What does mechanization encompass?

- All levels of production technology (incl. livestock)
  - Simple handtools (human power)
  - Use of animal traction equipment (animal power)
  - Motorised equipment
    - Stationary engine-powered (e.g. pumps)
    - Single axle tractors or tractor/trailer combinations
    - 4-wheel tractors and tracklayers
- Post-production/processing (at farm level)
- Rural transport

Mechanization – its Role and Place

- Input to agriculture
- Means to an end not an end in itself
- It should be demand driven
- Type and degree decided by farmer or user
- If used appropriately, it should facilitate environmental sustainability
- Means to reduce human drudgery

The Problem

- How to meet food self sufficiency of an increasing population?
- How can livelihoods be improved, particularly in the rural areas?
- Can the profitability of agricultural production be increased in a sustainable manner?
- How should we promote increased levels of sustainable mechanization?
- How to ensure environmental sustainability?

Global evolution of tractors use

Agricultural intensification in some Asian countries and globally

<table>
<thead>
<tr>
<th>Countries</th>
<th>Agricultural Land (000 ha)</th>
<th>Land irrigated (000 ha) as a percentage of total</th>
<th>Fertilizer (kg/ha)</th>
<th>Mechnization (tractors/1000 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>19,367</td>
<td>25</td>
<td>92</td>
<td>11.4</td>
</tr>
<tr>
<td>Malaysia</td>
<td>7,580</td>
<td>4.6</td>
<td>149.4</td>
<td>5.7</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,800</td>
<td>1.0</td>
<td>5.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Morocco</td>
<td>10,613</td>
<td>18.8</td>
<td>9.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Nepal</td>
<td>3,294</td>
<td>34.7</td>
<td>12.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Germany</td>
<td>31,997</td>
<td>4.7</td>
<td>217.4</td>
<td>85.8</td>
</tr>
<tr>
<td>Brazil</td>
<td>66,580</td>
<td>4.7</td>
<td>107.3</td>
<td>12.1</td>
</tr>
<tr>
<td>Japan</td>
<td>4,762</td>
<td>54.7</td>
<td>212.8</td>
<td>42.3</td>
</tr>
<tr>
<td>World</td>
<td>1,534,466</td>
<td>18.1</td>
<td>90.1</td>
<td>27.5</td>
</tr>
</tbody>
</table>

(Source: FAO, 2001)
What are the main issues?

- Which type and which level of mechanization should be promoted?
- What should be the role of the Public sector?
- What should be the role of the Private sector?
- How can best be invested in sustainable mechanization development?

Stakeholders in SAMS

Private Sector
- Mechanization demand
  - Smallholder farmers
  - Commercial farmers
  - Farmer organizations
  - Irrigation groups
  - Crop processors
  - Rural transporters

Public Sector
- Mechanization supply
  - Importers
  - Manufacturers
  - Blacksmiths
  - Distributors
  - Machinery support services

Sustainable Agricultural Mechanization Strategies (SAMS) FAO / UNAPCAEM, Bangkok, 8-9 Dec. 2011

Private Sector Public Sector

What is the basic principle?

- A manufacturer could make his product more profitable by increasing the price
- But then perhaps the farmer could not afford the product
- Sales would then drop and the manufacturer would still remain unprofitable
- Each of these must be able to develop a PROFITABLE business
- It is clearly a complicated system which merits careful analysis

The Agricultural Mechanization System

International environment

End users

Sub sector:
- Retailers and Wholesalers
- Manufacturers
- Importers

The Role of the Government

Policy
- Exchange rate policies
- Policies influencing relative agricultural input prices
- Policies influencing agricultural product prices
- Policies influencing farm and non-farm employment
- Land ownership and tenure policies
- Agrarian institutions
- Farm power research policy
- Infrastructure policy
- Agricultural financial markets
- Industry policy
- Transport policy and motive power

The Role of the Government
Institutional Aspects

- Research and Development in mechanization
- Testing and quality assurance
- Education and training in mechanization sector
- Extension services (private/public)
- Mechanization Departments in the MOA
- Consumer protection

What is the aim of a SAMS?

- The creation of effective linkages between each group of stakeholders
- Addressing the issues which affect the profitability of these groups
- Identification of the basic conditions that national governments could provide for a largely self-sustaining development of agricultural mechanization

Such actions should normally be planned within a policy of minimum or at least very carefully placed direct interventions

Approach for formulating an SAMS

- Agricultural mechanization is a very complex process
- Its development depends on many country-specific factors
- It involves a wide range of stakeholders

If the SAMS is to be “owned” then all stakeholders must be involved in its formulation

A PARTICIPATORY and HOLISTIC approach is recommended

Two aspects for analysis

- The DEMAND side
  - The farmers of course, but also
  - Production systems and methods?
  - Resource ownership?
  - Gender aspects
- The SUPPLY side (or Offer)
  - The suppliers of course, but also
  - National policies for tax, trade...
  - Availability of raw materials...

Role of AMS: it is only one of the Government policies

Role of SAMS: Outputs

- Programs and projects oriented towards resource efficiency and environmental sustainability
- Components that can be incorporated into other agricultural development projects

Government policies

SAMS

Strategy II

Strategy III

Strategy...
Pre-conditions to start to formulate an SAMS?

- Is there an expressed political will?
- Is it recognised that there are bottlenecks for developing the agricultural sector?
- Is the timing right for the exercise?
- Is there awareness of the role and place of sustainable agricultural mechanization?

Preparation for SAMS formulation

- Under which government institution should the exercise be based? (Is there a sector-planning unit within the MOA?)
- Have sufficient funds been allocated?
  - The formulation could be locally funded or supported with technical assistance from FAO/UN
  - FAO has supported such exercises in many countries through Tech. Coop. Projects (TCP)

Who should lead the formulation?

- Identify a National team
- Identify a National Coordinator
- Appoint a Steering Committee to guide and oversee activities (normally also include members from the private sector)
- External technical assistance

How to Formulate a Strategy?

- Analyse the existing national farm mechanization situation
- Define the actions to move from the existing situation to the optimum future situation
- Organise implementation and follow-up

The Formulation process

Step 1 Prepare Diagnostic
Step 2 Finalise Diagnostic Report
Step 3 Formulate Strategy and Action Plan
Step 4 Prepare to Implement

A typical time frame for the complete process is from 12 to 18 months

Thank you

Ensuring good participation

- Interview a wide range of stakeholders
- Organise participatory Workshops and discussion groups

When are Workshops useful?

- At Inception to explain and discuss the Methodology
- During the Diagnostic process – often several are arranged, some on specific topics
- During the Formulation of the Strategy and Action Plan. Again some specific subjects might receive special focus or Workshops such as for Gender, Conservation Agriculture, ...
- For Presentation of the proposals to invite clarifications or comments