Assessment of Mechanization Index in Sugarcane Cultivation: A Case Study in Mandya District, Karnataka

Abstract

Farm mechanization is the development and introduction of mechanized assistance of all forms and at any level of sophistication in agricultural production to improve efficiency of human time and labour. Mandya District is one of the most agriculturally prosperous districts in Karnataka. Sugarcane is the major commercial crop in district. Farmers used to grow in all seasons. This study was carried out to assess the mechanization index in sugarcane cultivation in selected region. Respondents from selected region were selected randomly and collect the information regarding machineries availability and usage in sugarcane cultivation. The overall mechanization index found 50.5 percent in sugarcane cultivation in selected region. Semi medium farmers found high mechanization index followed by medium, small and marginal farmers. The mechanization index was not uniform in selected region for all operations in sugarcane cultivation. Seedbed preparation found higher mechanization index followed by irrigation and weeding operation and zero percent mechanization index for planting and harvesting operations of sugarcane. The results clearly depicted the importance of the farm mechanization in realizing additional profit to the farmers. Government should create awareness among the farmers about existence of equipments and existence of custom hiring centres and adequate measures should be taken to promote mechanization for planting and harvesting of sugarcane.

Keywords: Sugarcane, Farm mechanization, Mandya, Karnataka, Mechanization index

1. Introduction

Agricultural mechanization is enabled by technologies that created value in agricultural production practices through the more efficient use of labour, the timeliness of operations, and more efficient input management with a focus on sustainable, high-productivity systems (Reid, 2011).

Mandya District is one of the most agriculturally prosperous districts in Karnataka. With the advent of irrigation from the K.R. Sagar reservoir (During 1930's), there was substantially marked transformation in cropping pattern, composition of crops, better grown yield level, ultimately leading to better economic conditions of the people (Anonymous,2016)

The total geographical area of the district is 4,98,244 ha, out of which 2,48,825 ha forms the sown area. More than half of the total land area in the district is put to agricultural use. The total irrigated area is 1,16,901ha out of which around 88,000 ha is being irrigated by K.R.Sagar and around 16,000 ha by Hemavathi reservoir. The rest of the land is irrigated by other sources like tanks, wells and bore wells (Anonymous,2016).

Agriculture is the main activity in the district. The major crops of the district are sugarcane, ragi, rice, pulsesand oilseeds. Sugarcane is the major commercial crop in district. Farmers used to grow in all seasons. In kharif season, farmers cultivate sugarcane around 31800 ha with production of 35,24,500 tonnes and productivity rate of 111 tons/ha and also in rabi/summer season cultivate around 4860ha with production of 5,34,600 ton and productivity rate of 111ton/ha(Anonymous,2016).

Mechanization may be defined as the process of injecting power and machinery between man and materials in a production system (Khalequzzaman and Karim, 2007). Verma (2008) reported that the agricultural mechanization implies the use of various power sources and improved farm tools and equipment, with a view to reduce the drudgery of the human beings and draught animals, enhance the cropping intensity, precision and timelines of efficient utilisation of various crop inputs and reduce the losses at different stages of crop production. Starkey (1998) defined farm mechanization as the development and introduction of mechanized assistance of all forms and at any level of sophistication in agricultural production to improve efficiency of human time and labour.

Joppich (1957) in his study reported that the mechanization affects the cost structure of agricultural production by (i) Saving labour (manual and bullock) (ii) Easing jobs (iii) Increasing yield and (iv) Facilitating the opening up of new land. The problem of labour shortage put the farmers to increased use of machine power in operations like field preparation, harvesting, winnowing and transportation. Use of efficient machines in agricultural mechanization improves the utilization efficiency of inputs like fertilizers and agro-chemicals and reduces negative impact on environment (Anonymous, 2015). In India, farm mechanization is growing at less than five per cent in the last two decades. Achieving/ attaining of the government’s target of doubling farmers' income in upcoming years is possible through large scale mechanization as it will bring down the cost of cultivation (Mishra, 2007). Further, use of agri-machineries will help increase production by 20 per cent and bring down the cost of cultivation by 20-25 per cent. Farm mechanization is key for

modernizing agriculture sector. With this background, this study mainly focused to assess the mechanization index in sugarcane cultivation inMandya district, Southern Dry Zones of Karnataka

2. Methodology

Based on the population of farmers, samples of 50 farmer respondents from the Thaggahalli village in Mandya district were selected randomly. Since Thaggahalli is one of the major sugarcane production village in Mandya district. Respondents were categorised into marginal, small, semi medium and medium farmers based on land holdings. General information regarding use of different types of machinery and equipments, cultivable land availability, different farm operations they followed to cultivate sugarcane, labours and time consumed for different operations, machines used, energy/fuel/power required for different operations, costs and returns of different crops and also the relevant data on variables related to the study etc., were collected from the sample respondents. The data collected were purely based on the memory of the respondents. Therefore, the sample respondents were convinced genuinely about the purpose for which the data was collected at the time of interview in order to minimize the personal bias.

a. Mechanization Index

The mechanization index was calculated by following formula

$$\text{Mechanization Index} = \frac{MP}{MP+Ap+HP} \times 100$$

Where,

MP - Mechanical power

AP – Animal Power

HP – Human Power

3. Results and Discussion

The respondents were categorised into marginal (< 1ha), small (1-2 ha), semi medium (2-4 ha), medium (4-10ha) and large farmers (>10 ha) based on land holdings. There were 30 percent of marginal farmers, 40 per cent of small farmers, 26 per cent of semi medium farmers and 4 per cent of medium farmers present in selected region.

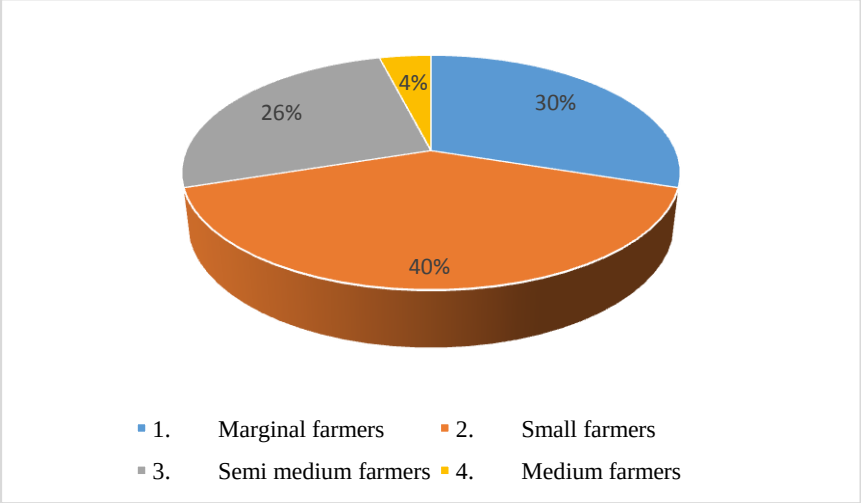

Fig .1. Type of farmers based on land holdings

3.1 Mechanization index in sugarcane cultivation based on type of famers

The mechanization index in sugarcane cultivation in selected region based on type of farmers as shown in the Table.1.The total mechanization in sugarcane cultivation in selected region was about 50.5 percent. The mechanization index was high in semi medium farmers followed by medium, small and marginal farmers. The mechanization index in sugarcane cultivation of semi medium farmers was about 51.85 per cent, for medium farmers it was about 50.62 percent, for small farmers 50.19 per cent and for marginal farmers it was about 49.34 percent.

The results shows, the mechanization index of marginal farmers in sugarcane cultivation was minimum in selected region, this may due to small land holdings farmers prefer animal and human labours rather than mechanical power.

Table.1. Mechanization index in sugarcane cultivation based on type of farmers

Sl.no	Type of farmers	Mechanization index, %
1.	Marginal farmers	49.34
2.	Small farmers	50.19
3.	Semi medium farmers	51.85
4.	Medium farmers	50.62
5.	Large farmers	-
	Total	**50.5**

3.2. Mechanization index in sugarcane cultivation based on type of operation

The mechanization index based on the operation in sugarcane cultivation of all type of farmers as shown in Table.2. The results shows that mechanization index was high in seed bed preparation (98.46 per cent) followed by irrigation (97.37 per cent) and weeding/spraying

operation (57.81 per cent) Fig.2. The mechanization index was zero for planting and harvesting operation, since the majority of farmers were perform operation manually and also unaware and unavailability of equipments for particular operation.

Table.2. Mechanization index in sugarcane cultivation based on operation

Sl.no	Type of farmers	Seed bed preparation	Planting	Weeding/spraying	irrigation	Harvesting	Total
1.	Marginal	95.3	-	57.69	93.7	-	49.338
2.	Small	99.16	-	54.102	97.665	-	50.1854
3.	Semi medium	99.64	-	60.66	98.94	-	51.85
4.	medium	99.725	-	58.76	99.15	-	50.62
5.	Large	-	-	-	-	-	-
	Total	98.46	-	57.81	97.37	-	50.5

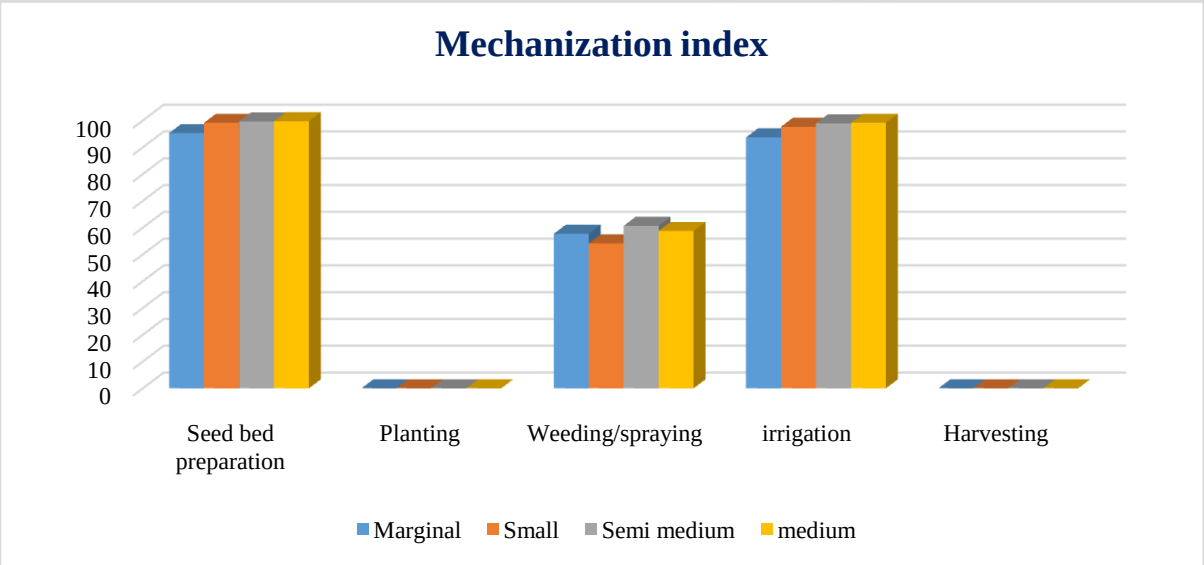

Fig.2. Mechanization index in sugarcane cultivation based on operation

4. Conclusion

Farm mechanization helps in timely performing of operations in the field. Seedbed preparation had high level of mechanization followed by irrigation and weeding operations compared to planting and harvesting had zero mechanization index. Deficit or non-availability of sufficient farm machinery/implements with the farmers was observed. Therefore, to enhance the mechanization level in the study areas, Government should create awareness among the farmers about existence of custom hiring centres and adequate

measures should be taken to promote mechanization by providing financial incentives to the farmers for the purchase of specialized machinery (planters, harvesters etc.)

5. References

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