Agricultural Research for Development in the Asia-Pacific Region

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Poverty prevalence and absolute numbers (< $1.25 per day, ca. 2005)

Prevalence

Absolute
Fig 3. Estimated regional distribution of hunger in 2009 (in mil.) and increase from 2008 levels (in %)

- Asia and the Pacific: 642 (+10.5%)
- Sub-Saharan Africa: 265 (+11.8%)
- Latin America and the Caribbean: 53 (12.8%)
- Near East and North Africa: 42 (+13.5%)
- Developed Countries: 15 (+15.4%)

For the first time > 1 billion people are undernourished

Source: FAO, 2009
Problem zone “under–two” worst in Asia

Weight for age by region

Source: Shrimpton et al. 2001.
Fig 4. The number of poor rose in South Asia

- Sub-Saharan Africa
- South Asia
- East Asia & Pacific
- Middle East & North Africa
- Europe & Central Asia
- Latin America & Caribbean

Millions of people below $1-a-day poverty line

1993 vs. 2002

Source: ASTI, 2008

FIGHTING STUBBORNLY HIGH HUNGER AND POVERTY
### Agricultural productivity growth in developing countries

**Small is Beautiful**

Annual total factor productivity growth, 1992-2003

<table>
<thead>
<tr>
<th>Region</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia</td>
<td>2.7</td>
</tr>
<tr>
<td>South Asia</td>
<td>1.0</td>
</tr>
<tr>
<td>East Africa</td>
<td>0.4</td>
</tr>
<tr>
<td>West Africa</td>
<td>1.6</td>
</tr>
<tr>
<td>Southern Africa</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Latin America</strong></td>
<td>2.7</td>
</tr>
<tr>
<td>North Africa &amp; West Asia</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>All regions</strong></td>
<td>2.1</td>
</tr>
</tbody>
</table>

Agricultural growth has large poverty reduction impact

Poverty reduction elasticities of agricultural growth

<table>
<thead>
<tr>
<th>Region</th>
<th>Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA</td>
<td>-1.83</td>
</tr>
<tr>
<td>South Asia</td>
<td>-1.73</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>-1.44</td>
</tr>
<tr>
<td>Eastern and Central Europe</td>
<td>-1.57</td>
</tr>
<tr>
<td>Latin America</td>
<td>-1.11</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>-0.92</td>
</tr>
<tr>
<td><strong>All Low Income Countries</strong></td>
<td><strong>-1.6</strong></td>
</tr>
</tbody>
</table>

Source: Christaensen et al (2005)
Agricultural potential and market access

Notes: Rainfed agriculture potential (crops, grazing, forest) is classified as high, medium or low (H,M,L). Rainfed potential, closed forest, intensively irrigated, and protected areas are all classified into high (H) and low (L) market access areas. Thus ML is medium rainfed agricultural potential areas with low market access.
Key Issues and Challenges

• **Fighting stubbornly high and even** increasing under-nutrition/malnutrition and inequity

• **Veritable divides** intensifying, especially, rural-urban, *farmer vs. non-farmer income*, enhanced vulnerability of poor both in markets and monsoon (climate change and intensifying meteorological aberrations)

• Increasing land fragmentation, **swelling number of small, marginal and landless farmers**, declining farm sizes becoming non-viable, exiting farming but limited employment options outside farming
Key Issues and Challenges (cont.)

• **Degrading and declining availability of land, water, and agriculture biodiversity** (in South Asia, per capita water availability halved during the past 30 years), total factor productivity growth rate declining, costs of inputs increased drastically as compared to those of agricultural products, thus adversely impacting farmers’ net incomes

• **Poor infrastructure, governance, unsatisfactory enabling and regulatory mechanisms, policy-strategy-program mismatch**
Key Issues and Challenges (cont.)

- **Non-alignment of input-output prices**, poor agricultural pricing policies
- **Deteriorating net trade**, unsatisfactory market infrastructure, SMEs being increasingly pushed out by larger companies, and destabilizing farmer market linkages
- **Low and declining investment in agriculture and agricultural research**, low intensity of investment in AR4D
- **Poor participation of the private sector** and limited efficacy of networks and inter-institutional, inter-ministerial and international agricultural research collaborations
Key Issues and Challenges (cont.)

• **Inadequate fiscal policies** especially on the extent and focus of credit, subsidies, agricultural insurance, and social safety nets

• **Eroding human resource** capital and HR gaps in certain new and emerging areas and overall declining capacity of REE institutions resulting in poor sharing of the knowledge domain and low competitiveness, decreasing employability of agriculture graduates and overall non-attractiveness of agriculture education

• **Poor strategic linkages** among productivity, profitability, sustainability, equity, and feminization of agriculture
Key Issues and Challenges (cont.)

• **Crisis of entitlement** on part of the poor to agricultural production and value chains

• **Underused indigenous technologies**, traditional knowledge and innovations; missed out opportunities for mutual enrichment of the traditional systems with the modern technologies and innovations

• **Non-availability of reliable data/information**, thus low reliability of predictions and projections, and lack of ground truthing of models and modeling exercises for climate change management
Key Issues and Challenges (cont.)

• Technology fatigue, persisting huge technology transfer, knowledge and innovation gaps, degeneration of extension services, lack of participatory approaches, poor monitoring, evaluation and assessment, neglect of maintenance research while biotic, non-biotic and economic stresses have been increasing
Bridging the Yield Gap

• Main Research Uptake and Innovation and Invest Adequately in Maintenance Research
• Strengthen Research-Extension-Farmer Linkage
• Adequate gender sensitivity in technology development, selection and transfer
• Improving Entitlement of the Poor to Land, Water, Credit, Other Production Assets and Safety Nets
New and Emerging Concerns to be Addressed by AR4D

- Focus on the agricultural system of the poor
- Forging coherence among productivity, sustainability, and biosecurity
- Managing climate change
- Balancing bioenergy and food needs
- Volatile food prices and food security
- Political economy and institutional reforms and enabling environment
Complementary Forces for AR4D

- Enhanced investment in AR4D alone is not enough unless complemented by commensurate investment in agriculture as a whole; agriculture must be the main agenda of development in the Pacific

Yield (kg/ha)

<table>
<thead>
<tr>
<th>Crop</th>
<th>India</th>
<th>China</th>
<th>Asia-Pacific</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy</td>
<td>3104</td>
<td>6275</td>
<td>4156</td>
<td>4108</td>
</tr>
<tr>
<td>Wheat</td>
<td>2681</td>
<td>4267</td>
<td>2627</td>
<td>2874</td>
</tr>
<tr>
<td>Maize</td>
<td>1901</td>
<td>5233</td>
<td>4139</td>
<td>4936</td>
</tr>
<tr>
<td>Groundnut (in shell)</td>
<td>998</td>
<td>3059</td>
<td>2200</td>
<td>1749</td>
</tr>
</tbody>
</table>
Complementary Forces for AR4D

- Infrastructure, rural roads
- GIS and communication
- Irrigation and watershed development
- Rural, peri-urban and urban markets
- General Education
- Nutrition and Public Health
Crops and Horticulture

• Crop varieties for (a) tolerance to abiotic and biotic stresses, (b) raising crop yield ceilings particularly in irrigated areas, (c) better product quality, nutrition, value addition, shelf life and high suitability for processing, and (d) multipurpose use.

• Short duration, period-bound high yielding varieties of rice, wheat and maize to incorporate other crops, especially legumes and vegetables and flowers, in cropping systems to enhance cropping intensity and resource-productivity

• Diversifying the production system consistent with land, water, social, economic regimes and market demand, particularly integrated management for off-season vegetables, flowers and peri-urban cultivation

• Improving input use efficiency through ICM, IPM, INM, fertigation, precision farming etc., especially of fertilizers, nutrients, water and energy
Crops and Horticulture

- Designing and improving cropping systems for higher yields, pest management, natural resource conservation, and integration with livestock and trees
- Sustainable production and distribution of quality seed and planting materials and technology transfer system, including *in vitro* methods
- Small farm mechanization and protected cultivation of vegetables and flowers
- Post-harvest handling, value addition through processing and storage
- Crop and horticulture-based farming systems suited to distinct agro-eco-regions viz. arid, hill and mountain, coastal and hot-humid zones
Livestock including poultry

• Improving nutrition through: quality of crops residues and removing anti-nutritional factors, strategic supplementation and improved varieties of fodder crops and feed balance and formulation, and reduction in methane emission.

• Animal health by enhanced science-based capacity in epidemiology and diagnosis of and vaccine production for major diseases, disease-nutrition interactions and genetic resistance to major diseases, and overall capacity in management of cross-border diseases and zoonotics.

• Characterization and improvement of local breeds through selective breeding, and evolving a science-led policy on cattle breeding.

• Market development, product processing and biosafety of products with focus on small holders.

• Animal waste management and socio-economic and environmental impact of crop-livestock systems, including pastoral systems.
**Fisheries Coastal**

- Sustainable integrated management of coastal systems and marine protected areas, including mangroves
- Sustainable management of marine shrimp farming (feed, nutrition, health and seed distribution), including effluent management
- Reef fishery systems management, crab culture and ornamental fishes
Fisheries Inland/Aquaculture

• Genetic improvement for growth enhancement and disease resistance
• Aquaculture systems management, including deepwater rice-fish/freshwater prawn, integrated fish farming, and open water culture-based fishery and cold water fish culture
• Fish health management, particularly for intensive culture of fish and crustaceans
Forestry

- Management of felling-cutting cycles in natural forest, timber utilization, second-growth forests and forest health
- Inventorying, evaluation and development of forest resources and biodiversity
- Promotion and management of agro-forestry, landscape forestry, alley cropping, and carbon sequestration and trading
- Improvement of medicinal and aromatic plants and enhanced judicious extraction of non-timber and minor products and their marketing
Natural Resources and Climate Change Management

• and tree) resources for food, agriculture, energy, adaptation to climate change and overall income and livelihood security
• Knowledge-based integrated management of both supply and demand sides of water and other non-renewable resources in the regimes of increasing water crisis, declining natural resources and globalization
• Improving efficiency in distribution and use of irrigation water, soil, nutrients/fertilizers (policy, technology and institutional issues) through enhancing crop-animal-water-nutrient-implement synergy
• Technological, institutional and policy options for rainwater harvesting, acquifer recharge, water pricing, watershed management, reclamation of degraded/sodic lands, control/management of saline and arsenic contaminated water and conjoint and multiple uses of water
Natural Resources and Climate Change Management

• Sustainable integrated land use, organic recycling and soil fertility and water quantity and quality management to maintain crop-soil-water balance particularly under the changing climate regimes

• Developing drought, flood and good weather codes, contingency and compensatory farming systems and biotic stress management devices for adapting to abnormal meteorological (weather) and climate changes, duly supported by credible early warning and ICT systems.
Congruence with CGIAR’s SRF

• Food for People: Create and accelerate sustainable increases in productivity and production of healthy food by and for the poor.
  – Increasing the productivity of crop and livestock systems
  – Reducing vulnerability to biotic and abiotic stresses
  – Improving the nutritional quality of food
Congruence with CGIAR’s SRF

- Environment for People: Conserve, enhance and sustainably use natural resources and biodiversity to improve the livelihoods of the poor, and respond to climate change.
  - Addressing climate change
  - Increasing the resilience of agro-ecosystems
  - Improving soil fertility
  - Increasing the efficiency of water use
Congruence with CGIAR’s SRF

• Innovation for People: Mobilise science and technology to stimulate institutional innovation and to enable policies for pro-poor agricultural growth and gender equity.
  – Genetic resource management
  – Institutional innovation to improve market
  – Innovative strategies to ensure that agricultural production benefits the poor, especially women.
Institutional Reforms

• Capacity building
• Feminization of agriculture
• Market related
• Research, Education and Extension
• Small Farmer Organizations including Producers Companies, Cooperatives, SHGs etc
Policy Environment

- Agriculture and Agriculture Research policies
- Trade in the globalized world, appropriate IPR, PVP, and SPS regimes
- Public-private partnerships in research, technology generation, assessment, refinement and transfer and in innovation
- South-South, North-South collaboration, regional networks/associations
- Supply chain management
Policy Environment

• Revival and strengthening of agricultural extension and services
• Promotion of participatory approaches involving all stakeholders in research planning and implementation along the production-consumption chain
Financial Innovations

• Increase the intensity of resource allocation and promote demand-driven allocation with high income return, such as livestock, horticulture and fisheries

• Converging the flow of financial resources to the action points

• Appropriate fiscal measures regarding credit subsidy and insurance and tradeoff between social safety networks and creation of production assets
Agriculture Research Strategy

• Investing in the poor and their livelihood security
• Agro-ecosystem and integrated farming approach
• Integrated yield, quality, nutrition, and food quality improvement
• Demand-driven research
• Inter- and multi-disciplinary and decentralized research
Paradigm shifts

1. Shift in research approach from a single commodity based and monodisciplinary to a farming system based and multidisciplinary.

2. A change from a top-down (training and visit system) extension approach to a participatory (effective research-extension-farmer-market interface) approach of technology assessment, refinement and transfer.

3. Integration of molecular biology, bio-technology and bio- information with conventional technology as well as with indigenous knowledge for speedy and more precise gains.
Paradigm shifts

4. Greater congruence between productivity and sustainability.
5. Creation of enabling mechanisms for adoption of new technologies, viz, IPR, PVP, SPS, harmonization of standards and regulations in consonance with TRIPS.
6. Cost-effectiveness of production, quality and safety in food and other agricultural products, including GMOs.
Where do we go from here?

- Communicate the outcome of these consultations to the stakeholders, governments, donors, development banks, and other relevant systems
- Undertake advocacy through:
  - a joint declaration
  - internalizing the output into the GCARD Montelier Conference (March 2010)
  - interact with the CGIAR Mega Programs
  - interact with all the regional fora networks
  - sensitize governments to adequately invest in AR4D
Thank You