



Agrobiodiversity monitoring in Bioversity



- International Workshop on Crop Agrobiodiversity Monitoring
 - 23-25 , Agropolis, Montpellier, France

Overview

- Introduction to Bioversity and its new strategic objectives
- Some Key Projects
- Need for a global Information system
- Conclusion where are we going?



Our Vision:

Agricultural biodiversity nourishes people and sustains the planet



Our Mission:

To deliver scientific evidence, management practices and policy options to use and safeguard agricultural biodiversity to attain sustainable global food and nutrition security.

Biodiversity Strategic Objectives

Strategic Objective 1: Low-income consumers have expanded access to and use of diverse, affordable, nutritious diets

Strategic Objective 2: Rural communities have increased the productivity, ecosystem services and resilience of farming systems, forests and landscapes

Strategic Objective 3: Farm households and rural communities have increased access to a diversity of quality seeds and other planting materials

Strategic Objective 4: Policymakers, scientists, and rural communities have safeguarded, assessed and are monitoring priority agricultural biodiversity

Bioversity's Theory of Change



New Bioversity Research Initiatives

- Biodiversity for Healthy Diets, Healthy Landscapes
 - Nutritious, diversity-rich value chains
 - Local food systems & healthy diets
- Biodiversity for Enhanced Productivity, Ecosystems and Livelihoods
 - Agro-ecological Diversification for Enhanced Productivity and Livelihoods
 - Integrated Landscape Management for Enhanced Ecosystem Services
- Biodiversity for Meeting the Challenges of Today and Tomorrow
 - Managing the On-Farm, In-Situ and Ex-Situ Continuum
 - Seed Delivery System Innovation
 - Global Policy and Monitoring

How Bioversity define research on Crop Agrobiodiversity ?

- **Innovative participatory approach** for baseline assessments of crop diversity and their wild relatives on farm. Investigating what drives changes in these systems at different scales: from individual men and women to communities and internationally? .
- **Develop interventions** that have a positive effect both on women and men's livelihoods and on the conservation of biodiversity, and principles for identifying the best locations for these interventions.
- **Studies of the public benefits** provided by the actions of individuals, for example investigating the functional relationships between amounts of crop diversity and the provision of ecosystem services in agricultural systems.
- **Works with a wide range of partners to identify policy options.** Participatory research methods to strengthen the capacity of partners to conduct policy research, and to proactively engage in policy development processes by developing science-based technical contributions for consideration by policymakers from local to global levels.
- **At the international level**, the majority of our work focuses on the Convention on Biological Diversity, Commission on GRFA and the International Treaty on Plant Genetic Resources for Food and Agriculture.

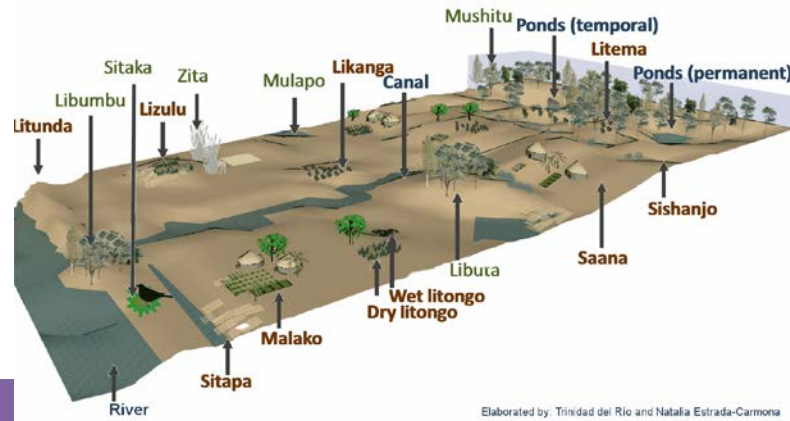
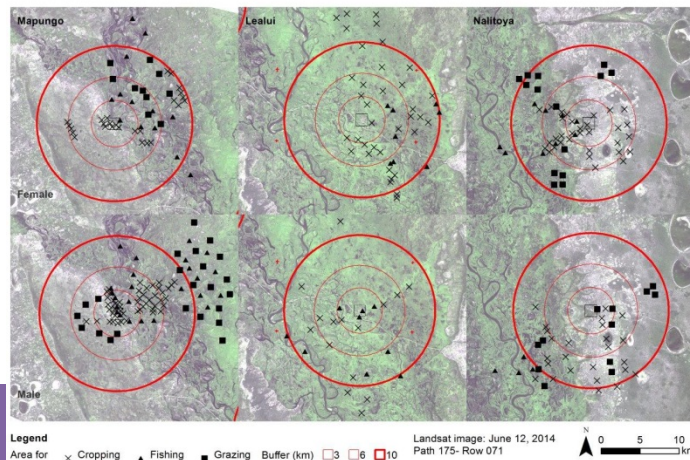
Some key projects

Projects on Nutrition-Sensitive Landscapes



Participatory identification of Ecosystem Services in Zambia- Aquatic Agricultural System CRP - *Natalia Estrada Carmona, F. Declerck*

- Translate flood systems into ecosystem services, in the Tonlé Sap in Cambodia and the Barotse floodplain in Zambia.
- Understand spatial gender-based differences with participatory mapping tool (LandSat images) and plot sampling as part



Elaborated by: Trinidad del Rio and Natalia Estrada-Carmona



RESEARCH PROGRAM ON
Aquatic
Agricultural
Systems



Bioversity
International

Projects on Nutrition Sensitive Landscape

Roselyne Remans, Ethiopia, F.Declerck – Agriculture for Health and Nutrition CRP

- Applying a landscape approach to improve nutrition while considering environmental health
- Understand the **Nutrition-Functional Diversity, management for resilience**
- **Vital Signs** – integrated monitoring system for agriculture, ecosystem services and human well-being (www.vitalsigns.org)
- **the Millennium Villages Project** – a multi-sectoral development effort to achieve the MDGs in a variety of African settings (www.millenniumvillages.org).



Matching the Needs for Adapting to Climate Change

Seeds for Needs - *Carlo Fadda, Jeske Van de Gevel, Jacob Van Etten, Prem Mathur, Sarika Mitra* - if farmers have better information and access to a wide range of varieties, they are more able to choose what best suits their conditions and cope with unpredictable weather.

- exposing farmer to more crop varieties and increase their first-hand knowledge about different traits and options available
- strengthening their seed systems and seed-saving capacity so that they always have access to planting material that fits their changing needs.

Seeds for Needs started in Ethiopia in 2009 and now is in 11 countries

- Cambodia: rice, sweet potato
- Colombia: beans
- Ethiopia: barley, wheat ([read the impact brief](#))
- Honduras: beans
- India: rice, wheat
- Kenya and Tanzania: cowpea, pigeon pea, sorghum
- Laos: cucumber, long bean, rice, sweet corn, watermelon
- Papua New Guinea: sweet potato, taro
- Rwanda and Uganda: beans



Project at Nile Basin level

Agrobiodiversity-based Restoration of degraded Ecosystem Services in Blue Nile basin - Water, Land Ecosystem CRP, Region Focus Project – *Carlo Fadda-2015-2016*

- Leverage the potential of plant agrobiodiversity to support the restoration of three degraded landscapes in the Ethiopian highlands from the northern Tigray region to the southern Oromia region, Ethiopia.
- holistic, integrated approach to develop appropriate restoration plans using plant biodiversity that are adapted to the regions.
- Looking at how ecosystem services can help the communities to cope with the effects of soil degradation, climate change, and simultaneously, improve health and nutrition.
- An **Agricultural ecosystem restoration toolkit**, shedding light on plant biodiversity options, aimed at helping local decision makers select the best and most sustainable combination of crop and plant species, varieties and trees to benefit their farms and agricultural landscape



RESEARCH
PROGRAM ON
Water, Land and
Ecosystems



SADC Crop Wild Relative

In situ Conservation and Use of Crop Wild Relatives in three ACP countries of SADC Region – (Short Name - SADC Crop Wild Relatives)

Overall objective:

Enhance link between conservation and use of CWR in three ACP countries within the SADC region, as a means of underpinning regional food security and mitigating the predicted adverse impact of climate change

Specific objectives:

- **Enhance the scientific capacities** within the partner countries to conserve CWR and identify useful potential traits for use to adapt to climate change.
- **Develop exemplar National Strategic Action Plans** for the conservation and use of CWR in the face of the challenges of climate change across the SADC region

UNIVERSITY OF
BIRMINGHAM

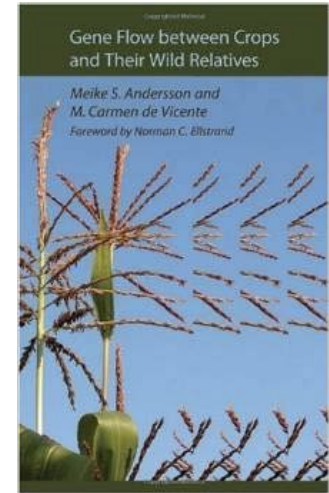
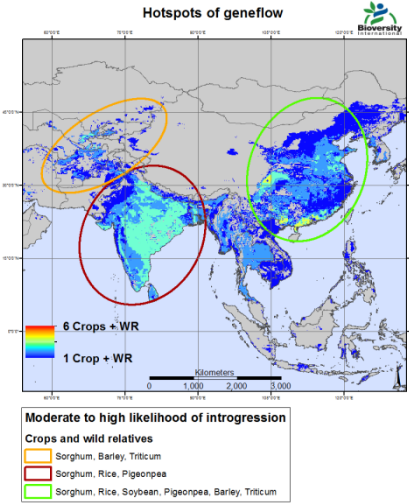
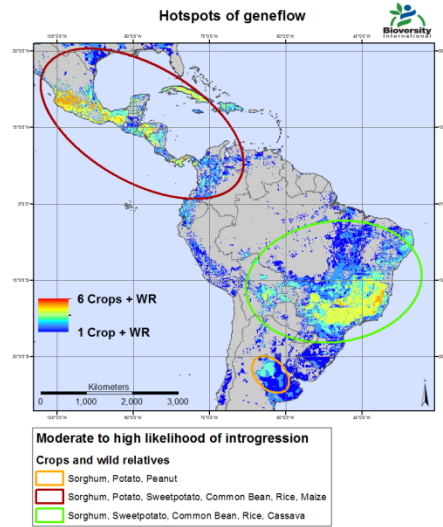
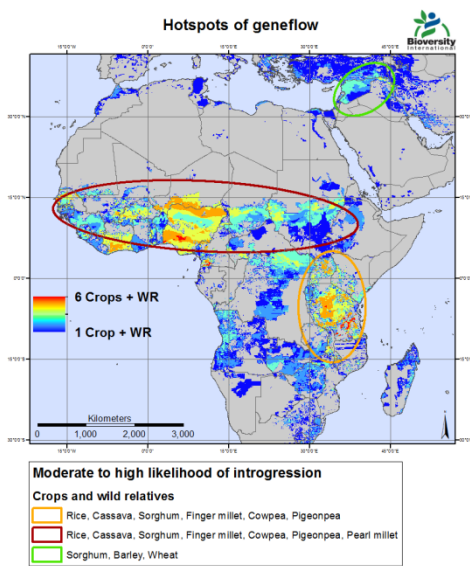


agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA

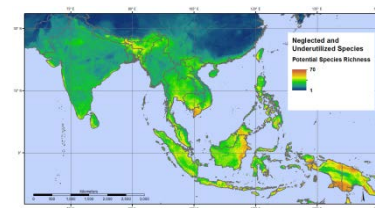
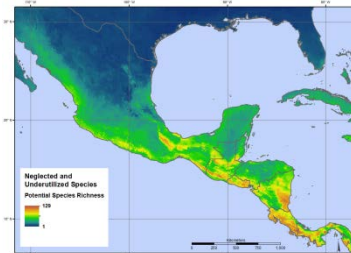
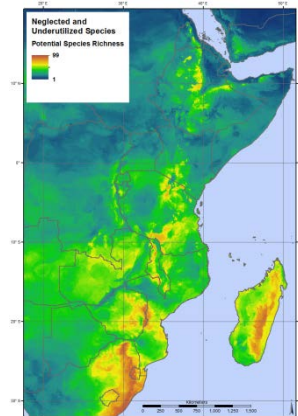
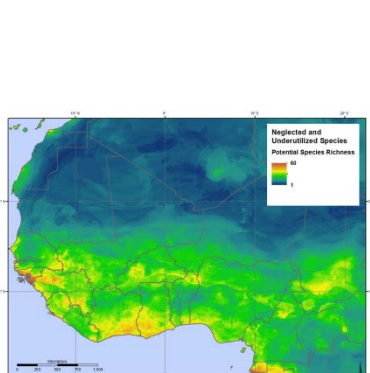


Hotspots of geneflow between 16 crops and their wild relatives

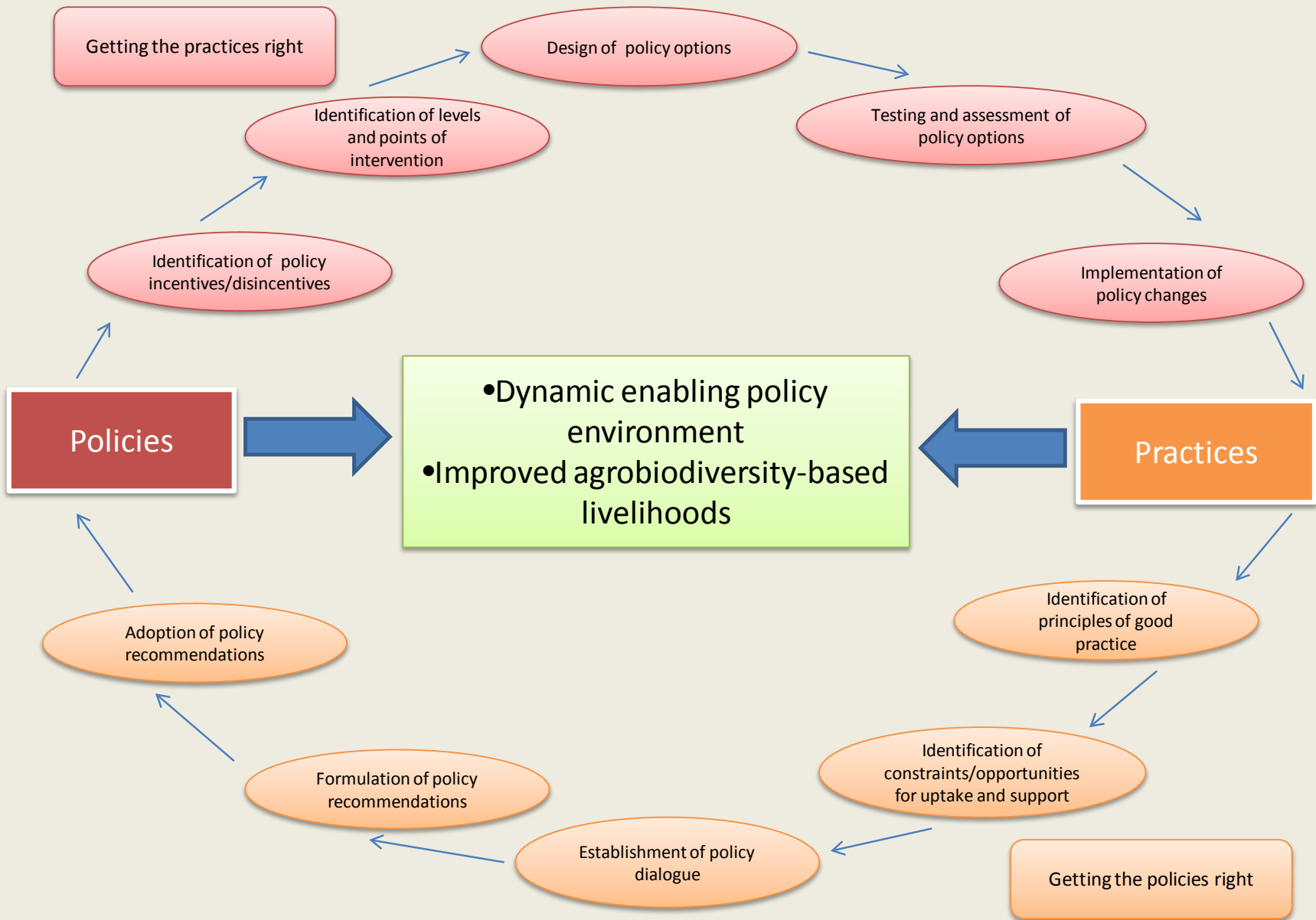


Maps by Hannes Gaisberger (Bioversity), July 2012, with the data of Anderson M.S., De Vicente C. 'Gene Flow between Crops and Their Wild Relatives' (2009)

Diversity Niche Modeling of Neglected Species



M. Deletre; map: H. Gaisberger; Fred Atieno

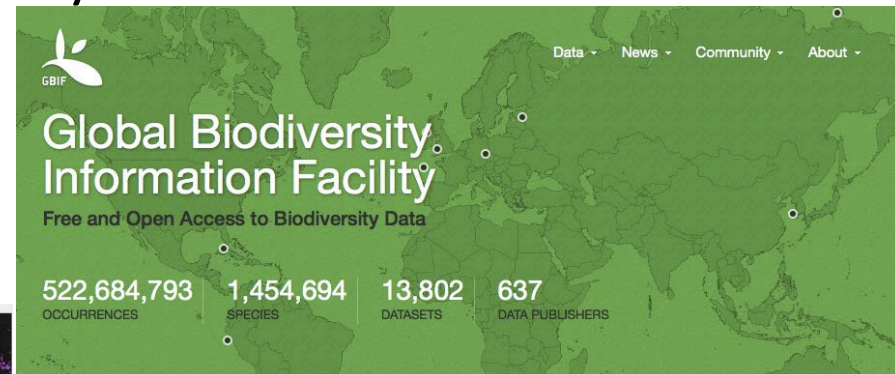
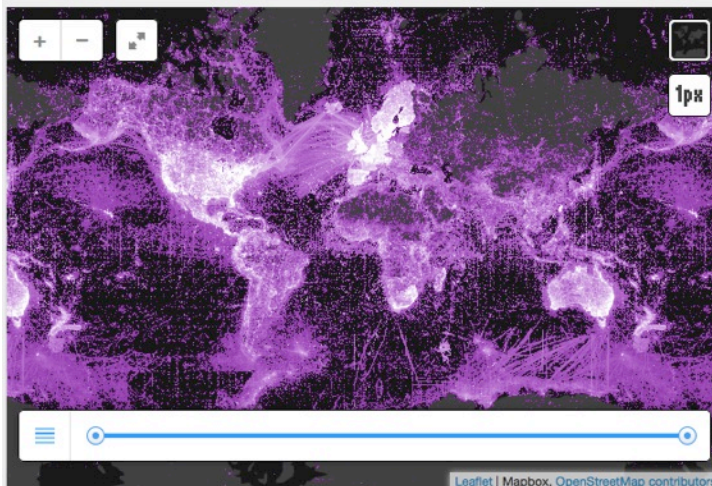


Global Context

- International Treaty on Plant Genetic Resources for Food and agriculture
- FAO-Global Plan of Action
- Strategic Plan for Biodiversity (Aichi Targets)
- Sustainable Development Goals
- Global Biodiversity Information Facility (GBIF)

Collaboration with Global Biodiversity Information Facility

- Associate partner since 2006
- Genebank Passport Data
- Informatics Standards
- GBIF Task Force on Agrobiodiversity



357,214,863

(68.3555%)

Animalia records

140,256,209

(26.839%)

Plantae records

9,031,254

(1.7282%)

Fungi records

4,630,639

(0.8861%)

Protozoa records

2,076,559

(0.3974%)

Chromista records

1,091,391

(0.2088%)

Bacteria records

886,979

(0.1697%)

Other records

18,419

(0.0035%)

Archaea records

8,187

(0.0016%)

Viruses records

Global Information System for *In situ* Conservation and On-farm Management of Plant Genetic Resources for Food and Agriculture

Input paper

For the ITPGRFA Consultation on the Global Information System on Plant Genetic Resources for Food and Agriculture (COGIS-PGRFA)

21 July 2014



Expression of support: The Platform on Agrobiodiversity (PAR); Agropolis International; UN Organization for Food and Agriculture (FAO)

What should be function of global information system?

- To monitor the status and trends of PGRFA *in situ* and on farm
- To provide decision makers with information that will help design policies supporting conservation and use of PGRFA.
- To support local use and conservation of PGRFA, crop wild relatives and landraces
- To facilitate seed exchange mechanisms that promote the use of farmers' preferred seeds

Mobilizing key information

- Diversity of crop wild relatives *in situ* and landraces on farm
- Ecogeographic information
- Seed exchange systems (formal and informal including community seedbanks)
- Socio-economic information
- Associated traditional knowledge
- Policies, seed laws and regulations

Actionable at different scales

- Farm households and consumers - field level
- Rural communities - landscape level
- National level actors - policies, institutions, and interventions level
- Global level actors - global level



Challenges

- More difficult and complex than dealing with *ex situ* data.
- Scope to be defined; in situ conservation v/s on farm management
- take into account many drivers which influence diversity on farm and *in situ*.
- Information is more scattered and usually poorly described and organized.
- Type of data- unstructured data, portability of the system, multimedia
- Very broad global collaboration
- Ownership and sharing of data and knowledge, avoiding any charges of misappropriation of Traditional Knowledge (TK) – ITPGRFA, Nagoya Protocol

Conclusion- where are we going?

Biodiversity for Healthy Diets, Healthy Landscapes

- Whole-of-diet approach to sustainable food systems and human health
- Concrete income opportunities from nutritious healthy ABTD from value chain participation
- Markets mechanisms and incentives for making diverse, nutritious and affordable food items accessible

Biodiversity for Enhanced Productivity, Ecosystems and Livelihoods

- Agro-ecological Diversification for Enhanced Productivity and Livelihoods; Pest and disease prevention and management
- Increased and stable productivity at the farm and landscape levels
- Integrated Landscape Management for Enhanced Ecosystem Services
- Adaptation to climate change from genes to landscapes
- Bridging agriculture and conservation for multifunctional landscapes
- Restoration of degraded lands, forests and ecosystem services

Conclusion- where are we going?

Biodiversity for Meeting the Challenges of Today and Tomorrow

- Holistic approach to conservation on farm, In-situ conservation and ex situ
- Trait identification and trait use of priority crops and trees
- Safeguarding crop evolution on farm through private and public incentive mechanisms (link to landscapes)
- Sustaining wild resources for food security, nutrition and livelihoods; Conserve tree genetic diversity in managed forests, protected areas
- Seed and Delivery System Innovation ; Overcoming barriers to diversification in seed systems
- Global mechanism and indicators to monitor the status and trends of agricultural biodiversity
- Institutional, national and international policies to monitor the conservation of agricultural biodiversity



Thank you

