Country Report: Pakistan

- Overview
- National Perspective
- Development Focus
Agriculture in National Economy

- Gross Domestic Product: 23%
- Employment: 42%
- Export Earnings of Raw & Processed Products: 70%
- Industrial Production: 51%
Agricultural Mechanization

Aims at

• Increasing productivity of land and labor
• Bringing in more area under cultivation
• Conserving energy and resources
• Sustaining agricultural production
• Improving operators’ comfort and safety
• Protecting environment
• Increasing farm profits
Agricultural Mechanization

National Perspective

- Practicing selective mechanization
- Mechanized operation for which there was shortage of labor, power or both
- Popular forms of mechanization are:
  - Bulldozers
  - Power rigs
  - Tube wells
  - Tractors with cultivator, wheat thresher and trailer
## Agricultural Machinery Used in Pakistan

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Tractor</td>
<td>18,909</td>
<td>35,714</td>
<td>157,310</td>
<td>252,861</td>
<td>4,96,000</td>
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<tr>
<td>Cultivator</td>
<td>14,338</td>
<td>31,619</td>
<td>146,863</td>
<td>236,272 (93)</td>
<td>4,71,200 (95)</td>
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<td>Mould Board Plough</td>
<td>2,335</td>
<td>2,734</td>
<td>7,319</td>
<td>28,413 (11)</td>
<td>99,200 (20)</td>
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<td>Disc Plough</td>
<td>2,513</td>
<td>2,938</td>
<td>6,355</td>
<td>20,372 (8)</td>
<td>64,400 (15)</td>
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<td>Blade</td>
<td>3,925</td>
<td>4,200</td>
<td>69,004</td>
<td>164,489 (65)</td>
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<td>Chisel Plough</td>
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<td>-</td>
<td>712</td>
<td>6,535 (3)</td>
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<td>Rotavator</td>
<td>-</td>
<td>-</td>
<td>2,101</td>
<td>5,594 (2)</td>
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<td>Bar/Disc Harrow</td>
<td>2,007</td>
<td>2,373</td>
<td>8,140</td>
<td>12,233 (5)</td>
<td>49,600 (10)</td>
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<tr>
<td>Ridger</td>
<td>-</td>
<td>120</td>
<td>4,711</td>
<td>10,984 (4)</td>
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<td>Grain Drill</td>
<td>563</td>
<td>1,174</td>
<td>11,251</td>
<td>64,126 (25)</td>
<td>2,48,000 (50)</td>
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<tr>
<td>Sprayer</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20,778 (8)</td>
<td>49,600 (10)</td>
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<tr>
<td>Trailer</td>
<td>-</td>
<td>18,074</td>
<td>98,787</td>
<td>176,412 (70)</td>
<td>2,48,000 (50)</td>
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<td>Wheat Thresher</td>
<td>-</td>
<td>5,635</td>
<td>78,377</td>
<td>112,707 (45)</td>
<td>1,24,000 (25)</td>
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<tr>
<td>Reaper</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,972 (3)</td>
<td>24,800 (5)</td>
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<tr>
<td>Combine Harvester (Wheat &amp; Paddy)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>859</td>
<td>6000</td>
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</tbody>
</table>

Values in parentheses are the machine population as percent of tractor population.
Agricultural Machinery Manufacturing

TRACTORS

- Massey Ferguson: MF-240 & MF-265/375
- Fiat: Fiat-480,640 & TD95S
- Belarus: MTZ-50 & UMZ-6AKM
- Ford: 3600 & 4600
- IMT: 540 & 560
TRACTORS – Deletion Achieved

Massey Ferguson
- 50-60 hp tractors: 87%
- 70-85 hp tractors: 60%

Fiat
- 50-65 hp tractors: 85%

Belarus
- 50 hp tractors: 68%
## Farm Power Available

<table>
<thead>
<tr>
<th>Power Source</th>
<th>Numbers</th>
<th>kW/Unit</th>
<th>Power Available (Million kW)</th>
<th>Share of Each Source (%)</th>
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<tbody>
<tr>
<td>Agriculture labor Force (million)</td>
<td>27.7</td>
<td>0.075</td>
<td>2.08</td>
<td>13.1</td>
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<td>Work Animal (million)</td>
<td>4.45</td>
<td>0.40</td>
<td>1.78</td>
<td>11.2</td>
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<tr>
<td>Tractor Population</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Medium size tractor (37 kW) - 80% of total population</td>
<td>240,000</td>
<td>37</td>
<td>8.88</td>
<td>56.2</td>
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<tr>
<td>• Large size tractor (51 kW) - 20% of total population</td>
<td>60,00</td>
<td>51</td>
<td>3.06</td>
<td>19.3</td>
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<tr>
<td>Total Power (kW)</td>
<td></td>
<td></td>
<td>15.80</td>
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<tr>
<td>Total cultivated area (million ha)</td>
<td>22.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power available (kW/ha)</td>
<td></td>
<td></td>
<td>0.71</td>
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# Farm Power Projected (2010)

<table>
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<th>Power Source</th>
<th>Numbers</th>
<th>kW/Unit</th>
<th>Power Available (Million kW)</th>
<th>Share of Each Source (%)</th>
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<tr>
<td>Agriculture labor Force (million)</td>
<td>34.8</td>
<td>0.075</td>
<td>2.61</td>
<td>10.9</td>
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<tr>
<td>Work Animal (million)</td>
<td>3.78</td>
<td>0.40</td>
<td>1.51</td>
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<tr>
<td><strong>Tractor Population</strong></td>
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<tr>
<td>• Medium size tractor (37 kW) - 80% of total population</td>
<td>396,800</td>
<td>37</td>
<td>14.60</td>
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<td>• Large size tractor (51 kW) - 20% of total population</td>
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<td>51</td>
<td>5.06</td>
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<td><strong>Total Power (kW)</strong></td>
<td></td>
<td></td>
<td>23.86</td>
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<tr>
<td><strong>Total cultivated area (million ha)</strong></td>
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<td>24.8</td>
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<tr>
<td><strong>Power available (kW/ha)</strong></td>
<td></td>
<td></td>
<td>0.96</td>
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Mechanization Organizations

- **R & D Institutions**
  - Farm Machinery Institute (FMI)
  - Agricultural Mechanization Research Institute (AMRI)
  - Agricultural Mechanization Research Cell (AMRC)
  - Centre For Agricultural Machinery Industry (CAMI)

- **Universities**
  - University of Agriculture, Faisalabad
  - University of Agriculture, Tandojam
  - University of Engineering, Peshawar

- **Others**
  - MINFAL, PDAE, ZTBL, APTMA, PAMIMA
Farm Mechanization

for

Self-reliance & Quality Living
Mission

Contribute to

• food security
• poverty reduction
• environment protection

by fostering sustainable enhancement in productivity of agricultural production resources

through farm machinery

• Development/adaptation
• testing & standardization
• commercialization
<table>
<thead>
<tr>
<th>Year</th>
<th>Reaper</th>
<th>Groundnut Digger</th>
<th>Groundnut Thresher</th>
<th>Planter</th>
<th>Zero-Till Drill</th>
<th>Sunflower Thresher</th>
<th>Total</th>
<th>Budget</th>
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<td>1985</td>
<td>12.86</td>
<td>0.92</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>13.87</td>
<td>3.382</td>
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<td>1986</td>
<td>27.48</td>
<td>1.29</td>
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<td>28.77</td>
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<td>1987</td>
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<td>2.48</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>64.68</td>
<td>2.810</td>
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<td>1988</td>
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<td>4.13</td>
<td>0.87</td>
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<td>122.01</td>
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<td>146.26</td>
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<td>1.53</td>
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<td>152.67</td>
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<td>2.38</td>
<td>16.00</td>
<td>9.20</td>
<td>849.48</td>
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<td>1998</td>
<td>959.23</td>
<td>47.43</td>
<td>62.63</td>
<td>2.33</td>
<td>93.71</td>
<td>8.87</td>
<td>1174.20</td>
<td>5.292</td>
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<td>1999</td>
<td>985.28</td>
<td>59.29</td>
<td>75.15</td>
<td>3.73</td>
<td>149.94</td>
<td>8.87</td>
<td>1282.26</td>
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<td>2000</td>
<td>1196.2</td>
<td>71.02</td>
<td>87.68</td>
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<td>94.69</td>
<td>111.76</td>
<td>8.86</td>
<td>315.34</td>
<td>8.80</td>
<td>2178.41</td>
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<td>Total</td>
<td>10988.81</td>
<td>633.72</td>
<td>718.25</td>
<td>37.48</td>
<td>1313.02</td>
<td>74.52</td>
<td>13770.90</td>
<td>81.800</td>
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Mechanization Research

- Development Focus
RICE THRESHING
(SINDH & BALOCHISTAN)

ISSUES

- Inefficient threshing practices
- Delayed threshing
- High grain losses
- Poor grain quality
**RICE THRESHER**

**TECHNOLOGY HIGHLIGHTS**

- **Output capacity**: 1.5 t/h
- **Operating cost**: US$ 3.2/t
- **Economic benefit**: US$ 3.5/t
- **Potential areas**: Rice growing areas of Sindh & Balochistan
FATE OF WHEAT STRAW

ISSUES

- Environmental pollution
- Wheat straw collection
- Straw losses
- Fire hazards
WHEAT STRAW CHOPPER

TECHNOLOGY HIGHLIGHTS

- Field capacity: 0.3 ha/h
- Operating cost: US$ 21.6/ha
- Economic benefit: US$ 29.8/ha
- Potential areas: Wheat growing areas of the country
ISSUES

- Delayed wheat sowing
- Irrigation water scarcity
- Escalating input cost
- Soil resources degradation
- Environmental pollution
TECHNOLOGY HIGHLIGHT

- **Field capacity**: 0.40 ha/h
- **Operating cost**: U.S $. 11.9/ha
- **Savings**: U.S $. 69.9/ha
- **Potential areas**: Rice-Wheat & Cotton-Wheat areas
FMI SEEDER
FERTILIZER BAND-PLACEMENT WHEAT DRILL

ISSUES

- In-efficient use of fertilizer (phosphorus)
- Improper placement of fertilizer
- WTO preparedness (reduced input cost)
FMI FERTILIZER BAND-PLACEMENT WHEAT DRILL

TECHNOLOGY HIGHLIGHTS

- Field capacity : 0.5 ha/h
- Operating cost : U.S $. 7.9/ha
- Savings : U.S $. 54.2/ha
- Potential areas : Rain-fed & Cotton-Wheat areas
SEED PROCESSING PRACTICES

ISSUES

- Low crops productivity
- Non-availability of quality seeds
- In-efficient traditional practices
- Non-availability of processing machinery
FMI MOBILE SEED PROCESSING UNIT

TECHNOLOGY HIGHLIGHTS

- Output capacity: 2 t/h (Wheat, Mung, Gram)
  1 t/h (Paddy)
- Operating cost: US$ 3.3/t
- Savings: US$ 30/t
- Potential areas: Seed producing areas of Pak
TRADITIONAL DATES DRYING

ISSUES

- In-efficient and un-hygienic practices
- High dates losses
- Poor quality dates
FMI SOLAR-CUM-GAS FIRED DATES DRYER

TECHNOLOGY HIGHLIGHTS

- Drying capacity: 4 t/season
- Operating cost: US$ 66.7/t
- Savings: US$ 33.3/t
- Potential Areas: KhairPur, Muzafargarh, D.I. Khan, Turbat
Vision

- Mechanization strategy formulation
- National Network of Agricultural Mechanization
- Machinery Testing Lab Accreditation
- Grain Drying & Storage
- Agro-Processing Machinery
- Livestock Mechanization
- Energy efficient & environment friendly technologies
- Mechanization Informatics
THANK YOU
FMI CONTRIBUTIONS
(Software)

Testing & Evaluation - Machines Tested

- Prototypes 20
- Commercial/Local 21
- Imported
  - Tractors 20
  - Others 35

Standardization - Standards Developed

- Farm machinery 53
- Plant protection equipment 10
- Earth moving machinery 18
FMI CONTRIBUTIONS
(Software)

Capacity Building:
• Engineers in testing & evaluation of farm machinery
• Extension Officers and farmers in operation, repair and maintenance of farm machinery

Technical Assistance:
• Provided to manufacturers in manufacture of FMI developed technologies

Policy Input:
• Input provided to Government in formulation of farm mechanization strategies for the country
FMI CONTRIBUTIONS

TECHNOLOGIES DEVELOPED

• REAPER-WINDROWER
• GROUNDNUT DIGGER
• GROUNDNUT THRESHER
• SUNFLOWER THRESHER
• ZERO-TILLAGE DRILL
• ROW-CROP PLANTER
• PADDY THRESHER