Climate-Smart Agriculture and Mechanization in Pakistan

Presentation by

Dr. Tanveer Ahmad
Director Agricultural and Biological Engineering Institute, NARC,
Pakistan Agricultural Research Council, Ministry of National Food Security and Research,
The Government of Islamic Republic of Pakistan

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INTRODUCTION

Agriculture

Pakistan is basically an agricultural country and it's almost 70% of the economy is based on agriculture. Most importantly, 68% of country’s population living in rural areas is directly or indirectly dependent upon agriculture for their livelihood.

- Agriculture sector is a dominant sector of Pakistan Economy
  - Contributes 21% of GDP
  - Employees 43.7% of the total work force
  - Serves as a major supplier of raw materials to industry as well as a market for industrial products
  - Contributes substantially to Pakistan’s export earnings
  - The four major crops (wheat, rice, cotton & sugarcane) on average contribute 31.1 percent to the value added in overall agriculture and 7.1 percent to GDP
  - The minor crops account for 11.1 percent of the value added in overall agriculture
LAND UTILIZATION

- Net Sown (19.3%), 15.36
- Current Fallow (8.4%), 6.68
- Forest (5.4%), 4.27
- Area not Available for Cultivation (29.1%), 23.15
- Non-Reported Area (27.4%), 21.8
- Cultureable waste (10.4%), 8.3

Agricultural Statics of Pakistan-2012-2013
Geographical Area: 79.61 million ha
Population: 194.3 million
Literacy Rate: 56%
  Male: 69%
  Female: 44%
Rainfall (mm): 127 ~ 1250

Major Crops: Wheat, Rice, Cotton, and Sugarcane
<table>
<thead>
<tr>
<th>Machine Type</th>
<th>Units</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaper</td>
<td>51000</td>
<td>103 billion</td>
</tr>
<tr>
<td>Zero tillage drill</td>
<td>7000</td>
<td>43 billion</td>
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<tr>
<td>Wheat straw chopper</td>
<td>5000</td>
<td>15 billion</td>
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<tr>
<td>Rice thresher</td>
<td>7000</td>
<td>33 billion</td>
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<tr>
<td>Seed processor</td>
<td>50</td>
<td>1.3 billion</td>
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<tr>
<td>Groundnut digger</td>
<td>2200</td>
<td>6 billion</td>
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<tr>
<td>Groundnut thresher</td>
<td>2200</td>
<td>7 billion</td>
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<tr>
<td>Planter</td>
<td>300</td>
<td>1 billion</td>
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<tr>
<td>Seed drill</td>
<td>8000</td>
<td>30 billion</td>
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</table>
Zero Tillage (ZT) Technology

- Time window between rice harvesting and wheat sowing is less than two weeks, especially in Basmati growing areas.
- Therefore, about 70% of wheat sowing in rice-wheat based cropping system gets late.
- Delayed planting of wheat in rice based farming system was resulting in 15% reduction of wheat yield.
- Challenge was to develop a technology for timely sowing of wheat, thus reducing its yield losses.
About 7,000 drills are being used by the farmers. Estimated 43 billion rupees saving due to timely sowing of wheat, yield increase and savings in production cost.
PAK SEEDER
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FARMERS CURRENT PRACTICES OF LAND PREPARATION
PAK SEEDER PERFORMANCE

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FERTILIZER BAND PLACEMENT DRILL
FERTILIZER BAND PLACEMENT DRILL

- Fertilizer broadcast method is a wasteful method of fertilizer application.
- Fertilizer use efficiency is less and high rate of ammoniated phosphate fertilizer (like DAP) affects the seed germination and crop yield.
- ABEI NARC designed and developed a fertilizer band placement drill. This drill places fertilizer 5cm away and 5cm deeper than the seed.
- Currently 8000 units in operation.
BENEFITS

- This drill saves 50% phosphate fertilizer compared with broadcast method.
- It saves One DAP bag (Rs 4300) per acre.
- About 10% more grain yield by using this drill for wheat sowing.
- By up scaling this technology, country will benefit Rs. 15000 million/annum.
WHEAT STRAW CHOPPER

Wheat Straw Chopper-cum-Blower

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Wheat Straw Chopper

ISSUES

- Straw collection
- Wastage of wheat straw in combine harvested field
- Straw burning & related field hazards
- Environmental pollution

TECHNOLOGY HIGHLIGHTS

Field Capacity : 0.4 ha/h
Economic Benefit : $190/ha (2400 kg straw not burned and saved for cattle feeding)
Operating units : 5000
Future Focus

• Precision Agriculture
• To optimize the use of inputs like fuel, water, seed, fertilizer, chemical etc. by the use of energy efficient and environment friendly mechanical technologies.
  - Computer controllers
  - Variable rate technology
  - Field shape affects farming efficiencies
  - Farm GIS and data management
  - Zone management
  - Telemetric machinery operating information available on internet
  - Crop sensors
Thank you.

Dr. Tanveer Ahmad
Email: tanveerz_isd@yahoo.com
Table-1 Pak Seeder vs Farmer’s Practice: Grain yield of wheat crop during 2015-16 Sowing Season

<table>
<thead>
<tr>
<th>Farmers Detail</th>
<th>Pak Seeder</th>
<th>Farmer Practice</th>
<th>Pak Seeder</th>
<th>Farmer Practice</th>
<th>Pak Seeder</th>
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<th>Farmer Practice</th>
<th>Pak Seeder</th>
<th>Farmer Practice</th>
<th>Pak Seeder</th>
<th>Farmer Practice</th>
<th>Zero Tillage</th>
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</thead>
<tbody>
<tr>
<td>1. Haji Mahmood Silver Star Factory, Daska Sialkot</td>
<td>Pak Seeder + Full residue</td>
<td>Farmer Practice</td>
<td>Pak Seeder + Full Residue</td>
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<td>2. Sultan Mahmood Qureshi Village: Chicher Wali Pasroor</td>
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<td>3. Mian Irfan Bhatti, Village: Baka Bhattian Khanka Dogran Hafizabad</td>
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<td>5. Ch. Mubarak, Village: Glotian, Daska-Wazirabad Road, Daska</td>
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<td>6. Ch. M. Afzal, Village: Jajay Sahian, Sialkot</td>
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<td>Practices</td>
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<td>Crop yield/ac (Kg)</td>
<td>1883</td>
<td>1670</td>
<td>1239</td>
<td>1767</td>
<td>1389</td>
<td>1738</td>
<td>1612</td>
<td>1728</td>
<td>1583</td>
<td>1718</td>
<td>1408</td>
<td>1776</td>
<td>1360</td>
</tr>
<tr>
<td>Crop Yield/ha (Kg)</td>
<td>4653</td>
<td>4127</td>
<td>3062</td>
<td>4366</td>
<td>3432</td>
<td>4295</td>
<td>3983</td>
<td>4270</td>
<td>3912</td>
<td>4245</td>
<td>3479</td>
<td>4388</td>
<td>3360</td>
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</table>

(* Date of Sowing)

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