

An Economic Analysis of Sorghum Seed Production: A Profitable Enterprise for Farmers

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ABSTRACT

Sorghum is an important fodder crop of summer and rainy season and suitable for silage making. It is the fast growing crop and can provide two-three fodder cuttings. The economics of sorghum seed production crop (cv. MP Chari) was analysed for the period *Kharif* 2010-11, *Kharif* 2011-12 and *Kharif* 2012-13 in IGFRI, Jhansi to inform the farmers about the profitability of seed production process. The highest cost was incurred on harvesting and pooling of mature crop. The average total expenditure incurred on that was 4933.3 and it was 17.28 percent of total cost. The average total working capital was found as ₹ 19073.3 per hectare (66.82% of total cost) and total variable cost is ₹ 19645.5 which is 68.82 percent of total cost. The average total cost is found as ₹ 28544.1 per hectare. The average total labour man days used per hectare are 84.64. The average total expenditure incurred on labour is ₹ 12120.28 (42.46 %) which is found as highest expenditure in total cost. The highest expenditure in percentage term is incurred on labour followed by manures, draft power and seed cost. On per hectare basis the average quality seed production was 857.00 kilogram. The average rate of quality seed was ₹ 35 per kilogram. The total return was found as ₹ 51899.41 per hectare. The average net return is ₹ 22161.33 per hectare. The average benefit cost ratio at is found as 1.72. The cost of production of seed when only main product quality seed only) was considered for selling was ₹ 35.11 per kilogram of seed. The cost of production of seed when both main product (quality seed only) and other by products (dry fodder, rejected seed etc.) was considered for selling was ₹ 11.18 per kilogram of seed. Thus, it is clear from the study that seed production of sorghum is highly profitable and has wide market available for it.

Keywords: Economic analysis, sorghum seed production, cost of cultivation, benefit- cost ratio

Sorghum is an important fodder crop of summer and rainy season and suitable for silage making. It is the fast growing crop and can provide two-three fodder cuttings. Its plant structure is tall and grow up to 5 meter high. Sorghum roots are adventitious and the root system can extend from the top 90 cm soil layer to twice that depth and drought resistant (FAO, 2011). It is not suited to higher elevations (more than 1200 m). It can be grown on any soil except on very sandy soils. Forage sorghum can be grazed (young or as deferred fodder), cut fresh, made

into hay or ensiled. Compared with corn plants, it uses water more efficiently which is important in Bundelkhand like areas where irrigation is limited or there is a greater chance of drought. The ratoon crop will mature early in the following season but yield slightly less than the first crop – depending on level of plant feeds available. This way the farmers can reduce the cost of replanting, land preparation, seeds and time. (Lambert *et al.*, 1999). Because of these important features, its seed has regular demand in the market in summer and kharif season. Thus, the

economics of sorghum seed production crop (cv. MP Chari) was analysed for the period *Kharif* 2010-11, *Kharif* 2011-12 and *Kharif* 2012-13 in IGFR, Jhansi to inform the farmers about the profitability of seed production process.

MATERIALS AND METHODS

For conducting the research work, the two villages of data were selected during *Kharif* 2010-11, *Kharif* 2011-12 and *Kharif* 2012-13 at IGFR, Jhansi.

The fields were prepared by harrow and cultivators. The seed rate was 18 kg per hectare and crop was sown by seed drill and 100 kg DAP was applied as basal dose and 100 kg Urea was applied in two times (50% as basal and 50% as top dressed). As crop was sown in Rainy season, so irrigation was required. No fodder cuttings were taken. The variable cost and fixed cost were calculated for different machines used and multiplied with hours for which they used to find the expenditures incurred on them. The prevalent labour rate was taken as per manday for 8 hours was ₹ 128 in 2010-11 and ₹ 150 in 2011-12 and 2012-13. The total working capital shows the total variable cost incurred on various operations. The total variable cost is calculated by adding three percent interest to total working capital. The addition of all the fixed cost, overhead cost and rental value of land gives the total fixed cost. The rental value of land was considered as that prevailing in the locality that is ₹ 5000/ha for one crop (Kumar *et al.*, 2013). The management and risk was considered as ten percent of total variable and fixed cost. The cost of cultivation data were calculated for every stage of crop growth.

RESULTS AND DISCUSSION

Operation wise cost of cultivation

First cost of cultivation was calculated over individual farms then the data are converted into per hectare basis and operation wise expenditure is presented in Table 1 and shown in Fig. 1. The average expenditure incurred on field preparation is ₹ 1053.0 per hectare that comes to 3.69 percent of total cost. The average expenditure made on sowing is ₹ 910.6 which is 3.19 percent of total cost. The average expenditure per hectare made on manures and fertilizers is ₹ 4847.7 that comes to 16.98 percent of total cost. The total expenditure incurred on weeding was ₹ 4166.7 which

was 14.6 percent of total cost. The highest cost was incurred on harvesting and pooling of mature crop. The total expenditure incurred on that was 4933.3 and it was 17.28 percent of total cost. The average total working capital was found as ₹ 19073.3 per hectare (66.82 % of total cost) and total variable cost is ₹ 19645.5 which is 68.82 percent of total cost. The average total cost is found as ₹ 28544.1 per hectare.

Table 1: Operation-wise cost of cultivation in sorghum seed (cv. MP Chari) production (Average for 2010, 2011 and 2012, per hectare basis)

Operations	Average per hectare, ₹	Percentage to total cost
Field preparation	1053.0	3.69
Sowing	910.6	3.19
Manures and fertilizers	4847.7	16.98
Weeding	4166.7	14.60
Rouging	2181.1	7.64
Harvesting and pooling	4933.3	17.28
Threshing	980.9	3.44
Total Working capital	19073.3	66.82
Interest on WC	572.2	
Total variable cost	19645.5	68.82
Fixed and other overhead cost	5707.3	19.99
Rental value of land	5000.0	17.52
Total fixed cost	5175.5	18.13
TVC + TFC	24821.0	86.96
Management & risk	3723.1	
Total Cost	28544.1	100.00

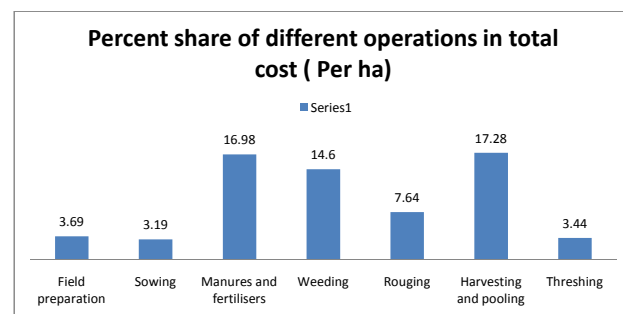


Fig. 1: Operation-wise cost of cultivation in improved sorghum seed production

Item wise cost share

Item wise cost of cultivation on per hectare basis is presented in Table 2. The average draft power used per hectare is 8.86 hours. The variable cost incurred on draft power is ₹ 1880.34 per hectare. The average total labour man days used per hectare are 84.64. The average total expenditure incurred on labour is ₹ 12120.28 (42.46%) which is found as highest expenditure in total cost. The expenditure incurred on seed purchase is ₹ 634.99 per hectare. The total expenditure incurred on manures and fertilizers is ₹ 4437.66 per hectare which is found as second highest in total cost. Thus the highest expenditure in percentage term is incurred on labour followed by manures, draft power and seed cost.

Table 2: Item wise cost of cultivation on per hectare basis for scientific sorghum seed production

Item wise cost of cultivation	Average per ha, ₹	Percent
Draft power		
Draft power hours	8.86	
Draft power cost	1880.34	6.59
Labour power	0.00	
Total mandays	84.64	
Total Labour cost	12120.28	42.46
Seed cost	634.99	2.22
Manures and Fertilizers	4437.66	15.55
Total Working capital	19073.27	66.82
Interest on WC	572.20	
Total variable cost	19645.46	68.82
Fixed and other overhead cost	5707.34	
Rental value of land	5000.00	17.52
Total fixed cost	5175.50	18.13
TVC+ TFC	24820.96	86.96
Management & risk	3723.14	
Total Cost	28544.11	100.00

Return analysis

The average return from sorghum is analysed and presented in Table 3. On per hectare basis the average quality seed production was 857.00 kilogram. The average rate of quality seed was ₹ 35 per kilogram. The total dry fodder produced was 6838.61 kg and

the imputed value of it was taken as ₹ 300 per quintal. The total return was found as ₹ 51899.41 per hectare. The average net return is ₹ 22161.33 per hectare. The average benefit cost ratio at is found as 1.72. The cost of production of seed when only main product quality seed only) was considered for selling was ₹ 35.11 per kilogram of seed. The cost of production of seed when both main product (quality seed only) and other by products (dry fodder, rejected seed etc) was considered for selling was ₹ 11.18 per kilogram of seed. Thus, it is found that if the farmers are able to utilise/sell the by-products efficiently, the cost of production of seed will reduce drastically.

Table 3: Return analysis of sorghum seed production

Particulars	Average
Total cost of seed production, ₹	29738.09
Pure seed, kg	857.00
Rate (₹/kg)	35.00
Dry fodder, kg	6838.61
Gross return, ₹	51899.41
Net return, ₹	22161.33
B:C ratio	1.72
Cost of production of seed, ₹/kg (when only main product is considered	35.11
Cost of production of seed, ₹/kg (considering by- product also)	11.18

CONCLUSION

Thus, it is found that the average total cost in sorghum seed production is incurred as ₹ 28544.1 per hectare. In that the highest share is of expenditure made on human labour that is 42.46 percent followed by the expenditure made on manures, draft power and seed cost. On per hectare basis the average quality seed production was 857.00 kilogram. The total return was found as ₹ 51899.41 per hectare. The average net return is ₹ 22161.33 per hectare. The average benefit cost ratio at is found as 1.72. The cost of production of seed when only main product quality seed only) was considered for selling was ₹ 35.11 per kilogram of seed and ₹ 11.18 per kg if farmer is able to utilise by products also. The seed of sorghum is available in markets during the sowing season as about ₹ 40-60 per kilogram of seed and the farmers can earn a attractive profits from the production of quality seed.

Thus, it is clear from the study that seed production of sorghum is highly profitable and has wide market available for it.

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REFERENCES

- FAO, 2011. Grassland Index. A searchable catalogue of grass and forage legumes. FAO
- Harada, H., Yoshimura, Y., Sunaga, Y. and Hatanaka, T. 2000. Variations in nitrogen uptake and nitrate-nitrogen concentration among sorghum groups. *Soil Sci. Plant Nutr.*, **46**(1): 97-104.
- Lambert, G.A., Hilder, T.B., Bishop, H.G. and Dodt, R.M. 1999. Regeneration of drought-affected Queensland bluegrass pastures. In: People and rangelands: building the future. *Proceedings of the VI International Rangeland Congress*, Townsville, Queensland, Australia, 19-23 July, **1 and 2**: 277-278.
- Thomas, C. George 2008. Fodder sorghum. Forage crop production in the tropics. Book from Kalyani Publications. 2nd edition, pp. 113-116.
- Vikas Kumar, Satyapriya, D. Bahukhandi and Maharaj Singh 2013. Participatory seed production of berseem under the farmers' field- an economic analysis. *Plant Archives*, **13**(2): 937-940.