Biodiversity for food and agriculture and the global environmental challenges

- and the importance of the State of the World’s Biodiversity for Food and Nutrition

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Overview

• What do we need to do? - challenges facing food and agriculture
• How we can do it?
  – Strategies to address the challenges
  – Examples of Biodiversity solutions for sustainable agriculture and food and nutrition security
• Summary of needs and opportunities
• The Strategic Plan for Biodiversity (2011-2020)
  • Examples of relevant targets
• Food and Nutrition and Environment Security in the Landscape Setting
• The role of the SoWBDfF&N assessments
  – Knowledge gaps and how to address them
• Outlook
Challenges facing food and agriculture

- Declining genetic resources for food and agriculture
- Competition for land and water
- Increasing variation in water availability (and extremes of drought and flood)
- Declining ecosystem services in food production landscapes
  - Water/nutrient/carbon/pollinators/pest-disease support and regulation
  - Loss of soil
- Conflicts between large-scale (commodity) agriculture and diverse small-scale agriculture
- Over reliance on a narrowing food base
- Malnutrition and food price increases versus access
- Increasing off-farm impacts
  - Water use, Water quality/pollution, GHG emissions, Soil erosion and sedimentation
  - Depletion of biological resources in natural ecosystems
Strategies

• Food and nutrition security is a primary goal
  • But with increased emphasis on sustainability
• Recognize the full dimension of food and nutrition security
  • Beyond “gross production” and includes:
    – resilient production
    – diverse production systems
    – resilient and equitable local farming economies
• Improve farming efficiency
  – at all scales
  – growing more (and diverse) with less consumption of resources and impact
• Creating resilient and diverse landscapes and seascapes
• Conserve and enhance ecosystem services
• Seeking and mainstreaming “win-win” solutions
Biodiversity solutions for sustainable agriculture and food and nutrition security

• Genetic resources
  – A treasure chest of materials of current and potential use
  • Development of new strains/breeds/varieties to:
    – Diversify farming systems
    – Respond to changing farming conditions
    – Respond to emerging threats (including diseases and pests)
    – Improving genetic base of production
  • Resources already held primarily *in situ*
    – Principally in farming systems
      » The importance of traditional and local knowledge
      » Also crop (and livestock) wild relatives
      » Better integration into protected area systems required
• Ecosystem services (solutions to support production):
  • **Pollinators**
    • Significant impacts on crop productivity and farm incomes
    • Reversing the decline of pollinators already a major priority
      » Reducing stressors on pollinators (land use change, chemicals etc)
      » Restoring habitats in agricultural landscapes results in improved crop productivity and sustainability
      » Re. International Initiative on Pollinators.
    • Reversing decline improves resilience, productivity and crop diversity
    • Significant economic benefits for farmers
  • **Pest and disease regulation**
    – Integrated pest management (reduces chemical – pesticide/antibiotic etc. use)
    – Reducing stressors on crops and livestock (e.g. healthier soils) = improved resistance to disease
  • **Water, carbon and nutrient cycling**
  • **Biodiversity for nutrition security**
    • Biodiversity delivers diverse and nutritious diets
Soil biodiversity
- an example of multiple benefits and win-win

• Soils are ecosystems which support all crop and livestock production (farms and forests)

• Soil health and functions are under-pined by biodiversity

• Restoring soil biodiversity/functions restores:
  – Nutrient cycling
  – Water regulation
  – Carbon sequestration
  – Pest and disease regulation
  – Supports pollinators (e.g. nesting/substrate habitat)

• Restoration of degraded soils results in win-win outcomes:
  – Improved production efficiency
    – Improved and more resilient farm incomes AND reduced off farm impacts (water, pollution, soil erosion etc.)
  – Improved carbon capture and storage
    – Benefits farmers AND helps reduce GHGs
DIREKTSAAT
semis direct
zero tillage

PFLUG
labour
plow
Climate change adaptation and mitigation

more win-wins

• Climate change adaptation
  – Soil biodiversity (and vegetation) improves water storage
    • reduced water and other (e.g. climate) stress for crops and livestock
  – Genetic resources
    • New varieties to adapt to changing climatic conditions

• Climate change mitigation:
  – improved farming efficiency
    • Reduces direct and in-direct land use change
      – Reduces GHG emissions from land conversion (e.g. deforestation)
  – Improved soil organic carbon levels
    • Sequester carbon and reduce atmospheric GHG concentrations

• Considerable synergies between mitigation and adaptation
  – E.g. improved carbon storage in soils reduces atmospheric GHG levels and simultaneously increases resilience/adaptation of farming systems

• Win-wins
  – Also delivers improved farming efficiency (and production), resilience and incomes
  – Significant synergy between food and nutrition security and contribution to improved environment
Summary

• Biodiversity is a solution for
  – achieving increased sustainable productivity
  – benefiting farming whilst simultaneously reducing off-farm impacts
  – improved healthy diets and nutrition

• The agriculture-environment relationship moving from “conflict” → mutually supporting solutions
The Strategic Plan for Biodiversity (2011-2020) and the Aichi Biodiversity Targets

- Adopted at CBD COP-10 (Nagoya, 2010)
  - Framework for action for all MEAs and the UN-System (also adopted by major partners; e.g. IUCN)
- VISION:
  - A world of "Living in harmony with nature" where "By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people"
- MISSION:
  - Take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication
Some targets relevant to food and agriculture

Aichi Targets - by 2020:

• Target 3: Re-align incentives and subsidies
• Target 4: Achieve or have implemented plans for sustainable production and consumption
• Target 7: Areas under agriculture (and aquaculture and forestry) are managed sustainably
• Target 8: Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity
• Target 13: Genetic diversity maintained and strategies have been developed and implemented for minimizing genetic erosion and safeguarding genetic diversity
• Target 14: Ecosystems that provide essential services restored and safeguarded
• Target 15: Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, including restoration of at least 15 per cent of degraded ecosystems, contributing to climate change mitigation and adaptation and combating desertification.
• Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.
• Target 18: Traditional knowledge, innovations and practices and customary use of biological resources, respected and fully integrated and reflected in implementation
Global Strategy for plant conservation (2011-2020)

All targets are relevant

Examples:

• **Target 2:** An assessment of the conservation status of all known plant species, as far as possible, to guide conservation action

• **Target 7:** At least 75 per cent of known threatened plant species conserved in situ.

• **Target 9:** 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge
Putting everything together:
Food and Nutrition and Environment Security in the Landscape Setting

- Wildlife
- Pollinators
- Forest genetic resources
- Tree crops
- Plantations
- Riparian buffer zones
- Community farming
- Soil health
- Water quality
- Community farming
Knowledge Requirements
The Role of the State of the World’s Biodiversity for Food and Agriculture

- **SoWBDfF&A**
  - Will be a major source of knowledge
  - Needs to capture multiple dimensions
    - Genetic resources (species/varieties)
    - Status and trends in ecosystem services
      - Water/nutrient/carbon/pest-disease regulation/pollinators (in farming systems and broader landscape)
      - And trends in solutions and how to achieve them
  - Biodiversity underpinning nutrition
  - Harmony with needs for Strategic Plan and Aichi Targets
    - Mutually reinforcing
  - National and “global” information needs are aligned
    - Info. required primarily at national level
  - What are major information gaps?
    - And how do we address them?
Outlook

- **Sustainability can be achieved**
  - There are enough renewable resources to achieve it
  - The problem is current resource use inefficiencies
    - But good news – this implies improved efficiencies are available
      - And extensive examples of good practice for how to achieve these
        » Most are based on improved management of biodiversity
    - The challenges are mainly institutional, political, economic (not technical)
- **Major constraints still to be addressed**
  - Capacity in developing countries
  - Realigning incentives and subsidies to support sustainability
  - Improving incentives for farmers (e.g. payments for ecosystem services)
  - Trade liberalisation
    - Encourage investment in agriculture in the south
- **More sustainable, resilient and diverse food production landscapes and seascapes can be achieved**
  - Through a *partnership between biodiversity conservation and food production*
- But we need a better knowledge base to achieve this
Obrigado - thank you
Putting everything together:
Food and Nutrition and Environment Security in the Landscape Setting