Forage Res., **51**(1) : pp. 69-72 (2025) **http://forageresearch.in**

EFFECT OF FARM MECHANIZATION ON GUAR (*CYAMOPSIS TETRAGONOLOBA*) PRODUCTIVITY AMONG FARMERS OF HARYANA

NARESH KUMAR[1], KULDEEP KUMAR[2] AND RAJESH KATHWAL[3]*

[1]KVK, Kaithal
[2]Department of Agricultural Economics, CCS Haryana Agricultural University, Hisar-125004
[3]Regional Research Station (Horticulture), Buria, CCS Haryana Agricultural University
CCS Haryana Agricultural University, Hisar-125004, Haryana (India)
**(e-mail : kt1977rajesh@gmail.com)*

(Received: 18 April 2025; Accepted: 15 June 2025)

SUMMARY

The present study was conducted during the year 2011-12 in district Sirsa (Haryana) to see the impact of mechanization on guar productivity of farms among the farmers of Haryana. There were 120 farmers under study selected purposively. The average productivity of guar per hectare was found to be maximum under own mechanized farms (13.42 q/ha) as compared to custom hiring farms (10.50 q/ha). The percentage increase in the guar productivity on own mechanized farms were 27.81 over custom hiring farms. The guar productivity of large farmers was found to be maximum under own mechanized farms (14.50 q/ha) as compared to custom hiring farms (11.25 q/ha). The percentage increase in the guar productivity on own mechanized farms was 28.89 per cent. Maximum benefit cost ratio was achieved in own mechanized farms (1.70) as compared to custom hiring farms (1.31). In nut nutshell, it can be concluded that farmers who owned their machines were more beneficial as compared to custom hiring farm implements.

Key words: Custom hiring farm, Guar, Own Mechanized Farms, B:C ratio, productivity

Guar (*Cyamopsis tetragonoloba*) with 2 n=14 is an annual, short-day, coarse, erect, bushy, and drought-resistant summer legume also known as castor bean. It grows 60–120 cm tall in arid and semiarid regions. Guar is used as a raw material in the pharmaceutical, food industry and cosmetic producing industries. It is also used as a fodder crop in stockbreeding because its leaves and seeds have about 42 to 65 per cent protein. It is mainly cultivated as a *kharif* crop and completes its life cycle from grain to grain within 3 months, being planted during the last week of June and up to the first fortnight of July. It is harvested during August and September. This crop enriches the soil as its leaves contain nitrogen (Gokdogan *et al.*, 2017). It helps in reducing the chemical dependency on nitrogenous fertilisers and is beneficial to the succeeding crop (Anonymous, 2016). Guar as a fodder crop contains traits like non-pubescent leaves with basal branched habit and delayed flowering (Gautam *et al.*, 2024). In India, among the states, Rajasthan leads in guar production (70%). However, guar is also produced in Gujarat, Haryana, Punjab and in some parts of Uttar Pradesh and Madhya Pradesh. In the present era, agriculture is in a transition phase with the coexistence of traditional and mechanized farming. Farm mechanization had direct effects on farm productivity and resulted in precision of farm operations, with the increase in production and productivity, higher income generation, reduction in crops and food losses, reduction in drudgery, and improvement in the farming work environment (Nag *et al.*, 2020). Therefore, the present study has been conducted in the district of Sirsa to see the impact of mechanization on guar productivity of farms among the farmers of Haryana.

MATERIALS AND METHODS

The present study was conducted during 2011-12 in the district Sirsa. There were a total 120 farmers categorized into small, medium and large farmers based on land holdings from Rori, Surtia and Baragudha villages in Baragudha block and Gadrana, Odhan and Deshu Malkana villages in Odhan block were selected purposively. Then, farmers with and non-mechanization were selected. The GPS location has been given in Table 2.

B:C ratio (benefit : cost ratio was worked out with the given formula :

$$B:C = \frac{\text{Gross returns}}{\text{Total cost}}$$

RESULTS AND DISCUSSION

(i) Average productivity of guar

There were three categories of farmers under study, which were classified into their own mechanised and custom hiring farms. The average productivity of guar per hectare was found to be maximum under own mechanised farms (13.42 q/ha) as compared to custom hiring farms (10.50 q/ha) (Table 1). The percentage increase in the guar productivity on own mechanised farms was 27.81% over custom hiring farms.

TABLE 1
Average yield (q/ha) of guar on different categories of farms in Sirsa district

S. No.	Farmer category	Own mechanized farms	Custom hiring farms	Per cent increase
1	Small	12.75	10.00	27.50
2	Medium	13.00	10.25	26.83
3	Large	14.50	11.25	28.89
	Average	13.42	10.50	27.81

(ii) Productivity of guar of small, medium and large farmers

The guar productivity of large farmers was found to be maximum under their mechanized farms (14.50 q/ha) as compared to custom hiring farms (11.25 q/ha). The percentage increase in the guar productivity on own mechanized farms was 28.89 per cent.

(iii) Economics of guar production

Maximum benefit cost ratio was achieved in own mechanized farms (1.70) as compared to custom hiring farms (1.31). This was due to higher yield (13.42 q/ha), gross returns (Rs. 64378/ha) and lesser total cost (Rs. 38096/ha) (Table 2). The cost of production per quintal was lower in own mechanized farms (Rs. 2833/ha) as compared to Rs. 3708/ha in custom hiring farms. This might be due to the reason that custom hiring charges per quintal production of guar were higher as compared to own mechanized farms where farmers had not paid anything from their pocket.

Variable cost analysis: The large farmers who have their own mechanized farms achieved the maximum variable cost of Rs. 25266 per hectare, followed by medium farmers (Rs. 21,572/- per hectare), and the lowest in small farmers (Rs. 17372/- per hectare). The variable cost was found to be 2.64 per cent higher (Rs. 25932/- per hectare) among the large farmers who cultivated guar on custom hiring farms. The increase in the variable cost was due to the expenditure incurred on the various implements used for guar cultivation, as compared to the farmers who owned the implements.

Chander and Kumari (2023) reported that Custom Hiring Centres of agricultural machinery found to be helpful for the farmers in increasing the net income by reducing the cost of cultivation in a timely manner. Hence the farmers can use the implements available at custom hiring centres, if they are not able to purchase the same.

Total cost: The highest estimated total cost of guar cultivation for mechanized farms was among large farmers, with Rs. 42853/- per hectare as compared to small (Rs. 33172/- per hectare and medium farmers (Rs. 38862/- per hectare). The total cost of cultivation of guar was even more among the large farmers who took the implements on custom hire basis *i.e.*, Rs. 44197/- per hectare. The per cent increase in total cost was 3.64 per cent. Kumar and Athare (2025) noted that both small and large farmers struggle with accessing advanced agricultural tools, relying on traditional methods and experiencing lower productivity compared to farmers in developed countries. In the Indian context, the role of financial institutions is crucial as they are responsible for providing the necessary credit to farmers in need. The government has also started the scheme Sub-Mission on Agricultural Mechanization (SMAM) during 2014-15 to facilitate the small farmers who can take advantage of Custom hiring centres.

Gross returns: The gross returns received by the large farmers who cultivated the guar crop on their mechanized farm were estimated at Rs. 64480/- per hectare. The gross returns per hectare of the large farmers who cultivated guar on custom hiring farms were lesser with Rs. 54273/-, followed by medium farmers (Rs. 49618/- per ha) and small farmers (Rs.

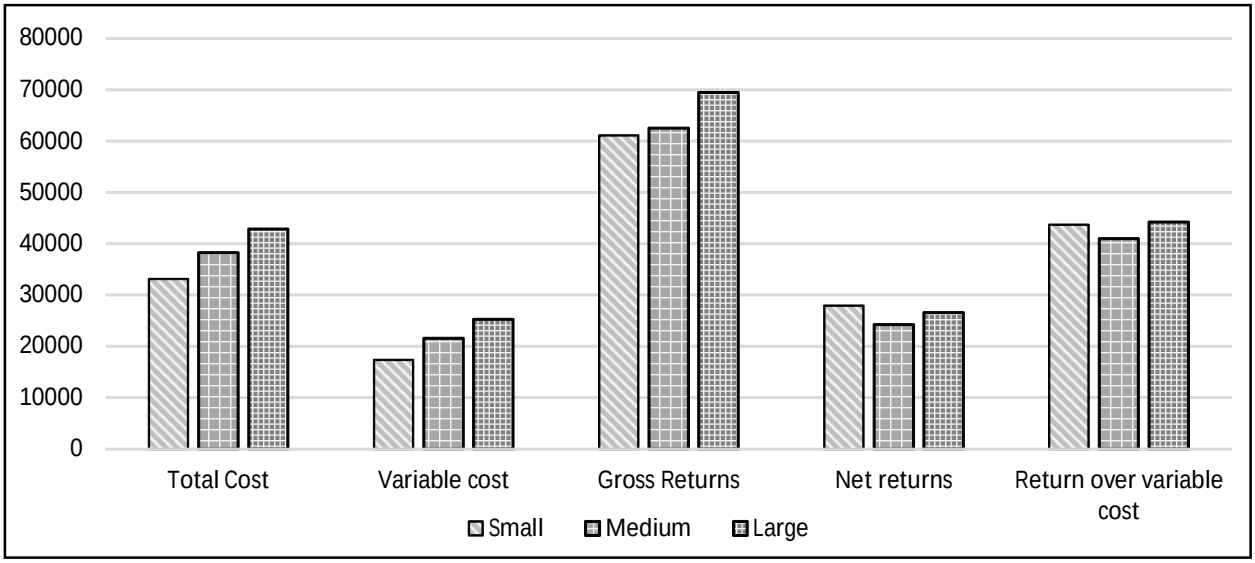

Fig. 1. Economics of guar cultivation on own mechanized farm (Rs./ha).

TABLE 2
GPS location of the study sites

Country	State	District	Block	Latitude	Longitude
India	Haryana	Sirsa	Baragudha	29.66490261	75.03292799
India	Haryana	Sirsa	Baragudha	29.74166670	75.19583330
India	Haryana	Sirsa	Baragudha	29.80532061	75.18789768
India	Haryana	Sirsa	Odhan	29.79891583	74.98343211
India	Haryana	Sirsa	Odhan	29.76498955	74.89932898
India	Haryana	Sirsa	Odhan	29.86937570	74.95744421

TABLE 3
Economics of guar production on own mechanized and custom hire farms (Rs./ha)

Particulars	Guar							
	Own Mechanized farm				Custom hiring farm			
	Small	Medium	Large	Overall average	Small	Medium	Large	Overall average
Variable cost	17372	21572	25266	21403	17601	21081	25932	21538
Total Cost	33172	38262	42853	38096	34261	38626	44197	39028
Yield (q/ha)	12.75	13.00	14.5	13.42	10	10.25	11.25	10.5
Gross Returns	61110	62545	69480	64378	48190	49618	54273	50694
Return over variable cost	43738	40973	44214	42975	30589	28537	28341	29156
Net returns	27938	24283	26627	26283	13929	10992	10076	11666
Cost of production per quintal	2602	2943	2955	2833	3426	3768	3929	3708
B:C ratio	1.84	1.63	1.62	1.70	1.41	1.28	1.23	1.31

48190/- per ha). The increase in additional costs of rental nature of the implements for guar cultivation might be one of the reasons for the lower gross returns. The lower productivity of the custom hiring farms might be the other reason for the lower gross returns. Rao *et al.* (2025) reported that lower productivity means an undernourishment of the people in a country. They reported that during 2023, there were 195 million people who were categorized as undernourished. In case of guar, lower guar productivity means lesser gross returns and consequently lesser profits with lower access to the food bowl.

Return over variable cost: The highest returns over variable costs were recorded among the large farmers with Rs. 24,214/- per hectare who owned the mechanized farms, followed by small (Rs. 43,738/- per ha) and medium farmers (Rs. 40,973/- per ha), respectively. In comparison to this, the returns over variable costs of the large farmers who cultivated guar crop on custom hiring farms achieved lesser returns over variable cost, i.e., Rs. 28,341/- while the small farmers of this category achieved maximum returns over variable cost (Rs. 30,589/- per ha) followed by medium farmers (Rs. 28,537/- per ha). The small farmers with owned mechanized farms were found in a more profitable condition was due to improved productivity of guar crop and more gross and net returns (Fig. 1).

CONCLUSION

Based on the above study, it can be concluded that guar production under own mechanized farms is found to be more beneficial as compared to custom hiring farms in terms of higher productivity, gross returns and higher benefit-cost ratio.

ACKNOWLEDGEMENT

The research facilities provided by the Department of Agricultural Economics of the College of Agriculture, CCS Haryana Agricultural University, are duly acknowledged.

REFERENCES

Anonymous, 2016 : http://tarim.com.tr/Haber/20031/Tohumundansapinakadarkatmadeger. Aspx (01 August 2016, In Turkish).

Chander, S., and V. Kumari, 2023 : Socio-economic Impact of Custom Hiring Centres on Farmers in Haryana. *IAHRW International Journal of Social Sciences Review*, *11*(1), 39-44.

Gautam, R., A. K. Verma, S. Dwivedi and T. Jhang, 2024 : Breeding guar [*Cyamopsis tetragonoloba* (L.) Taub]: A variety compendium of a multifaceted industrial crop for resource-constrained scenarios in India. *Ind Crops and Prod*, **214**: 118502.

Gokdogan, O., S. Seydosoglu, K. Kokten, A. S. Bengu, and M. F. Baran, 2017 : Energy input-output analysis of guar (*Cyamopsis tetragonoloba*) and lupin (*Lupinus albus* L.) production in Turkey, *Legume Res.-An International Journal*, **40**(3): 526-531.

Kumar, N. R. and P. G. Athare 2025 : Farm mechanization in India : The crucial role of custom hiring services. *AgEcon Search, research in Agricultural and Applied Economics*, 1-5.

Nag, P. K., L. P. Gite, P. K. Nag and L. P. Gite, 2020 : Farm mechanization: Nature of development. *Human-Centered Agriculture: Ergonomics and Human Factors Applied*, 149-171.

Rao, N., R. Sathe and N. Grist, 2025 : Gender, intersectionality and climate-smart agriculture in South Asia: A review. *PLOS Climate*, **4**(2), p.e0000482.