Overview of Agricultural Research and Extension in Pakistan

M. Afzal
Pakistan Agricultural Research Council
Islamabad
New face of Agriculture

• Pakistan’s Agriculture is complex - geography, agro-ecological zones, cropping patterns, production systems, mixed farming

• Agriculture has undergone tremendous changes over the past few decades

• It is not only essential for national food security but also acts as engine of economic growth

• The era of green revolution is long over

• The agricultural research system devised earlier has served reasonably well notably through provision of high yielding crop varieties

• The research system needs a conceptual change
Agriculture knowledge system has worked but sub-optimally (e.g. Wheat productivity)
Agricultural Developments in Pakistan

• Yield improvements
• From import to export
• Off-season vegetables
• Introduction of new crops, fruits and vegetables
• Control of animal and plant diseases
• Poultry industry
• New dairy products
• Fish farming and many more ….
Productivity improvement is multi-factorial

- Policy interventions
- Farmer’s resources and inputs
- Availability of technology (Research)
- Transfer of technology (Extension)
- Marketing

Ultimate driver is profitability
Federal Research Establishments (6)

Provincial Research Institutes (15)

Agricultural/Veterinary Sciences in Universities (13)

Agro-industry (Pesticides/Fertilizers/Seed/Machinery etc.)

PARC
Federal Agriculture Research System

- **MI NFA**
  - PARC, PCCC, Soil Survey, Zoological Survey
- **PAEC**
  - NI AB, NI BGE, NI FA, NI A
- **MoST**
  - PCSI R, PCRWR, Leather Research Centre, NI O
- **WAPDA**
  - IWASARI, Mona
- **HEC**
  - Agricultural/Animal Science Universities
  - General Universities
Provincial Research System

- Multi-departmental
- Crops and Horticulture - multi and mono disciplinary institutes
- Livestock - health, production, farms, poultry
- Fisheries – variable infrastructure and hatcheries
- Provincial Research Systems vary in infrastructure and capacity
## Distribution of Agricultural Scientists

<table>
<thead>
<tr>
<th>Area</th>
<th>% of Total Scientists</th>
<th>% of Scientists with Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provinces</td>
<td>50</td>
<td>18</td>
</tr>
<tr>
<td>Universities</td>
<td>23</td>
<td>50</td>
</tr>
<tr>
<td>PARC</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>PAEC</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>PCCC</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
DISTRIBUTION OF Ph.D. WITHIN PROVINCES

Distribution of PhDs within Provinces

- Punjab
- Sindh
- KP
- Baluchistan

Legend:
- PhD Univ
- PhDs ARI
## Number of Agricultural Scientists

<table>
<thead>
<tr>
<th>Country</th>
<th>Scientists /million pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>300</td>
</tr>
<tr>
<td>Pakistan</td>
<td>44</td>
</tr>
<tr>
<td>UK</td>
<td>1400</td>
</tr>
<tr>
<td>USA</td>
<td>2360</td>
</tr>
<tr>
<td>India</td>
<td>65</td>
</tr>
</tbody>
</table>
Expenditure on R&D in Agriculture

Figure 1—Intensity ratios, 1991 and 2002

Bangladesh
China
India
Indonesia
Laos
Malaysia
Nepal
Pakistan
Papua New Guinea
The Philippines
Sri Lanka
Vietnam

Sample total (11)
Sample total plus China (12)

Percentage


Notes: Data in parentheses indicate the number of countries in each category. Intensity ratios indicate the ratio of total public agricultural R&D spending to total agricultural gross domestic product.
## Public Agricultural Research and Development Spending

<table>
<thead>
<tr>
<th>Countries</th>
<th>Agricultural R&amp;D total spending (in million 2005 international dollars)</th>
<th>1991</th>
<th>2002</th>
<th>% (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing countries (117)</td>
<td></td>
<td>9,459</td>
<td>12,819</td>
<td>+36</td>
</tr>
<tr>
<td>Asia and Pacific (28 countries)</td>
<td></td>
<td>4,847</td>
<td>7,523</td>
<td>+55</td>
</tr>
<tr>
<td>High-income countries (22 country)</td>
<td></td>
<td>10,534</td>
<td>10,191</td>
<td>-3</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td>1,174</td>
<td>2,574</td>
<td>+119</td>
</tr>
<tr>
<td>India</td>
<td></td>
<td>746</td>
<td>1,355</td>
<td>+82</td>
</tr>
<tr>
<td>Malaysia</td>
<td></td>
<td>227</td>
<td>424</td>
<td>+87</td>
</tr>
<tr>
<td>Bangladesh</td>
<td></td>
<td>81</td>
<td>109</td>
<td>+35</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td></td>
<td>39</td>
<td>51</td>
<td>+31</td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td>223</td>
<td>171</td>
<td>-23</td>
</tr>
</tbody>
</table>

Source: IFPRI Research Brief No. 11, 2008
Agriculture Research Expenditure
(000) International Dollar per Scientist

Source: IFPRI-ASTI Country Brief
Agriculture Research Expenditure
(Percentage of Agriculture GDP)

% of Ag GDP

Pakistan 0.31
Nepal 0.22
Philippines 0.44
Bangladesh 0.36
Sri Lanka 0.49
Malaysia 1.92

Source: IFPRI – ASTI Country Brief
Funding Pattern of Agricultural Research

<table>
<thead>
<tr>
<th>Expenditure on</th>
<th>Range (% age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment charges</td>
<td>78 – 90</td>
</tr>
<tr>
<td>Operational – fixed cost</td>
<td>10 – 25</td>
</tr>
<tr>
<td>Operational – research</td>
<td>3 – 9</td>
</tr>
<tr>
<td>Capital</td>
<td>0.2 – 3</td>
</tr>
</tbody>
</table>
# Allocation of Resources by Discipline

<table>
<thead>
<tr>
<th>Discipline</th>
<th>% Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crops</td>
<td>52</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>25</td>
</tr>
<tr>
<td>Livestock &amp; Fisheries</td>
<td>14</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>9</td>
</tr>
</tbody>
</table>
## Agricultural Extension Infrastructure in Pakistan

<table>
<thead>
<tr>
<th>Province</th>
<th>Agriculture Officer</th>
<th>Field Assistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punjab</td>
<td>763</td>
<td>3264</td>
</tr>
<tr>
<td>Sindh</td>
<td>573</td>
<td>1026</td>
</tr>
<tr>
<td>Balochistan</td>
<td>586</td>
<td>1016</td>
</tr>
<tr>
<td>Khyber Pakhtunkhwa</td>
<td>222</td>
<td>539</td>
</tr>
<tr>
<td>AJK, GB, FATA, ICT</td>
<td>180</td>
<td>673</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2324</strong></td>
<td><strong>6518</strong></td>
</tr>
</tbody>
</table>
Livestock Extension Infrastructure in Pakistan

<table>
<thead>
<tr>
<th>Province</th>
<th>Veterinary Officers</th>
<th>Veterinary Assistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punjab</td>
<td>1403</td>
<td>2271</td>
</tr>
<tr>
<td>Sindh</td>
<td>358</td>
<td>748</td>
</tr>
<tr>
<td>Balochistia</td>
<td>631</td>
<td>1153</td>
</tr>
<tr>
<td>Khyber Pakhtunkhwa</td>
<td>338</td>
<td>1600</td>
</tr>
<tr>
<td>AJK, GB, FATA, ICT</td>
<td>323</td>
<td>1346</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3053</strong></td>
<td><strong>7118</strong></td>
</tr>
</tbody>
</table>
Agricultural Extension Approaches in Pakistan

- Village Cooperative Movement
- Village Agricultural & Industrial Development Program (Village-ÅI D)
- Basic Democracies System (BDS)
- Inputs at Farmers’ Doorstep Approach
- Training and Visit System (T & V)
- Agriculture Development Corporation
- Barani Area Development Program
- Crop Maximization Program
- Integrated Rural Development Program
- Integrated Pest Management Program
- Farmers’ Field School Approach
- Productivity Enhancement Model, Sarghoda
- Electronic media in agriculture knowledge transfer
- Current system of Provincial Extension
Issues of Agricultural Research and Extension in Pakistan

- **Human Resources Issues**
  - Pay structure & career opportunities
  - Research managers selection
  - Training opportunities

- **Research Efficiency Issues**
  - Priority setting
  - Collaboration / Linkage with external agencies
  - Funding for research to action

- **Functional Issues**
  - Funding and funding patterns
  - Facilities and equipments
  - Mobility
The Way Forward – 1

- Institutional **autonomy** and Increased **flexibility** for public research institutions combined with increased **accountability**
- A growing role for **private sector R&D**, especially in commercial crops
- An appropriate policy framework to provide **incentives to invest in R&D**, and create the opportunity for public-private partnerships
- Special and separate focus on **small-scale farmers and marginal areas**, where poverty is highest and which are bypassed by the private sector
- The longer-term needs for conservation of the **natural resources and ecosystems**, and
- **Consumer concerns** on health issues, such as quality, adulteration and livestock and poultry diseases
- **Globalization** and **climatic change**
The Way Forward – 2

• Scientists / extension workers to be recruited on merit in open and transparent way
• Career structure for scientists not to be linked with availability of posts but target based up-gradation
• Salary/ incentives structure for scientists to be overhauled
• Research / extension leaders to be selected through open merit and search committees
• Review of mandate of institutions and their rationalization
• Mechanism to constantly consult the relevant stakeholders for setting up research agenda
• Research coordination fund
• Operational funds for research-extension linkage
• Endowment fund for agriculture research and development to target specific issues
Concluding Remarks

Competitive position and the quality of a country’s economy are defined in large part by the size and density of the country’s “Knowledge Cloud” .... The “Precipitate” of knowledge will “irrigate” development.

(World Bank Report)
Thanks