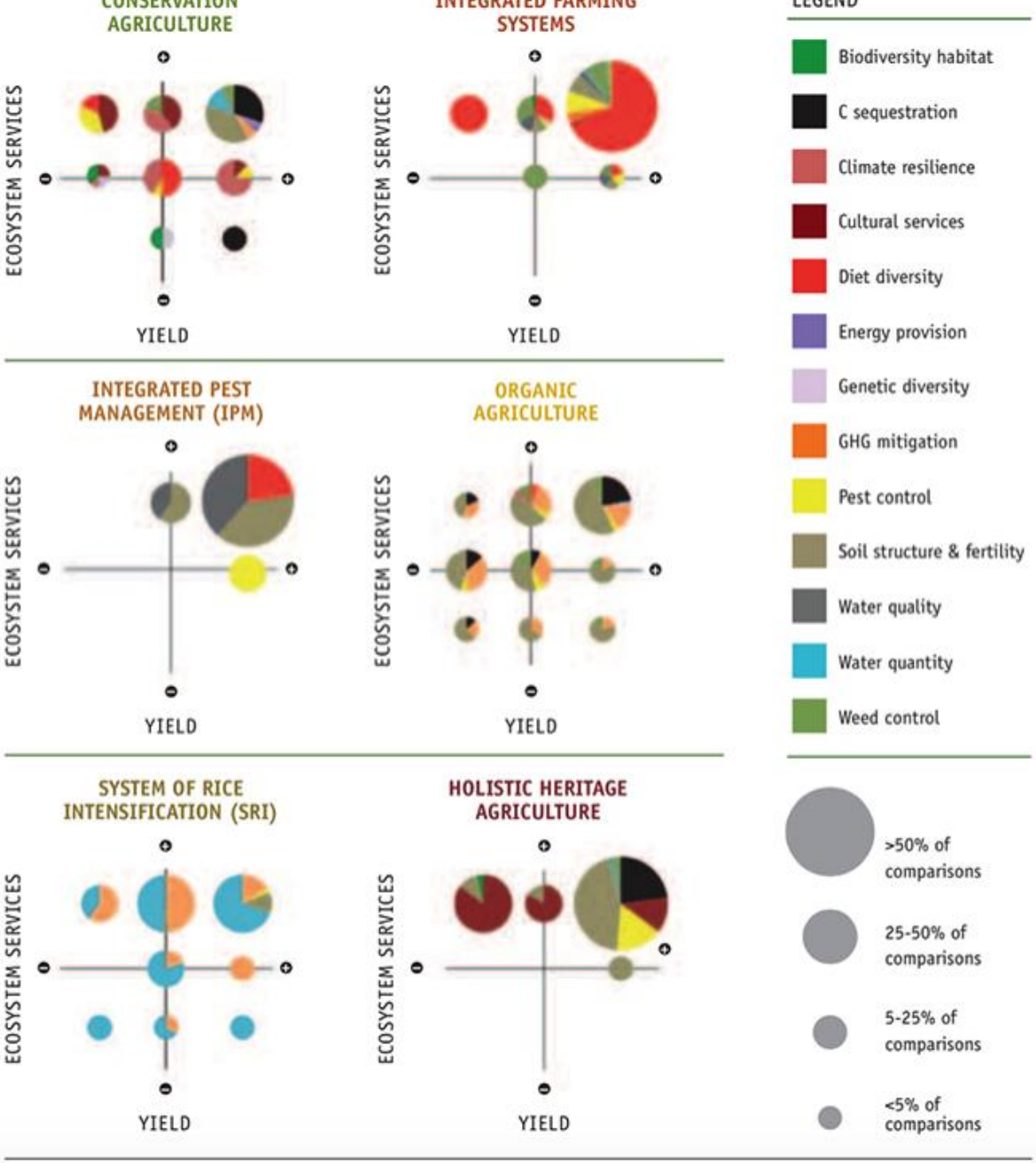
In India, for example, large nutritional gains have been found in enabling a return to the more traditional crops such as millet, and providing new income opportunities for women producing millet-based snacks. In 12 districts in Central and South India, switching from white rice to minor millets in school lunches resulted in increased haemoglobin levels in children – up to 37% higher than the control group.

Key Challenges and Opportunities

Ecological approaches to agricultural production

- Evidence base- tradeoffs and synergies, true cost accounting

Evidence base



Key Challenges and Opportunities

- **Monitoring systems**

(State of the World of Biodiversity for Food and Agriculture, national assessments, carrots and sticks?)

THANK YOU