RESEARCH REPORT FROM MALAYSIA

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Malaysian Agricultural Research & Development Institute
General information concerning all machines being used in MALAYSIA

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Number in use (amount)</th>
<th>Source of data</th>
<th>Average Age (year)</th>
<th>Source of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Tractors</td>
<td>15000</td>
<td></td>
<td>8</td>
<td>Estimate</td>
</tr>
<tr>
<td>Hand Tools</td>
<td>na</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knapsack Sprayer</td>
<td>47,800</td>
<td>NAFAS</td>
<td>1</td>
<td>Estimate</td>
</tr>
<tr>
<td>Mechanical / Combine harvester</td>
<td>2800</td>
<td>NAFAS</td>
<td>10</td>
<td>Estimate</td>
</tr>
<tr>
<td>Post-Harvest Machinery</td>
<td>na</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other machines</td>
<td>na</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COUNTRIES</td>
<td>Number in use (amount)</td>
<td>Source of data</td>
<td>Average Age (year)</td>
<td>Source of data</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------</td>
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<td>--------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>MALAYSIA</td>
<td>2800 (rice combine)</td>
<td>NAFAS</td>
<td>10</td>
<td>Estimate</td>
</tr>
<tr>
<td>CHINA</td>
<td>862,400 (wheat/rice)</td>
<td>MOA</td>
<td>5</td>
<td>Estimate</td>
</tr>
<tr>
<td>THAILAND</td>
<td>41,143 (rice combine)</td>
<td>MOICT</td>
<td>7</td>
<td>Estimate</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>80,700 Grain</td>
<td>Rosstat, 2011</td>
<td>70% &gt; 10</td>
<td>Rosstat</td>
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<tr>
<td></td>
<td></td>
<td>Rosagromash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHILLIPINES</td>
<td>50</td>
<td>PhilRice(^6) (Gagelonia, 2012(^7))</td>
<td>3</td>
<td>PhilRice(^6) (Gagelonia, 2012(^7))</td>
</tr>
</tbody>
</table>
# Market for New and Reconditioned Machinery

<table>
<thead>
<tr>
<th>Item</th>
<th>Machinery/Implement</th>
<th>Number/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>New Tractor 50 to 90 hp</td>
<td>1500</td>
</tr>
<tr>
<td>2</td>
<td>Small (mini) tractor 15 to 45 hp</td>
<td>600</td>
</tr>
<tr>
<td>3</td>
<td>Tractors, recondition</td>
<td>500</td>
</tr>
<tr>
<td>4</td>
<td>Combine harvesters (recondition)</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>2W tractor (Power tiller)</td>
<td>680</td>
</tr>
<tr>
<td>6</td>
<td>Garden tiller</td>
<td>600</td>
</tr>
<tr>
<td>COUNTRIES</td>
<td>MACHINERY</td>
<td>REQ / YEAR</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td>MALAYSIA</td>
<td>Rice combine</td>
<td>45</td>
</tr>
<tr>
<td>CHINA</td>
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<td>-</td>
</tr>
<tr>
<td>THAILAND</td>
<td>Rice combine</td>
<td>600</td>
</tr>
<tr>
<td>RUSSIA</td>
<td></td>
<td>-</td>
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<tr>
<td>PHILIPPINES</td>
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</table>
PADDY COMBINE HARVESTER

» Malaysia is Fully dependent on paddy combine
» All are reconditioned machine from imported scrap wheat combine
» Modified locally to suit paddy
» Major changes made on under carriage and threshing unit
Performance VS Safety

» Priority is performance rather than safety
» % Grain losses must be < 3%
» > 8% rejected by farmer
» Rate must exceed 4 Ha per day
» > 4 Ha, total combine wt > 10 tons & may damage hard pan in low soil bearing capacity
» Reported accidents < 10 annually, or <1%
» Reported injury, fatalities ~ 1 annually
» Mostly unreported because combines not registered
» Cannot enforce insurance scheme

Accident & Injuries
Boy dies after being run over by tractor at padi field

NST 07 May 2012
Brake issue – overturned combine

Parking at edge at soft soil – slides into irrigation cannal

TYPES OF ACCIDENTS
Bogged down at soft spots at low hardpan

Steering wheels get lifted while driving over buns results in header damage

TYPES of ACCIDENTS
Walking along header (leg injury)

Falling on header while seating on grain tank can cause death

TYPES of ACCIDENTS
Driver not aware of passenger dismounting

Dismount while on the move
Gap at unloading auger – leg injury

No protection device at auger – arm injury

TOP VIEW of Grain Tank

Worker pushes grain by leg to empty the grain tank and shirts may get caught by the unloading auger
Dislodged steering wheel can overturn combine
» Matching grants to farmers for small machines only (2 wheels tractors & power tiller)
» Government set-up agency to manage tractors and harvesters
» Grants given to Farmers Organization to purchase Tractors & Combines
» No subsidy for private sectors
Injuries and Fatalities

» Small and Not reported
» Settled between related parties
» No statistics on medical costs related to farm accidents

Machinery Damage

» Usually through tractor bogged down
» Time loss is substantial
» One incident took 12 days to recover machine and cost the owner USD 4,000

Social Costs
Combine harvester Test Rig
Mardi adopts ASABE and PAMI test procedures for combine

Adjustment made to ensure easy evaluation in the fields

Standard field instrumentations, tools, sampling procedures, processing & analysis of data used

Malaysia used this standard procedure developed by MARDI

- American Society of Agricultural and Biological Engineers (ASABE)
- The Prairie Agricultural Machinery Institute – PAMI
KEHILANGAN BIJIRIN OLEH JENTUAI

GRAIN LOSS MEASUREMENT
» Only reconditioned combine in Malaysia, modified from imported scrap wheat harvester
» Major modifications: threshing & under carriage units
» Threshing elements changed from rasp to spike tooth type
» Sieve and straw walker replaced with locally made components
» Header is locally made
» Stainless steel used to increase strength
» MARDI is involved with reconditioning works
NO laws governing combine harvesters. National Legislations and Standardization of Combine harvesters required for:

1. Development of national standard criteria for combine harvesters
2. Establishment of national agricultural testing and evaluating center
3. Establishment of testing and evaluation code and procedures
4. Sales of certified machinery only, hence benefits the consumers
5. Strengthening the research in machinery testing locally
6. Improve quality and growth of local fabricated combine harvesters
MARDI IS REQUESTING $$ FROM GOVT TO FUND THE FOLLOWING ACTIVITIES

1. Establishment of national legislation
2. Development of national standard criteria for combine harvester
4. Development of national testing and evaluating center for agricultural machinery
5. Developing manpower capable of testing and evaluating the machinery in the laboratory
6. Developing manpower capable of testing and evaluating the machinery in the field
THANK YOU