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HUMAN RESOURCES FOR MECHANIZATION

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WHO ARE INVOLVED IN AGRICULTURAL MECHANIZATION?

- Agricultural mechanization as a supply chain
- All stakeholders need to make profit in the chain

1. Producers of agricultural machinery
2. Traders, exporters, importers, and dealers
3. Financiers
4. Repair and maintenance service providers
5. Custom hiring service providers
6. Operators
7. Farmers

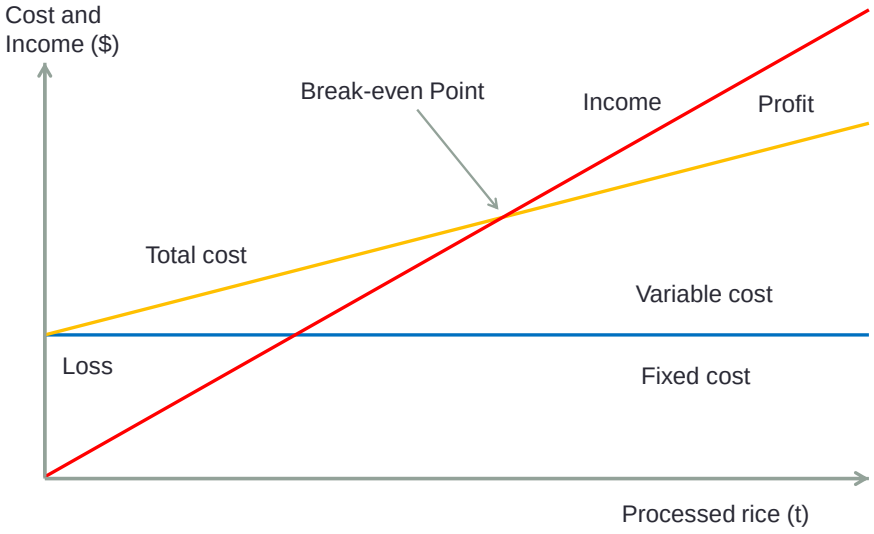
Agricultural Mechanization Stakeholders (Private Sectors)

Actors on value chain	Check list (enabling environment, capacity etc.)
International manufactures	Warranty on exported machinery, Quality assurance, Assurance of supplying spare parts
Importing agents	Adequate stocks for immediate delivery, Local assembling
Domestic manufactures	Quality control and warranty of products,
Material suppliers	Supply materials and machine elements
Dealers	Repair and maintenance imported machines, stocks of standard spare parts, Operator instruction, In-house credit
Local workshops	Periodical and preventive maintenance,
Financiers	Low interest credit, Long repayment period,
Custom hiring providers	Information network, Access by farmers, High rate of operation,
Milling service providers	Accessible location, High rate of operation
Machine operators	Farming experience, Daily inspection
Small scale farmers	Farmer organization, saving & credit, collective shipment,
Animal draught power	Veterinary service, Skilled trainers,

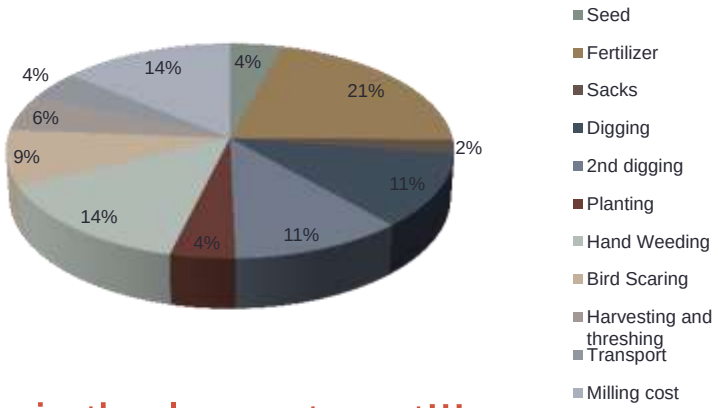
Agricultural Mechanization Stakeholders (Public Sectors)

Actors on value chain	Check list (enabling environment, capacity etc.)
Ministry of Trade	Import tariff exemption for agricultural machinery, spare parts and raw materials, Tax reduction on importers, Distribution network for spare parts
Ministry of Industry	Engineering standard, Quality control, Training on technicians, SME promotion on agricultural machinery,
National Standard Agency	Engineering standard, Quality control,
Ministry of Agriculture	Policy & strategy on agricultural mechanization, Agricultural mechanization promotion act, Statistical data on agricultural machinery, Agricultural credit, Farmer organization, Agricultural input subsidies, Extension services, Operator training
Local Government	Farmer organization, Agricultural input subsidies, Extension services,
Agricultural machinery R&D institute	Safety Inspection, Test & evaluation, Certification, Training for local artisans
Universities	Qualified agricultural engineers
Training Institutes	Qualified technicians

IS MECHANIZATION PROFITABLE?



Cost for One Acre Upland Rice



Labor is the largest cost!!!

CAN WE MECHANIZE RICE FARMING?

Hand weeding = 2500 Ush x 2 persons x 10 days
= 50,000 Ush x 2 times = 100,000 Ush

Rotary weeder = 100,000 Ush
Life span = 4 years
Repair cost = 10% of initial cost
Labour saving = 50%

Rotary weeding = 2500 Ush x 1 person x 10 days
= 25,000 Ush x 2 times = 50,000 Ush
Annual weeder cost = 100,000 / 4 + 100,000 * 0.1
= 35,000 Ush

Mr. Gideon Gitungo Kingangi
Hire service, Tour van operator
Machine ownership

Down payment 30%, 2year loan、Interest rate15%

- CASE JX80 4WD (2009) 3.4mill. shs
- Disc Plow 3x66cm 0.4mill. shs
- Disc Harrow 24x56cm 0.4mill. shs
- MF165 (1980)

Service fee

- Disc Plow 2000Kshs/acre
- Disc Harrow 1000Kshs/acre

10acre/day x 25days/mo x 10 mo/year x 2,000shs
=5,000,000/year

Major cost

- Fuel 600shs/acre x 10acre/day x 250days = 1,500,000
- R&M 500,000Kshs/year
- Operator 5,000,000 x 10% = 500,000 +food +hotel

REQUIREMENTS FOR MANAGERS

1. Preparation or resources
   Preparation of fund, procurement of land, labour
2. Technical management of production process
   Preparation of seed, fertilizer Tillage to harvest
3. Sales and marketing
   Processing, value addition
4. Recording and sorting
   Costing
5. Information collection and analysis
   Technical information, price information, funding
6. Capital build-up
   Renewal of equipment

FIXED COST MATTERS

- Rice mill 500kg/h capacity
  Japanese 12,000 USD$ (Chinese 4,000US$)
  20HP Engine: 2,000US$

Life span: 10 years Building: 24,000US$
Depreciation = 14,000$/10 + 24,000$/20 = 2,600$/year
Maintenance cost 20% =2,800$/year
Interest cost 20% = 2,800$/year
Management cost = 10,000$/year total fixed cost = 17,800$/year
Working hours = 6 hours/day
Fuel cost 2L/h = 3$/h x 6h = 18$/day
Labor cost 2$/day x 4 persons = 8$/day

Milling charge 0.04/kg =0.04x500kgx6h=120$/day

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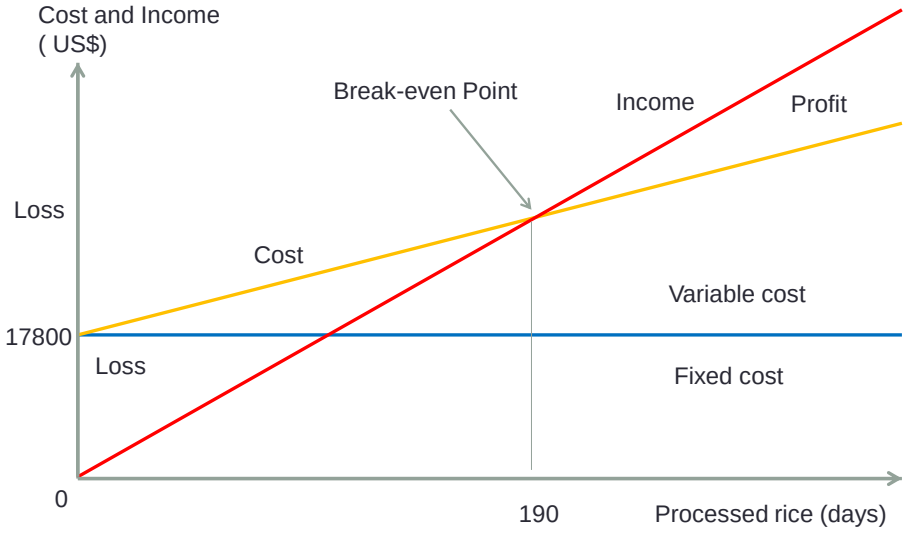
IS RICE MILLING A GOOD BUSINESS?



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RICE MILLING IS NOT AN EASY BUSINESS

- Rice mill 500kg/h capacity

  Working hours = 190days x 6 hours/day
  = 1140 hours
  Processed paddy = 1140h x 500kg
  = 570 tonnes

Where can we get 570 tonnes of paddy?
Assuming 2t/ha of yield = 285 ha required
One rice farmer has only 0.5 ha, then 570 farmers required.

- Who can invest 38,000US$?
- Initial cost:Rice mill 500kg/h:12,000 $
  20HP Engine: 2,000$
  Building: 24,000$
  Total: 38,000$

ENABLING ENVIRONMENT FOR PPP IN SSA?

Government commitment with clear mechanization policy and strategy with concerned ministries

Direct public investment that does not disturb private investment

Available human resources

Reduction of business risks

Infrastructure development for domestic industry

Business system for sustainable agricultural inputs

Protection of investors

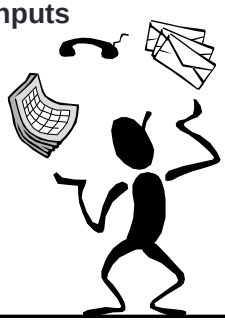
Tariff reduction

Cost reduction

Creation of mechanization demand

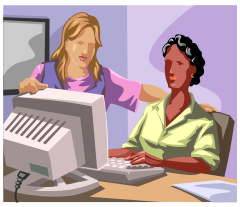
Protection of customers

Financial support and purchase subsidies



Private-Public-Partnership (PPP) Role of Government

- Health and safety
- Labor law
- Training
- Industrial development
- Manufacturing standards
- Machinery testing and evaluation
- Licensing
- Credit
- Business promotion and development
- Market infomation and promotion



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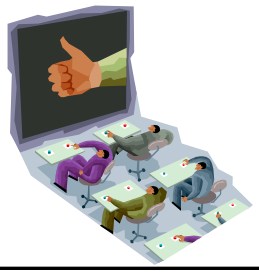
WHO CAN PROMOTE PPP IF WE DON'T HAVE ENOUGH AVAILABLE HUMAN RESOURCES?

- Who can bring enabling environment of PPP?
- All stakeholders? Who can be the driving force?
- Let's examine availability of human resources in terms of quality and quantity for each stakeholder.
- What capacity are they expected to have?
- Do they have enough capacity?
- If not, how can we build their capacity?



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STAKEHOLDER ANALYSIS

- Let us list up the members of the taskforce
- Let us consider characteristics of the taskforce
- Let us conduct SWOT anaysis on the taskforce

- Can you cover the weakness of the taskforce?
- Is there any necessary inputs from outside?
- What actions are needed to utilize opportunities?
- Are they more controllable or not?

- Can the taskforce reduce threats and risks?
- What are the necessary external force to do that?

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SWOT ANALYSIS

- Let us know more about our target groups, FARMERS and USERS.
- Let us know more about our target areas, MARKETS.
- What are the under utilized resources?

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EXAMPLE OF SWOT FOR A LOCAL MANUFACTURER

	Preferable	Unpreferable
Internal	Short time for product development Motibated labor force Stable product quality Increasing number of customers Electricity interuption is frequent Fuel cost is increased Recent investment in factory S	Little product line up Sales is not increased in two years Payment for labor is not increased Analysis on information is stagnated Managers are not nurtured Management plan is not executed W
External	Government provides soft loan Local steel factory is established IT infrastructure is improved University provide technical support Tariff on machine element is reduced O	Cheap machines are imported More pressure on price reduction Reduced order from donnors High cost for envionment conservation More small competitors Market scale is not enlarging T

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CAN WE BUILD THE CAPACITY OF MECHANIZATION STAKEHOLDERS USING EXISTING INSTITUTE?

- What institutes are existing in the country for human resources development concerning mechanization?
- Can they provide intended training to capacitate the stakeholders?
  - Do they have enough quality staff to provide training?
  - Do they have enough facilities and equipment?
- If they are not able to do it, what alternative do we have?
  - Do we need to increase quality staff?
    - Conducting training of trainers
    - Hiring new quality staff
  - Can we use other institutes for the above function?
  - Do we need to establish new institute?

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LISTING OF INSTITUTIONS

NAME	STAFF	FACILITIES	TARGET	REMARKS
ABC AGRICULTURAL TRIANING CENTRE	4 ADMIN 2 ENGINEERS 4 SCIENTISTS 5 TECHNICIANS 12 SUPPORTS	4 CLASS RM 2 WORKSHOPS 4 TRACTORS 1 SEEDER 1 SPRAYER 1 HARVESTER	20 TECHNICIANS (1 YR COURSE) 80 OPERATORS (1WK COURSE)	REHABILITATION IS NEEDED REPLACEMENT OF EQUIPMENT
(REQUIREMENT)	2 ENGINEERS 3TECHNICIANS	1 POSTHARVEST W/S RICE MILLS RICE GRADERS	10 SENIOR TECHNICIANS 10 POSTHARVEST TECHNICIANS	REHABILITATION ($750000) EQUIPENT ($250000)
DEF UNIVERSITY DEPT.OF AGRIC. ENGINEERING	5 ADMIN 1 PROF 1 ASSOC. PROF 1 ASST. PROF 1 ENGINEER 4 TECHNICIANS 10 SUPPORTS	1 MECH. LAB 1 MECH. W/S 1 AGRIC. W/S	24 BSC IN AGRIC. ENGR.	LESS PRACTICAL WORK
(REQUIREMENT)	1 PROF 2 ASST. PROF 1 ENGINEER 2 TECHNICIANS	POSTHARVEST LAB POSTHARVEST W/S	10 MSC IN AGRIC. EGR. BSC IN POSTHARVEST	NEW COURSE FIELD ATTACHMENT

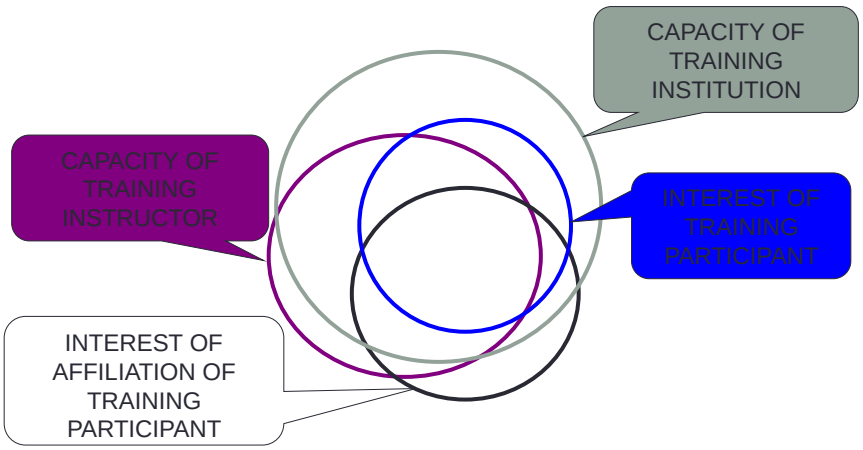
PROBLEMS IN TRAINING SYSTEMS

- TARGETING
  - TRAINING PARTICIPANTS
  - ORGANIZATION OF PARTICIPANTS
- CAPACITY
  - ABILITY OF INSTRUCTORS
  - CAPACITY OF INSTITUTIONS
- DISORGANIZED DESIGN
  - UNCLEAR OBJECTINES
  - UNCERTAIN GOAL SETTING
  - DISORGANIZED SESSIONS
  - UNMATCHED METHODS
  - …

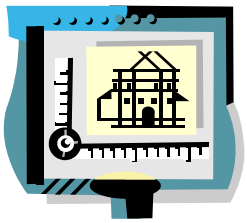
WHO ARE INVOLVED IN TRAINING?

- TRAINING PARTICIPANTS
  - PARTICIPANTS
  - COLEAGUES OF PARTICIPANTS, BOSS
- INSTRUCTORS
  - LECTURERS
  - TECHNICIANS
  - ASSISTANTS
- COOPERATING ORGANIZATIONS
  - PRACTICE
  - FIELD VISIT
- COURSE MANAGERS
  - COORDINATOR
  - ADVISORS

DIFFERENT INTERESTS AND CAPACITIES

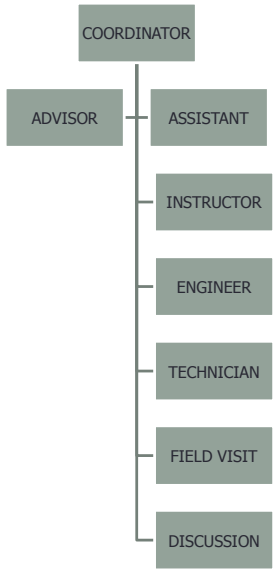


TRAINING COURSE DESIGN



- TRAINING PURPOSE
  - KNOWLEDGE
  - SKILL
  - ATTITUDE
- TRAININGA TYPE
  - SEMINAR
  - PROBLEM SOLVING
  - TECHNOLOGY TRANSFER
  - THEORY
  - PRACTICE
- COURSE LAYOUT
  - PRE-REQUIREMENT
  - ADVANCEMENT
- TIME ALLOCATION

DESCRIBING TRAINING SYSTEM



- WHAT IS THE TRAINING PURPOSE?
- WHO ARE TRAINEES?
- HOW MANY SECTIONS ARE TAUGHT?
- WHAT RESOURCES DO WE HAVE?
- WHAT LIMITS AND CONSTRAINTS ARE THERE?
- HOW IS THE COURSE HUNDLED?
- ARE THEIR SPECIAL PROBLEMS?

- WHAT ARE IMPORTANT CHARACTERISTICS OF THE TRAINING SYSTEM?
- WHAT MEANS ADVOCATED TO ACCOMPLISH THE PURPOSE?

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WHO CAN WORK FOR HUMAN RESOURCE DEVELOPMENT IN AGRICULTURAL MECHANIZATION?

- Taskforce members (example)

1. Ag. Director - Policy debate and legislation (Chairperson)
2. Engineer - Technical backstopping
3. Ministry of Finance – Tax and tariff, incentives
4. Ministry of Trade and Industry - SME, standard
5. Financial institution – loan support
6. Representative of domestic manufacturers
7. Representative of importers/dealers
8. Representative of processors/rice millers
9. Representative of farmer forum
10. NRDS Focal Person – Coordinator/Secretariat

Can Mechanization Taskforce mobilize all stakeholders?

IS MECHANIZATION A PROBLEM?

LET'S TAKE ACTIONS TO SOLVE IT!