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Integrated Crop Management in Niger for Higher Productivity in Hill and Tribal Areas of Andhra Pradesh, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Niger crop is being cultivated in hilly and tribal agency Mandals of Alluri Sitarama Raju district in Andhra Pradesh in an area of 3900 ha during late kharif. Though Niger is an economically potential crop, non-adoption of scientific recommendations by the farmers leading to reduced or poor yields, 400-450kg/ha. District Agricultural Advisory and Transfer of Technology Centre (DAATTC), ASR District has conducted demonstrations in the selected tribal Mandals on Integrated Crop Management (ICM) in Niger for higher productivity for the benefit of farming community during 2023. ICM demonstrated plots has recorded improved yields (562 kg/ha) compared to the farmers practice (458 kg/ha) in the ASR District. The productivity of Niger crop was improved upto 22.7 per cent in the ICM demonstrated plots and the BC ratio recorded was 1: 4.80 as against 1:3.95. Also

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educated the farmers through the awareness programmes on crop management and most of the farmers were convinced with the results in integrated crop management practices in Niger.

Keywords: Niger; ICM; hill and tribal; ASR district.

1. INTRODUCTION

Niger [*Guizotia abyssinica* (L.f.) Cass.] is commonly known as ramtil, jagni or jatangi (Hindi), ramtal (Gujrati), karale or khurasani (Marathi), uhechellu (Kannada), payellu (Tamil), verrinuvvulu (Telugu), alashi (Oriya), sarguza (Bengali), ramtil (Punjabi) and sorguja (Assamese). India ranks first in the world in terms of area, production and export volume (Ranganatha et al*.,* 2013). Although considered as minor oilseed crop, the seeds contain 32 to 40% saturated fat and 18 to 24% protein. Niger oil is slow drying and is used in foods, paints, soaps and illuminators. It is used as a substitute for olive oil and can be incorporated into canola, sesame and linseed oils. The oil is used for cooking. The oil from the seeds can be used to treat burns and infections. The seeds are fried and used as food. After oil extraction, the filter cake can be used as animal feed. Niger oil has good storage properties, free fatty acid content is <70% and is free of toxins. This oil is considered to have health benefits (Chowhan, 2022). The crop can produce more seeds even in conditions of poor soil, water stress and poor crop management. Niger is good at oil production and has good resistance to pests, diseases and wildlife. Niger has great potential for soil and water conservation. This habit favours planting in marginal and edge areas in and around hills and forests (Ranganatha et al*.,* 2013).

Niger cultivated in most of the bare land in tribal areas in India under poor conditions. This is still the life of a group of farmers and businessmen. Niger crop, even though being cultivated for more than many decades in high altitude tribal area in Andhra Pradesh, it was still being cultivated in old traditional practices by the tribal farmers of Alluri Sitarama Raju district despite availability of scientific recommended cultivation practices (Mohan, 2023). Niger crop is being cultivated in hilly and tribal agency mandals of Alluri Sitarama Raju district in Andhra Pradesh with an extent of area ranging between 19300 ha (1995-96) and gradually reduced to 4264 ha (2019- 20) (DHBS, 2020). At present, 3900 ha is under niger cultivation with poor yields (400-450 kg/ha). The low yield is due to poor seed set resulting from protrandrous self-incompatibility, shattering nature, low harvest index, non-determinant types and cuscuta infestation (Rajani et al*.,* 2022). Though hill and tribal area was suitable for niger farming and potential yields were not harvested by the farmers and also farmers not adopting all integrated crop management practices. Based on this data, District Agricultural Advisory and Transfer of Technology Centre (DAATTC), ASR District in collaboration with IIOR-Hyderabad has conducted demonstrations in the selected tribal mandals on ICM in Niger for higher productivity for the benefit of farming community during 2023.

2. MATERIALS AND METHODS

In the ASR District, five niger grown villages were selected from Dumbriguda, Arakuvalley and Munchingput mandals. A total of fifty farmers were selected from all the five villages and demonstrated the integrated crop management in Niger *i.e*. improved variety JNS 28, optimum seed rate, seed treatment with salt solution, foliar spraying of Bio fertilizers (Azotobacter, PSB and KRB) and spraying of 5% neem oil. No chemicals were used in the demonstration. Whereas, farmers practice was non adoption of scientific recommendations. Data was recorded on pest and disease incidence (%), yield (kg/ha) and analyzed.

Table 1. Particulars of demonstrated locations

S. No	Name of the village	Mandal	No of farmers	Geo coordinates and MSL
1	Mebha	Munchingput	12	18.481 N 82.510 E;950 MSL
2	Arama	Dumbriguda	10	18.255N 82.737 E;925 MSL
3	Bodimela		10	18.288N 82.791 E;918 MSL
4	Garudaguda	Arakuvalley	8	18.296N 82.939E; 1038 MSL
5	Arakuvalley		10	18.360 N 82.866 E;1056 MSL

Table 2a. Village wise Results of demonstration on ICM in Niger during 2023

S. No	Name of the village	Mandal	No of farmers	Yield (Kg/ha)		Per cent increase
				ICM	FP	
1	Mebha	Munchingput	12	542	452	19.9
2	Arama	Dumbriguda	10	587	476	23.3
3	Bodimela		10	568	452	25.6
4	Garudaguda	Arakuvalley	8	548	468	17.0
5	Arakuvalley		10	565	442	27.8

Table 2b. Results of demonstration on ICM in Niger during 2023

Parameters	ICM (T1)	Farmers Practice (T2)	Per cent increase
Yield kg/ha	562	458	+ 22.7
Pest incidence	8.2	19.4	- 57.4
BC Ratio	1: 4.80	1:3.95	

3. RESULTS AND DISCUSSION

The results indicated that, the ICM demonstrated fields has recorded improved yields (562 kg/ha) compared to the farmers practice (458 kg/ha) in the ASR District. The productivity of niger crop was improved upto 22.7 per cent in the ICM demonstrated plots. Research has shown that the productivity of Niger can be significantly improved by growing improved crop varieties and using fertilizers. The usage of bio fertilizers viz., Azotobactor, PSB and KRB played a crucial role in availability of nutrients to the plant growth and development of pods. Choudhari et al., 2023 also confirmed that, application of 75% RDF + Vermicompost + Azotobacter + PSB had a substantial impact on growth metrics such plant height (cm), number of leaves, leaf area, and dry matter and recorded higher yields. The higher growth and yield can be obtained by the higher level of by providing sufficient amount and nutrients (Chowhan et al., 2023a, Chowhan et al., 2023b) made available to the Niger crop to exploit the yield potential (Kasle et al., 2020).

Also, in the ICM plots semi looper incidence was only 8.2% whereas, in the farmers plots it was recorded upto 19.4 %. Timely usage of plant protection measures and spraying of simple bio pesticide like neem oil @ 5ml/l, controlled the semi looper population and thus, helped in recording the higher yields. Earlier research also proved that, by the improved cultivation practices and use of high yielding variety JNS-28, the farmer harvested 9.25 q/ha Niger (Rajani et al., 2022).

3.1 Extension Activities

DAATTC, ASR District has also conducted three capacity building programmes to the selected farmers on Niger crop management practices and production technologies periodically and created awareness. Also conducted field day on performance of ICM in Niger to the nearby village farmers.

3.2 Impact of ICM In Niger Cultivation

Most of the farmers were convinced with the integrated crop management practices in Niger. Now, farmers of the selected mandals district are showing keen interest and have started growing this crop (cultivar JNS-28) with integrated crop management practices in an area of about 50 ha. Increase in MSP gave an additional encouragement to the farmers to take the crop even in plains.

4. CONCLUSION

Niger cultivated in most of the bare land in tribal areas in India under poor conditions. This is still the life of a group of farmers and businessmen. The research has proved that, the poor productivity in Niger can be enhanced though the integrated crop management practices included, improved variety, optimum nutrient management and pest management. Higher net returns will improve the socio-economic status of hill and tribal farmers.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models

(ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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