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Sowmyalatha BS
AICRP on Small Millets, ZARS, V.C. Farm, Mandya, UAS, Bangalore, Karnataka, India

Shubhashree KS
AICRP on Small Millets, ZARS, V.C. Farm, Mandya, UAS, Bangalore, Karnataka, India

Sahana SR
AICRP on Small Millets, ZARS, V.C. Farm, Mandya, UAS, Bangalore, Karnataka, India

Corresponding Author:
Sowmyalatha BS
AICRP on Small Millets, ZARS, V.C. Farm, Mandya, UAS, Bangalore, Karnataka, India

Role of mechanization in developing low-cost technology for finger millet (*Eleusine coracana*) cultivation

Sowmyalatha BS, Shubhashree KS and Sahana SR

Abstract
India is the largest producer of various kinds of millets. Out of the total minor millets produced, finger millet (*Eleusine coracana* L. Gaertn.) (Ragi) accounts for about 85% of production in India. Traditional farming is being practiced from land preparation to post-harvest operations, where too much drudgery is involved and also due to excess involvement of labour in different farm operations the cost of production is quite high. Non-availability of labour in peak period accounts for higher expenditure with less productivity. The timeliness of operations has assumed greater significant in obtaining optimal yields from different crops, which has been possible by way of mechanization. Human drudgery can be reduced by providing farmer-friendly farm tools and equipment which increase the productivity of worker with safety and comfort. For development of low-cost technologies through mechanization in finger millet, an experiment was laid out in Mandya during *Kharif* 2018. The research result indicated that, Significantly higher grain yield and straw yield was recorded when sowing was taken up with tractor drawn seed drill coupled with hand weeding at 20 and 35 DAS and harvested mechanically (43.62 q/ha and 65 q/ha, respectively) which was on par with that of Sowing with tractor drawn seed drill coupled with cycle weeding and mechanical harvesting. However, significantly higher B: C Ratio of 2.24 was recorded with sowing with animal drawn seed drill coupled with cycle weeder and mechanical harvesting.

Keywords: Mechanization, tractor drawn seed drill, cycle weeder, mechanical harvester

Introduction
Finger millet (*Eleusine coracana* (L.) Gaertn) is an important cereal crop amongst the small millets and third in importance among millets, in the country in area and production after sorghum and pearl millet (Ganapathy *et. al*., 2011) [3]. Finger millet is grown in India, Srilanka, Nepal, parts of Africa, Madgaskar, Malaysia, Uganda and Japan (http://agritech.tnau.ac.in). It accounts for about 85% of production in India (Divya, 2011) [1]. Due to its valued food grains and its adaptability to wide range of geographical areas and agro-ecological diversity it's mostly cultivated in Africa and Asia. It is cultivated as a rainfed crop in India. In India, finger millet is cultivated over an area of 1.19 million hectares with a production of 1.98 million tonnes giving an average productivity of 1661 kg per ha. Karnataka accounts for 56.21 and 59.52% of area and production of finger millet followed by Tamil Nadu (9.94% and 18.27%), Uttarakhand (9.40% and 7.76%) and Maharashtra (10.56% and 7.16%), respectively (http://www.indiastat.com).
Finger millet is the prime staple food consumed by majority of population in South Karnataka. Finger millet has manifold nutritional benefits; it has thirty times more calcium than rice (Millet Network of India-Deccan Development Society-FIAN, 2009). Millets are important food in many under developed countries because of their ability to grow under adverse weather conditions like limited rainfall. In contrast, millet is the major source of energy and protein for millions of people in dry country. Generally the Production of millet is still at subsistence level by small scale holders and consumed as staple food and drink in most areas. The crop has high impact on the poor in Africa for food security and source of energy and protein for about 130million people in sub Saharan Africa (Obilana *et. al*., 2002 and Yang *et al*., 2012) [9, 12]. The crop is important because it plays role in both the dietary needs and incomes of many rural households.
Traditional farming is being practiced from land preparation to post-harvest operations, where too much drudgery is involved and also due to excess involvement of labour in different farm operations the cost of production is quite high. Non-availability of labour in peak period accounts for higher expenditure with less productivity.

The timeliness of operations has assumed greater significant in obtaining optimal yields from different crops, which has been possible by way of mechanization (Joginder Singh, 2006) [10]. Human drudgery can be reduced by providing farmer-friendly farm tools and equipment which increase the productivity of worker with safety and comfort. To overcome these problems Farm mechanization has been adopted. Farm mechanization has been useful to bring about a significant improvement in agricultural productivity. Khobragade *et al*., (2011) [7], in his study reported that, tractor operated seed-cum-fertilizer drill works better than bullock drawn seed drill in respect of effective field capacity, field efficiency, depth of placement of seed, yield of crop, yield of fodder and cost of sowing per hectare in sorghum cultivation. With this background, the present was conducted to analyze the low cost technology with economic benefits of mechanization in finger millet.

Materials and Methods

A field investigation was carried out during *Kharif* 2018 at Zonal Agricultural Research Station, V.C. Farm, Mandya for development of low-cost technologies through mechanization in finger millet. The soil of the experimental site was red sandy loam in texture with normal fertility status of low in available nitrogen (243.2 kg/ha), medium in available phosphorus (45.17 kg/ha) and medium in potassium (210.07 kg/ha) with soil pH of 6.86. The experiment was laid in randomized block design replicated thrice. The eight treatments comprised of two method of sowing *viz*., Sowing with animal drawn seed drill (S_1) and Mechanized sowing (S_2), two method of weeding *viz*., Hand weeding (W_1) and Cycle weeding (W_2) and two method of harvesting and threshing *viz*., Farmers method (H_1) and Mechanical harvesting (reaper/combiner) (H_2), The variety used for sowing was KMR 630 and at the time of sowing half the recommended dose of nitrogen (30 kg/ha) and complete dose of P_2O_5 and K_2O (40 and 20 Kg/ha, respectively) were applied as basal application. The remaining 50% nitrogen (30 kg/ha) was used for top dressing after 30 DAS. Growth and yield parameters such as plant height, number of tillers, number of fingers, finger length, grain yield, straw yield and test weight was recorded on randomly selected five plants. The data was statistically analyzed using ANOVA.

Result and Discussion

In development of low-cost technologies through mechanization in finger millet experiment the data on yield and economics are recorded and they are presented in table 1. The research result indicated that, Significantly higher grain and straw yield was recorded when sowing was taken up with tractor drawn seed drill coupled with hand weeding at 20 and 35 DAS and harvested mechanically (4362 kg ha^{-1} and 6503 kg ha^{-1}, respectively) which was on par with that of sowing with tractor drawn seed drill coupled with cycle weeding and mechanical harvesting (4048 kg ha^{-1} and 6838 kg ha^{-1}, respectively).

Significantly higher gross return was recorded when sowing was taken up with tractor drawn seed drill coupled with hand weeding at 20 and 35 DAS and harvested mechanically (Rs. 95487 ha^{-1}) which was on par with that of sowing with tractor drawn seed drill coupled with cycle weeding and mechanical harvesting (Rs. 89623 ha^{-1}).

Higher B:C Ratio of 2.24 was recorded with sowing using animal drawn seed drill coupled with cycle weeding and mechanical harvesting followed by sowing with tractor drawn seed drill coupled with cycle weeding and mechanical harvesting (2.08). It was observed that overall time taken for carrying all the field operations with improved equipment was reduced when compared to conventional farming. In comparison to conventional farming by using improved set of equipment labour dependency and cost of cultivation was reduced (Syed Mazar Ali *et al*., 2017) [11].

Table 1: Productivity and profitability of Finger millet as influenced by mechanization

Treatments	Grain yield (kg/ha)	Straw yield (kg/ha)	Gross returns (Rs/ha)	Cost of cultivation (Rs/ha)	Net returns (Rs/ha)	B:C Ratio
T1: S1+ 1+H1	3191	4193	69298	39960	29338	0.74
T2: S1+ 1+H2	3112	4343	67895	31947	35948	1.13
T3: S1+ 2+H1	3759	6409	83321	31635	51686	1.64
T4: 1+W2+H2	4256	5136	91730	28272	63458	2.24
T5: S2+ 1+H1	3429	5532	75671	40775	34896	0.85
T6: S2+ 1+H2	4362	6503	95487	35087	60400	1.72
T7: S2+ 2+H1	3744	5757	82241	34775	47466	1.37
T8: 2+W2+H2	4048	6838	89623	29087	60536	2.08
S.Em (±)	153.55	197.23	3047.35	0.00	3047.35	0.09
C.D.@ p=0.05	465.80	598.29	9244.11	NS	9244.11	0.27

Note:

Method of Sowing (S): 02
S_1: Sowing with animal drawn seed drill
S_2: Mechanical sowing

Method of Weeding (W): 02
W_1: Hand weeding
W_2: Cycle weeding

Method of Harvesting and threshing (H): 02
H_1: Farmers method
H_2: Mechanical harvesting

Conclusion

Time and labour are crucial resources in cultivation of field crops. Adoption of mechanization in cultural operations not only reduced drudgery but also saved time resulting in low cost of cultivation and increased returns. Finger millet sowing using tractor drawn seed drill coupled with cycle weeding and harvested mechanically found more remunerative by saving time, labour and reducing drudgery for the farmers.

References

1. Divya V, Freire RO, Reddy ML. Tuning of the excitation wavelength from UV to visible region in Eu 3+-β-diketonate complexes: comparison of theoretical and experimental photophysical properties. Dalton Transactions. 2011;40(13):3257-68.
2. FAO/WHO. Carbohydrates in human nutrition: Report of joint FAO/WHO expert consultation. FAO Food and Nutrition. 1998;66:1-140.
3. Ganapathy S, Nirmalakumari A, Muthiah AR. Genetic Variability and Interrealtionship Analyses for Economic Traits in Finger Millet Germplasm. Journal of Agricultural Sciences. 2011;7(2):185-188.

4. Weblink: http://des.kar.nic.in
5. Weblink: http://www.agritech.tnau.ac.in
6. Weblink: http://www.indiastat.com
7. Khobragade BV, Bokade NA, Jadhavrao KS, Chaudhari MS. International Journal of Agriculture Engineering. 2011;4(2):176-178.
8. Millet Network of India-Deccan Development Society-FIAN. Millets-Future of food & Farming; c2009.
9. Obilana AB, Manyasa E. Millets in (Pseudo cereals and less common cereals: grain Properties and utilization potential (P.S. Belton and J.R.N. Taylor eds.), Springer-verlag, Berlin Heidelberg New York; c2002. p. 177-217.
10. Singh Joginder. Scope, progress and constraints of farm mechanization in India; c2006. http:// www.researchgate.net/publication/266082375.
11. Syed Mazar Ali, Kamalabai KH, Nagraj, Ranganath. Role of Mechanization in Effective Management of Time and Labour in Ragi (*Eleusine coracana* L.) Cultivation of Agricultural Engineering Today. 2017;41(2):16-20.
12. Yang X, Wan Z, Perry L, Lu H, Wang Q, Hao C, *et al*. Early millet use in northern China. Procedure of national Academic Science. 2012 Mar 6;109(10):3726-3730.