Are genebanks serving farmers?

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Food Systems Dialogues/Post - COVID Recovery

Rural transformation processes

- Productive transformation: more food, better quality (nutritious) & taste, technological innovations, incentives, better logistical arrangements, environmentally sustainable, integrated
- Better livelihoods for small-scale farmers
- Better health/nutrition for all, in cities and globally
- How: multi sectorial, dialogue, new governance: central, regional and local
Buzzwords

Agriculture based in **Family Agriculture (FA)**

Inclusive recovery

Re-design food systems

Sustainable responses

Resilient

Ambitious but not impossible
Why a **doubling** of genetic diversity available to users?

- Currently:
  - Crop breeders calling for access to greater diversity to address climate change (Vodopija and Sigman, 2009; Taddei et al., 2008; Thadani et al., 2008; McCouch et al., 2013)
  - CWR are suffering erosion and extinction – 16 to 35% are IUCN threatened (Kehl et al., 2012; Goetz et al., 2011)
    - 99% of CWR conservation is **ex situ** as seed in genebanks and supplies users (Mantled et al., 2016)
  - Analysis of CWR holdings shows 5% unconserved, 5% poorly conserved (<10 accessions) and 95% are under-collected (Castañeda et al., 2016)
  - Similar data for LR is unavailable, no threat risk assessment, no complete national inventories and no estimates of **ex situ** holdings

- Complementary conservation means applying **ex situ** and **in situ** techniques together, but **in situ** (incl. on-farm) conservation is almost completely ignored

- Systematic **in situ** (incl. on-farm) conservation could at least double the diversity available to users who are acknowledging PGR availability is limiting breeding options
ReSCA en Latino América: 2010-2020

4 Países

100 Comunidades

130 variedades amenazadas de varios cultivos

1,100 familias participaron
Peru (Puno and Cusco)
Payments for Agrobiodiversity Conservation Services (PACS): R4D Platform Elements

1. What to conserve? Where to conserve it?
   - 1A. Wetzman Method (What to Board on Noah’s Ark?)
   - 1B. Four Cell Method
   - 1C. Identification of a Priority Conservation Portfolio and Triage

2. How much should we conserve and why?
   - 2A. Consideration of Total Economic Values
   - 2B. Indicators
   - 2C. Agrobiodiversity Status Baselines

3. With Whom should we conserve? How can we maximise impact?
   - 3A. Farmers as a Strategic partners of the State
   - 3B. Competitive Tenders for Cost-Effective Incentives
   - 3C. Social Equity Considerations
   - 3D. Collectives Action and Traditional Values
   - 3E. Quantification of Costs and Benefits of Conservation

4. How to finance conservation and sustainable use?
   - 4A. Demonstrate Cost-Effectiveness of High Benefit-Cost Ratios
   - 4B. Threatened Variety Value Chain Development
   - 4C. Private Sector Involvement
   - 4D. Creation of Demand thru Public Food Procurement Programs
   - 4E. Regional Government Support Inc. thru Green Public Investment Projects

5. How to Support the Regulatory Framework?
   - 5A. Raise decision-maker awareness
     - Biodiversity includes ABD
     - Ecosystems inc. Agro-Ecosystems
     - PES includes PACS
   - 5B. Speak the Language of the Ministries of Environment, Agriculture and Economy
   - 5C. Facilitate Prioritisation and Target Setting as part of Regulatory Development/Implementation

6. How to demonstrate impact?
   - 6A. Indicators and Monitoring (Conventional and Participatory)
   - 6B. Valuation of the Benefits (market and non-market) of Conservation
   - 6C. Multiple Incentives to Overcome Fragmented Institutional Landscapes

TARGETS AND ECOSYSTEM SERVICES

IMPACT

PRIORITIZATION

AGRO BIODIVERSITY (ABD)

IN SITU ON FARM

CONSERVATION AND USE

REGULATORY OPTIONS

VALUATION AND INCENTIVES

SUSTAINABLE FINANCING (RESOURCES)
Pending issues

• Prioritization, finding enough rare seeds for multiplication and distribution to bidding farmers

• Valuation and incentives, need to support farmer managers of diversity, in establishing links with other key actors, e.g., genebanks, establish linkages with other initiatives, explore networking

• Draw attention to role of small-scale farmers in conservation, generation and value adding to crop genetic diversity (Halewood et al., 2021)
Action Plan to Strengthen the Conservation and Use of PGRFA in Mesoamérica (SAPM)

M. Ramirez, Regional Director, Americas Office

June 16-20, 2014
What is the SAPM?

- A roadmap to strengthen the conservation and use of native plant genetic resources of Mesoamerica strategic for the adaptation of agriculture to climate change.
- Focused on 10 Mesoamerican crops important for local and global food security, with potential to generate income.
- Developed through a systematic analysis of relevant information + broad consultation with regional stakeholders resulting in the identification of a key set of activities (87) to be implemented in the next decade.
- Severe climatic events: Mesoamerica is highly vulnerable to climate change

- Interdependence: adaptation of agriculture to new climates will need materials found beyond national frontiers

- Opportunities: native PGRFA represent present and future options for access to adapted seeds; within framework of the International Treaty
Focus genepools

- Baseline study focused on 10 genepools considered representative of agriculture in Mesoamerica: 26 crop species and >350 CWR

- **Zea, Phaseolus, Manihot, Ipomoea, Cucurbita, Amaranthus, Capsicum, Carica, Persea, Tripsacum**

- Selection based on:
  - Crop types: grains, tubers, horticultural, trees, fodder
  - Treaty annex and non-annex
  - Regional priority crops
  - Important for food security, diets and income generation
Climate projections—Wild Relatives

Changes in environmental aptitude for wild relatives from now until 2050

+ 69 species

0

- 29 species
Priority Areas for *In Situ* Conservation of Crop Species

Areas with current and future (2050) high crop diversity

Presence of linguistic groups today
Priority Areas for *In Situ* Conservation of Crop and CWR Diversity

- **Protected areas**
- **Areas with past (LGM), current and future (2050) high diversity of CWR**
- **Areas with current and future (2050) high crop diversity**
- **Presence of linguistic groups today**

Scale: 0 500 1,000 Kilometers
What are the priorities of farmers?

- 174 farmers from 5 neighboring countries involved in PPB were asked about their views on CC, their needs and suggestions
- What?
  - Access to adapted seeds
  - Information about weather to schedule planting, cultural activities
- How?
  - Support for community seed banks, local seed production, local extension
Participatory process
**SAPM implementation**

- ITPGRFF implementation institutionalized
- Farmers rights recognized and promoted
- National actors equipped to support and promote an integrated system of conservation and use of PGRFA

**Biocultural territories**

**New architecture of ex situ conservation**

**Increased distribution of adapted material**
Institutional genebanks (National, private, experimental stations, universities...)

Regional genebanks

Community seedbanks

CIAT, CIMMYT, CIP...

International Genebanks
USDA, CATIE
Farmer-focused Actions

• Promote the establishment of sustainable biocultural territories integrated in existing conservation systems,
• Establishment of Community seed banks
• Crop diversification for risk management
• Promote PPB, cost effective mechanisms for exchange, evaluation and adoption
• Improve technical capacity to obtain, and interpret meteorological data for use by farmers, etc.
• Promotion of farmers rights and legal frameworks within IT implementation
• Creation of incentives for small holders to in situ conservation focused on areas of high diversity
Complementary → Dynamic conservation

**in situ:**
- allows for continued evolutionary dynamics on farm/in the wild
- allows for preservation of traditional knowledge/expertise

**ex situ:**
- Back-up function for *in situ*
- Allows for easier access through centralized repositories
- Long-term conservation

**need to get better at:**
- Working hand in hand
- Help stakeholders understand that they are not substitutes

Jamora, 2021
On farm Crop diversity at risk

- Funding Gap for in situ conservation
- Only partially conserved ex-situ
- High risk of extinction and loss of traditional knowledge
Rematriation and Repatriation

• Jamora, 2021
Farmer valuation

An experimental approach to farmer valuation of African rice genetic resources

1. WTP for ARICA varieties & WTA African rice landraces
   Mean: $0.50 (ARICA) and $0.47 (landrace)
   Max: $1.05 for a bag of seeds
   9% were not willing to pay anything for either type

2. Non-market elicitation of option and bequest values
   Annual contribution to the community seedbank
   (option value) Mean: $4.34 (ARICA) and $4.38 (landrace)
   (bequest value) Mean: $3.94 (ARICA) and $4.01 (landrace)
   Median $1.85

CROP WILD RELATIVE CONSERVATION PLANNING

IN SITU AND EX SITU CONSERVATION RECOMMENDATIONS

1. Genetic reserves: within the 120 complementary PA in 13 countries to cover 88 priority CWR and 50% of their ecogeographic diversity.

2. Genetic reserves: 151 sites outside PA in 11 countries to cover a further 21 CWR and remaining ecogeographic diversity. Alternatively, or as a first back-up, the CWR populations occurring in these sites should be conserved ex situ.

3. Prior to the establishment of the reserves: assessment of population occurrence, fitness status and suitability to implement the reserve.


5. Use the CWR Population Management Guidelines (see Iriondo et al., 2021).

(Magos Brehm et al. in prep.)
In situ networks of CWR populations

Governance: a work in progress...
Collaborations

• Ensuring communities have seed at hand, locally adapted through targeted multiplication
• Properly document local/farmer varieties (database development and maintenance)
• Identify lost varieties of high value and conserve most threatened or endangered species/varieties
• Reintroduce lost varieties of high value in the community, national genebank can provide lost varieties and CSB multiplies and stores
• Carry out research and incorporate new findings re:new technologies for the storage, conservation and multiplication
Collaborations…

- Train farmers on conservation methods
- Build capacity for the production of quality seed for the benefit of the farming communities
- Promote CSB as a platform for community development
- Document and share information about emerging dynamics
- Promote agroecology as sound agricultural management practices
- Organize seed (diversity) fairs and exchange visits
- Work together on participatory crop improvement
- Adapted from Maxted, 2021
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Thank you!

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Enfoque integrado multi-propósito de cadenas de valor basado en la biodiversidad

- Rescatar y conservar la diversidad ex situ/in situ
- Caracterización (taxonomía, molecular, morfología etc.)
- Evaluar la diversidad de los rasgos valiosos (micronutrientes etc.)
- Documentar el conocimiento indígena y los usos tradicionales
- Sequía, heladas, tolerancia a la salinidad

- Tecnología post-cosecha mejorada
- Seguridad Alimentaria

- Tecnología de procesamiento mejorada
- Buenas prácticas de manufactura, HACCP
- Nuevo desarrollo de productos
- Recetas (viejas/nuevas)
- Estándares de calidad

- Evaluación y mejoramiento de cadenas de valor
- Comercialización de marca
- Plataformas de cooperación e innovación

- Mejoramiento
- Variedades mejoradas
- Buenas prácticas agrícolas y de recolección
- Sistemas de semillas eficientes

- Concentración nutricional
- Preparación de comida
- Preferencias del consumidor
- Disposición a pagar
- Políticas facilitadoras

- Uso mejorado, mejor nutrición, ingresos y medios de vida