Conservation and Utilization of Agricultural Biodiversity by Farmer Communities in Nepal: Lessons Learned

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10th Anniversary Celebration of the SGSV
More than 85% of the total seed requirement of the major food crops (rice, maize, wheat, lentil, mustard) is supplied by the informal or framers' system.

Quality of the farm-saved seed, however, is questionable.
Diversity in farmers' field is declining!

Many local varieties are in the verge of extinction from the farmers' field.
Since its establishment in 1995, LI-BIRD is part of the various national, regional and international initiatives on on-farm management of agricultural biodiversity.

In collaboration with national agricultural research and extension system, LI-BIRD has tested and developed a number of participatory tools, methods and approaches and disseminated within community, country, region and beyond,

Participatory crop improvement and community seed banks are some of the successful practices promoted by LI-BIRD for on farm management of agricultural biodiversity in Nepal and some lessons learned are discussed here.
Participatory Crop Improvement (PCI) linked to Farmers' Seed Enterprise

- Enhancement of local variety through selection
- Crossing of local variety with exotic parent for developing farmer preferred new varieties
- Testing and promotion of promising new varieties

Sustainable enterprise

Community Seed Banks

Community Based Seed Production Group / cooperatives

Increased access to quality seed, income and employment.
Conservation of local crop diversity and seeds
Enhancement of local rice variety: *Jethobudho*

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
<th>Pokhreli Jethobudho Rice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>Sample collection from 338 farmers</td>
<td></td>
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<tr>
<td>2000</td>
<td>Diversity assessment</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>Screening for blast, lodging and yield (183)</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>Assessment of post harvest traits (46)</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>PVS and SSR evaluation (6)</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>PVS, CBSP (6). Bulk</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>CBSP. VRRC visit. Released as bulk of 6</td>
<td></td>
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</tbody>
</table>

Volume of seed production (Kg) *Pokhreli Jethobudho* by Fewa Seed Producer Group

Seed price of this variety is 3 times higher compared to other rice varieties.
Scaling up of landrace enhancement method

- Farmers have rich diversity in finger millet but research on variety and technology development is limited.
- Post harvest of finger millet and proso millet is difficult so, our work is also focused on this aspect for reducing the drudgery of women.
Scaling up of landrace enhancement method

Amaranth:

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
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<tbody>
<tr>
<td>2012</td>
<td>• A total of 435 accessions collected from farmers’ field and storage in 11 districts of Nepal including 125 from the National gene bank and 23 from a research station)</td>
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<tr>
<td>2013-2014</td>
<td>Characterization and evaluation conducted in 3 locations</td>
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<tr>
<td>2015</td>
<td>Identified 13 lines for Veg. type and 17 for grain</td>
</tr>
<tr>
<td>2016</td>
<td>Seed multiplication and dissemination. Yield trila</td>
</tr>
<tr>
<td>2017</td>
<td>Organized Variety Release and Registration Committee visit and proposal developed for registration.</td>
</tr>
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</table>
PPB using local variety as a parent

Dhudhisari X Hardinath 1
Kachorwa 4

Proposed for registration

Thulo Pinyalo X Rampur Composite
Resunga Composite and Gulmi 2

Released from national system
### Number of varieties developed through PPB/landrace enhancement works in Nepal

<table>
<thead>
<tr>
<th>PPB activity</th>
<th>Name of released/registered variety</th>
<th>Number of pipeline varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>High altitude rice</td>
<td>Machhapuchhre 3 (1) Lumle 2 (1)</td>
<td></td>
</tr>
<tr>
<td>Conservation of useful traits of landraces</td>
<td>Pokhreli Jethobudho (1)</td>
<td>Kachorwa 4, Kalonuniya, Tilki, Amaranth, Finger millet, Proso-millet (6)</td>
</tr>
<tr>
<td>PPB in rice in high potential production system</td>
<td>Barkhe 3004, Barkhe 1027, Barkhe 2014 and Sunaulo Sugandha (4)</td>
<td>Anamol Masuli (1)</td>
</tr>
<tr>
<td>PPB in Maize</td>
<td>Resunga Composite and Gulmi 2 (2)</td>
<td>-</td>
</tr>
<tr>
<td>PVS in Potato</td>
<td>-</td>
<td>CIP 390478-9, CIP 393073-179, CIP 395112-32 (3)</td>
</tr>
</tbody>
</table>

Total 8 11
Farmer-to-farmer dissemination of enhanced *Kalonuniya* rice landrace in Jhapa district of Nepal
Community Seed Bank (CSB)

Established for:

• Helping farming communities to conserve PGRFA that are rapidly being lost from the farmers' field and natural habitat;

• Provide easy access and quality seeds of diverse crops and varieties

• Build capacity of farming communities to address environmental adversities through the provision of climate resilient local crop varieties and seeds; and

• Promoting participatory crops improvement activities and strengthening local seed system
Community Seed Banks Supported by LI-BIRD in Nepal

- High hills (5)
- Mid hills (4)
- Terai (12)

Total 21 CSBs
Community Seed Banks in Nepal

- 21 community seed banks supported by LI-BIRD have conserved more than 916 local varieties of 62 crop species.
- These community seed banks produce approx. 150 tonnes of seed annually, which is accessed by approx. 10,000 farming households each year.
- The annual turnover through seed transaction amounts to NPR 6.3 million (approx. USD 61,000).
- Sent 916 accessions of 62 local crop species to the National Gene Bank for ex situ conservation.
Rice nursery bed for establishing diversity block by Agyauli community seed bank in Nepal
Sustainability and Self-financing of CSB

Community Seed Bank

Seed Fund
Approx. $5000

Operational cost
Profit

CBM Fund
Approx. $10,000

Interest
Operational cost

Farmers' Organization

Capital for transaction of seed in volume

Mobilized as loan and interest is used for conducting seed production of rare, unique local vars. and maintain diversity blocks
Lessons learned and the way forward

• Any participatory crop improvement activities should be linked to community seed bank or community-based seed production groups or other forms of farmer-based seed enterprise to make the seed easily available and support the income of custodians and breeder farmers.

• Community empowerment is key to maintaining and promoting on-farm crop diversity. Hence, establishment and strengthening farmers' organization should be the core of any on-farm conservation initiatives.

• Commercial agriculture is heavily subsidized but there is no public funding mechanism exist for funding collective and individual conservation actions at the community. If a CSB maintains over 100 local varieties and deals with more than 20 tones of seeds every year, we should not hesitate to allocate $15,000 to Seed Fund and CBM Fund.

• Variety release and the registration process is same for all category of seed i.e. F1, improved varieties and landraces. This is not in favor of local varieties at all. Hence, it is necessary to simplifying provision of local variety registration also by farmers and groups.

• The national government, international funding agencies, and CGIAR system should find a balance of work both on ex-situ and on-farm conservation.
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