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# Assessment of level of mechanization in selected crops of north Karnataka

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■ **ABSTRACT :** The level of agricultural mechanization for each field operation in different crops of North Karnataka were measured and analyzed. The purpose of the study was to determine the level of mechanization for each field operation in paddy, maize and pigeonpea crops. Data were collected from a sample of 240 farmers in which paddy, maize and pigeonpea growers constituted 80 each. Tillage/land preparation operations such as ploughing, harrowing and other field operations (puddling, leveling and clod crushing) and threshing operation had high level of mechanization compared to operations like sowing/transplanting, weeding and harvesting. Deficit or non-availability of sufficient farm machinery with the farmers was observed. In order to solve this problem, the availability of implements/machinery, skilled labours and repair centers should be increased for timeliness of operation.

■ **KEY WORDS :** Level of mechanization, Paddy, Maize, Pigeonpea

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The technological improvements in Indian agriculture since mid sixties have brought about revolutionary increase in agricultural production. The country was facing acute food shortages till eighties has now become not only self sufficient but also a net exporter of food grains. This has been made possible due to evolution of high yielding crop varieties, increased use of chemical fertilizers, development of irrigation facilities and plant protection measures accompanied by effective price support programmes for farm produce. The increased use of purchased inputs in agriculture necessitated to raise their use efficiencies through mechanization. The increase in the use of human and bullock labour, rising wage rates and cost of up-keep of bullock has made the case of farm mechanization still stronger.

The adoption of agricultural mechanization in India is increasing continuously. In 2007, India had 3.149 million agricultural tractors and 0.477 million which accounts for both combine harvesters and theshers (Padmavati and Mahaswetha, 2011). In 2013, India produced 6.19 million agricultural tractors and 0.60 million combine harvesters and threshers accounting for 29 per cent of world's output, as the world's largest producer and market for tractors.

India currently has 16 domestic and 4 multinational corporations manufacturing tractors. This demonstrates an increasing awareness and popularity of mechanized farming in the country. As the focus is now on evergreen revolution, each farmer need to have sufficient farm implements which consumes less energy to achieve self sufficiency in the production. In this context the present

study was undertaken to assess the level of mechanization for each operation in selected crops of North Karnataka.

## METHODOLOGY

The present study was conducted in North Karnataka during the year 2016-17. Based on cropping pattern three districts Uttar Kannada, Belgavi and Vijayapura were selected for paddy, maize and pigeonpea crops, respectively. From each district two taluks were selected and from each taluk two villages were selected. From each village 20 farmers were selected comprising 10 large farmers and 10 small farmers using stratified random sampling thus making a total of 240 as the sample size. Personal interview method was followed for data collection using a interview schedule developed for the study. Statistical tools mean and t-test have been used for the study.

Level of mechanization was measured by using the formula given by Olaoye and Rotimi (2010)

**Level of mechanization LM** :

Corresponds to use of machinery with mechanical energy source under direct human control.

**LM = 0.2*N.TM/A** KWh/ha

where;

LM = Work outlay of a motorized machine

0.2 = Corrector co- efficient of the tractor-powered machine.

N = Horse power of the tractor (KW)

TM = Time used (h)

A = Area of land (ha)

Mean values for each operation were calculated for each crop. To find out the difference in means of two categories *i.e.*, small and large farmers t-test was used.

## RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

**Operation wise level of mechanization in paddy :**

Table 1 represents the operation wise level of mechanization in paddy. Level of mechanization was high in ploughing operation (15.29 KWh/ha) followed by threshing (14.56 KWh/ha). Other field operations like puddling and leveling constituted 7.86 KWh/ha followed by harrowing (4.48 KWh/ha), sowing (3.54 KWh/ha) and weeding/intercultivation (3.09 KWh/ha). Mechanization was observed low in harvesting operation which was 0.78 KWh/ha (Table 1).

Mechanization was observed low in harvesting operation. Majority of the farmers performed the operation manually. Only few farmers used paddy reaper for performing harvesting operation.

There was a significant difference in ploughing and harvesting operations between small and large farmers. Large farmers have used tractor operated M B plough for ploughing the field and few of them used paddy reaper for harvesting operation. While, small farmers used country plough (bullock drawn) for ploughing operation and harvesting has been done manually.

**Operation wise level of mechanization in maize :**

Table 2 shows the operation wise level of mechanization in maize. Level of mechanization was high in harrowing operation (15.81 KWh/ha) followed by ploughing (15.21 KWh/ha). Other field operations like

**Table 1: Operation wise level of mechanization in paddy** **(n=80)**

| Sr. No. | Operation | | Level of mechanization (KW.h/ha) Paddy (Uttar Kannada) | | | t-values |
|---|---|---|---|---|---|---|
| | | | Overall | Small farmers (< 5 acres) | Large farmers (>5 acres) | |
| 1. | Land preparation | Ploughing | 15.29 | 12.15 | 18.43 | 2.46** |
| | | Harrowing | 4.48 | 3.75 | 5.22 | 0.99NS |
| | | Other field operations | 7.86 | 7.56 | 8.17 | 0.45NS |
| 2. | Sowing/Transplanting | | 3.54 | 3.45 | 3.63 | 0.25NS |
| 3. | Weeding/Intercultivation | | 3.09 | 2.84 | 3.35 | 0.61NS |
| 4. | Harvesting | | 0.78 | 0.53 | 1.03 | 4.80** |
| 5. | Threshing | | 14.56 | 13.29 | 15.84 | 1.03NS |

* and ** indicate significance of values at P=0.05 and 0.01, respectively
NS=Non-significant

**Table 2: Operation wise level of mechanization in maize** **(n=80)**

| Sr. No. | Operation | | Level of mechanization (KW.h/ha) Maize (Belgaum) | | | t-values |
|---|---|---|---|---|---|---|
| | | | Overall | Small farmers (< 5 acres) | Large farmers (>5 acres) | |
| 1. | Land preparation | Ploughing | 15.21 | 11.25 | 19.17 | 3.10** |
| | | Harrowing | 15.81 | 12.09 | 19.54 | 2.74** |
| | | Other field operations | 8.71 | 7.37 | 10.06 | 0.93NS |
| 2. | Sowing/Transplanting | | 5.07 | 2.89 | 7.26 | 3.16** |
| 3. | Weeding/Intercultivation | | 0.90 | 0.62 | 1.19 | 3.82** |
| 4. | Harvesting | | 5.10 | 4.45 | 5.76 | 2.54* |
| 5. | Threshing | | 13.63 | 10.08 | 17.19 | 9.52** |

* and ** indicate significance of values at P=0.05 and 0.01, respectively
NS=Non-significant

**Table 3: Operation wise level of mechanization of pigeonpea growers** **(n=80)**

| Sr. No. | Operation | | Level of mechanization (KW.h/ha) Pigeonpea (Vijayapura) | | | t-values |
|---|---|---|---|---|---|---|
| | | | Overall | Small farmers (< 5 acres) | Large farmers (>5 acres) | |
| 1. | Land Preparation | Ploughing | 17.56 | 15.50 | 19.62 | 1.14NS |
| | | Harrowing | 10.96 | 8.65 | 13.27 | 2.17* |
| | | Clod crushing | 5.98 | 5.75 | 6.21 | 0.76NS |
| 2. | Sowing/Transplanting | | 6.18 | 5.64 | 6.73 | 1.16NS |
| 3. | Weeding/Intercultivation | | 10.10 | 9.15 | 11.06 | 1.69* |
| 4. | Harvesting | | 7.43 | 6.36 | 8.51 | 2.35* |
| 5. | Threshing | | 5.87 | 3.64 | 8.10 | 4.52** |

* and ** indicate significance of values at P=0.05 and 0.01, respectively
NS=Non-significant

clod crushing and leveling constituted 8.71 KWh/ha followed by harvesting (5.10 KWh/ha) and sowing (5.07 KWh/ha). Mechanization was observed low in weeding/ intercultivation operation which was 0.90 KWh/ha (Table 2).

Mechanization was observed high in harrowing and ploughing operations. Majority of the farmers performed land preparation operations using suitable farm machinery such as M.B. plough, harrow, cultivator and rotovator.

There was a significant difference in ploughing, harrowing, sowing, weeding, harvesting and threshing operations between small and large farmers. Large farmers utilization and possession of farm machinery and implements was more compared to small farmers.

## Operation wise level of mechanization in pigeonpea:

Table 3 represents the operation wise level of mechanization in pigeonpea. Level of mechanization was high in ploughing operation (17.56 KWh/ha) followed by harrowing (10.96 KWh/ha). Weeding/intercultivation constituted 10.10 KWh/ha followed by harvesting (7.43 KWh/ha), sowing (6.18 KWh/ha) and clod crushing (5.98 KWh/ha). Mechanization was observed low in threshing operation which was 5.87 KWh/ha (Table 3).

Mechanization was observed high in ploughing operation as majority of the farmers used M B plough for performing the ploughing operation.

The t-test revealed a significant difference in harrowing, weeding/intercultivation, harvesting and threshing operations between small and large farmers. Use of combine harvesters and possession of other farm machinery/implements was more with large farmers compared to small farmers.

## Conclusion :

Farm mechanization helps in timely performing of operations in the field. Tillage/land preparation operations such as ploughing, harrowing and other field operations (puddling, leveling and clod crushing) had high level of mechanization compared to operations like sowing/ transplanting, weeding, harvesting and threshing. Deficit or non-availability of sufficient farm machinery/

implements with the farmers was observed. Most of the farmers were using the farm machinery and implements of neighbouring farmers who possess them (custom hiring). Even though custom hiring centers have been established in some places, farmers' access to them was found low. Whenever the farmer is in need of the implement/machinery it was found that the implement/ machinery is already engaged to some other farmer. Non availability of repair centers makes maintenance of farm machinery/implements difficult. In order to solve these problems, the availability of implements/machinery, skilled labours and repair centers should be increased for timeliness of operation.

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