

# MECHANIZATION FOR SAT BRAZIL

by

HARBANS LAL

## DEFINITION OF MECHANIZATION

Agricultural Mechanization is generally defined as the usage of mechanical linkages for agricultural operations. The operations can range from processing seed for planting to harvesting and storage. The mechanical linkages can be from simple hand tools to sophisticated tractors or aerocrafts for aerial spraying. Advantages of mechanization are well established in terms of efficient utilization of power source, improvement in timeliness of operation, and reduction in the drudgery of the operator. which ultimately results in higher yield with low inputs. The higher yield in results due to uniformity of operation maintained with mechanical means and mechanised agriculture minimising the possible human variations. The typical example is the uniformity of seeding and fertilization patterns achieved, when done by machinery as compared to manual drilling.

## APPROACHES OF MECHANIZATION

In general three approaches are followed for mechanization:

- (a) Evaluation of traditional equipment and modifications.
- (b) Development of new equipment.
- (c) Importation of technology and making it locally adopted.

### (a) Evaluation of traditional equipment and modifications

The traditional equipment package is generally the result of farmer's own experience of ages. This package is well suited for traditional farming systems. The traditional system has low production level and requires simple equipment and has less versatility. It is possible to develop these equipment and make it better precise, but chances of substantial gain by these processes are rather minimal. Certain features which are location specific can always be picked up from the traditional equipment package while designing new equipment. It is worth mentioning here that no mechanization program can be a success until and unless the present status of mechanization is thoroughly understood.



(b) Development of new equipment

This approach of mechanization is most suited for the developing regions if handled properly. The development of new equipment package should be in tune with the systems of cultivation which has higher production potentials. New equipment developed are slightly costly as compared to traditional equipment, and it is always desirable to put new equipment as a component of improved farming systems rather than an individual component in isolation. Either an established and/or prospective manufacturer, of agricultural implement should always be involved in the development process of improved equipment. This helps considerably in popularising new equipment once it becomes a production model.

(c) Importing technology and making it locally adopted

This approach of mechanization has a definite advantage in terms of low development cost requirement, but due to import restriction in many developing countries (including India and Brazil), it is not very easy to follow this approach of mechanization. This approach of mechanization, though, solves mechanization problems easily at research Centre, but finds difficulty in extension. The whole process of getting in manufactured with locally available material at the cost level acceptable to farmer is time and human resource consuming.

MECHANIZATION FOR SAT BRAZIL

Because of the diversity of field locations, the equipment package which can be owned by the farmers for its field location(s) be better suitable for the Brazil SAT farmers. The immediate requirement of the Brazilian SAT farmers is low cost, simple equipment. Taking these points into account the mechanization program of CPATSA/EMBRAPA should put major emphasis on the following components of mechanization.

1. Evaluation of present status of mechanization.
2. Collection, testing and evaluation of available equipment.
3. Development of Brazilian tractor and its attachments.

My colleague Mr. Péicles Ferreira Nunes will discuss some of the project proposal, we plan to undertake in next few months.

PROJECT OUT LINE

1. NAME: Harbans Lal
2. TITLE OF POSITION: Specialist on agricultural mechanization
3. OBJECTIVE: To participate with CPATSA specialist in activities geared to strengthen the farm machinery program technical capacity by planning, execution and evaluating research on farm machinery suited for the cropping systems adopted to the semi-arid tropics.
4. ACTIVITY: To strengthen Semi-Arid production Systems.
5. DESCRIPTION OF ACTIVITIES FOR VARIOUS RESPONSIBILITIES:
  - 5.1 To analyze the problems and needs of mechanization
    - 5.1.1 Identifications of locations of on-farm situation to monitor the present mechanization status.
    - 5.1.2 Identification and selection of two or three persons to monitor the operations. Qualification and experience desired for these persons are given in appendix I.
    - 5.1.3 Training the selected persons to monitor the operations.
    - 5.1.4 Actual monitoring the operations as for schedule of appendix II.
  - 5.2 To test and/or adapt agricultural machinery or equipment available locally
    - 5.2.1 Survey the available equipment by visiting the farmers' field and agricultural implement industries.
    - 5.2.2 Procure the equipment look promising for S.A.T. (Semi Arid Tropics) Brazilian Agriculture.
    - 5.2.3 Test and evaluate these equipments.
    - 5.2.4 Based upon the test performance, decide which of these equipment can be used as such, which of them need modifications and which of them need to be re-design of and re-constructed.
  - 5.3 Design construct and evaluate manual, animal, and mechanical farm machinery and equipment.
    - 5.3.1 Based upon the results of the test/evaluation of available equipment and the discussions with the specialists of EMBRAPA, decide the priorities for development of new equipment.
    - 5.3.2 Development of new equipment.

5.3.3 Testing and evaluation of developed equipment.

5.4 Development of inservice training programs for researchers of CPATSA and other units of EMBRAPA

5.4.1 Study the results of first three activities.

5.4.2 Gather information about various EMBRAPA units either through discussion with CPATSA researchers or through visiting these centres personally.

5.4.3 Prepare in-service training programs for researchers of EMBRAPA.

5.5 Advise and guide thesis research projects

5.5.1 As and when opportunity comes.

5.6 To prepare documents and technical reports

5.6.1 As and when requested and need arises.

5.7 To cooperate with the head of CPATSA for multidisciplinary research

5.7.1 Always available.

## AGRICULTURAL MECHANISATION FOR SAT BRAZIL

### GENERAL OBJECTIVE:

To study the present status of mechanisation in the SAT of Brazil and to define and design possible alternatives (approches) for improvement.

### JUSTIFICATIONS:

It is well established and that mechanisation in agriculture reduces durgery of the farmer, results in less energy requiriment and improves timeliness of the operations. This ultimately results in higher yield with low inputs. The mechanisation aspect of SAT (Semi Arid Tropics), Brazilian agriculture need to be studied in detail. This project is designed to study the present status of mechanisation and design and develop improved equipment for efficient utilisation of available power sources.

### SPECIFIC OBJECTIVES:

1. To analyse the problem and needs of mechanisation and to define research priorities to produce farm machinery and equipment effeciently adopted to different cropping systems.
2. To test and/or adapt agricultural machinery or equipment available locally to improve its effeciency and to suggest modifications or improvement to the manufactures.

### Project Scientists:

1. Péricles Ferreira Nunes
2. Harbans Lal

### Collaborating Scientists:

1. Manuel Abílio de Queiroz
2. Geraldo Magela Calegar
3. Octávio Pessoa Aragão
4. Luis Corsino Freire

### SUPPORT STAFF AND FACILITIES:

1. Field staff - 2 or 3
2. Work shop facilities

### PROCEDURE:

To identify and select 2 to 3 locations of on farm situation and to monitor the operations in the detail. Operations to be monitored in a standard format as shown in appendix I.

2. To visit certain implement manufactures and yo identify and purchase equipment look promising for animal power.
3. To adpt and develop a loccaly avaiable horse-cart to work as a multitool carrier.
4. To adapt the selected/pruchased equipment for broad-bed and furrow (ridge and furrow) systems of cultivation.
5. To test and evaluate the develop and/or adapted equipment in the field.

OBSERVATION:

1. Refer appendix I
2. Cost of equipment/implement purchased
3. Operation cost
4. Field Capacity (ha/hr)
5. Cost of multitool carries planned to be develop
  1. Material cost
  2. Labour cost
  3. Development cost.

## APPENDIX I

### QUALIFICATION AND EXPERIENCE DESIRED FOR THE PERSONS TO MONITOR THE OPERATIONS OF ON-FARM SITUATIONS.

- Higher secondary, with the knoweldge of field operation, and with the technical competence to measure the area and record the timings of the operations.

type of soil.

Location

(X)

PRESENT STATUS OF MECHANISATION SCHEDULE

DATE	AREA	OPERATION	MACHINE USED	TIME / <del>TAKEN</del>		POWER - INPUT			SIGNATURE RECORD
				START	FINISH	MANUAL	ANIMAL	MECHANICAL	
1/1	2.0 ha	Plowing	Plow	8	12		✓		
			1 ha						
									Labo
									1 Animal day
									Plenty
									Plow Hand 1/2 2/3 1/3
									No.
									Time a va

