2. Rationale for the Genebank Conservation

Specific question:
What to conserve? Where to go to collect germplasm?

Evaluation of genetic diversity of germplasm conserved in genebank

- Crop species with different seed/reproductive characters
  - Bread Wheat
  - Mango
Evaluation of Genetic Diversity of Bread Wheat Landraces from Pakistan
Hirano et al. Genetic Resources and Crop Evolution, 55(7)1007-1015

- Wheat Landraces in Pakistan
  - Major cereal crop
  - Proximity of the origin of domestication
  - Long history of wheat cultivation
  - Introduction of the Modern High-yield Varieties in 1980’s (Green Revolution)

Photo: Courtesy by Ms. Yuko Tanaka
Materials and Methods

- Wheat landraces collected in Pakistan in 1980’s
- Northern and Southwest (different ethnic groups)
- 4 Modern High-yield Varieties (MHVs) promoted by Pakistani government in 1980’s
- Amplified Fragment Length Polymorphisms (AFLPs) (Vos et al. 1995): Genome wide marker
Results and Discussion

Fig. NJ tree illustrates the genetic relationships of the Pakistan landraces and HYVs

Different regions mix together
No genetic erosion by MHVs
Considerable genetic diversity exists in wheat landraces collected from Pakistan

Table: Population data obtained by AFLP result

<table>
<thead>
<tr>
<th>Population</th>
<th>n</th>
<th>#loc.</th>
<th>Hj</th>
<th>S.E.(Hj)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Himalaya</td>
<td>18</td>
<td>453</td>
<td>0.17</td>
<td>0.0075</td>
</tr>
<tr>
<td>Balochistan</td>
<td>22</td>
<td>453</td>
<td>0.15</td>
<td>0.0065</td>
</tr>
<tr>
<td>HYVs</td>
<td>4</td>
<td>453</td>
<td>0.15</td>
<td>0.0074</td>
</tr>
</tbody>
</table>

China:         Hj = 0.14 (Tian et al. 2003)
Middle East:    Hj = 0.23 (Stodart et al. 2005)
Rare but locally common

Fig. Number of alleles categorized by the frequency in each area. Only the rare alleles (frequency <5%) found in the country level

Collection in Himalaya area is recommended
• Mango in Myanmar
  – Seeds do not survive long time
  – Vegetative propagation (grafting and nuceller embryony)
  – Proximity to the origin of the species (North east India to Myanmar)
  – Important fruits economically and culturally
  – Conservation has initiated but lack of evaluation