



Araku tribal farmers revealed Little Millet crop productivity three times more under the Natural Farming practices in the ASR district of AP.

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ABSTRACT

This project was carried out with the objective of enhancing Little Millet crop productivity by the local Landrace known as **Peddasama** three times more through natural farming practices. The study was carried out with Araku tribal farmers of Alluri Sitharama Raju district of Andhra Pradesh. The sample farmers were selected through a random selection process and distributed Pedda Sama Millet seeds to cultivate on their lands. 14 farmers were selected for these trials out of these 11 farmers were selected as experimental and 3 were selected as control groups. During the harvesting period, Watershed Support Service Activities and Network (WASSAN) set up validation trials in the tribal farmer's fields. Scientists from Regional Agriculture Research Stations (RARS) Chintapalli and Agriculture extension officers jointly organized the crop-cutting experiments. The data revealed that Peddasama grain yield increased from a mean average of 544kg/ha (AICRP report 2017) to 1958kg/per ha under Natural farming practices.

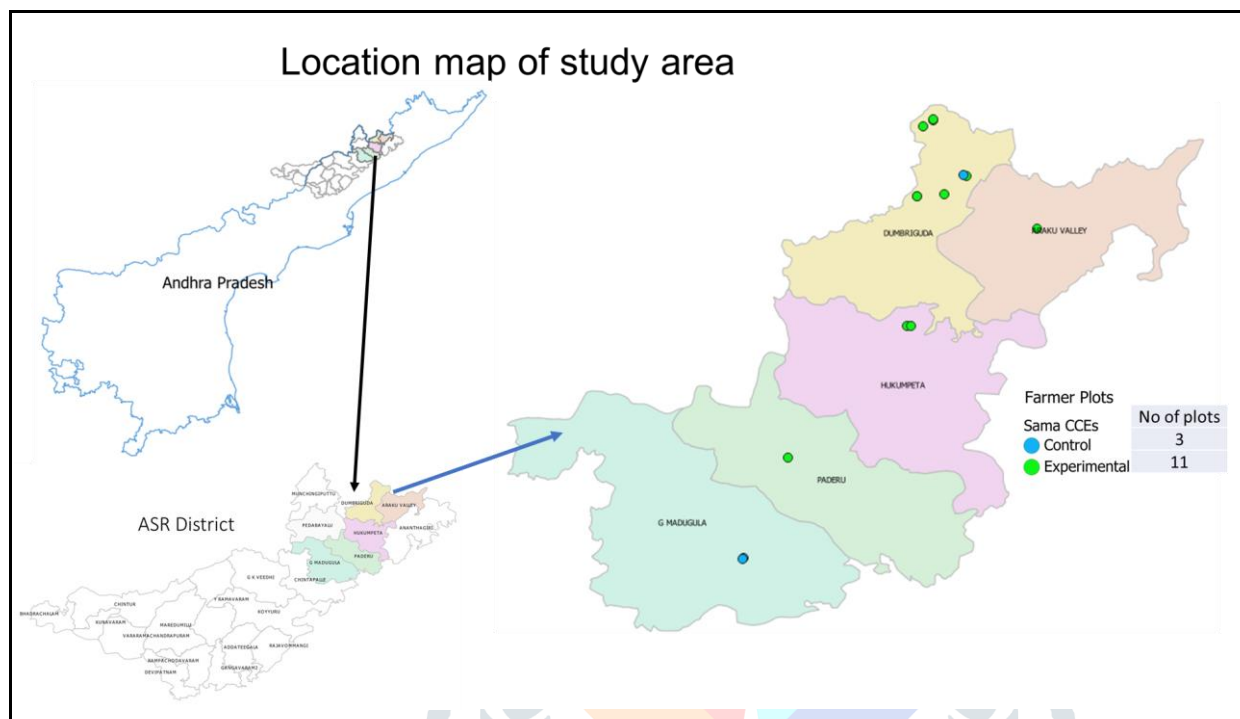
Keywords: Little Millet Productivity, Natural Farming, Peddasama, System of Millet Intensification.

INTRODUCTION:

Millets are gradually gaining popularity due to their nutritional-rich and consumers are also exploring various food products to obtain a safe and healthy diet. Millets are climate-resilient crops that can grow on barren and degraded soils under rainfed conditions. However, the millet net cultivated area is low as expected. Rainfed farmers have their own choices for allocating land to cultivate millets. Tribal farmers never consider Millets for market, their priority is self consumption hence some portion of land is being used for growing millets. Low productivity is one of the barriers to farmers taking up millet cultivation where there is high market demand. Traditionally, tribal farmers of the ASR district grow Little millet (*Panicum sumatrense*) landrace locally called Peddasama on rainfed drylands. grows up to 2 meters in height and is also a drought-tolerant variety. Farmers generally grow this crop under the broadcasting method, which gives a yield of an average of 544kg per ha under the broadcasting system. During Kharif 2023, as per the E Crop data of GoAP, a total of 5304 farmers cultivated Little Millet in 6605 acres in Andhra Pradesh, Alluri Sitharamaraju district alone covered 87% of the net area sown. Farmers can retain their lands to grow millets when they are able to get a good yield from their lands. WASSAN had done an experiment with this variety to see the crop yield potentiality in the farmer field, the trial was done in the fields of farmer Sonnu of Baliyaguda village in the Kharif 2018, farmer achieved a yield of 6.4quintal per acre as per the crop cutting experiment done on 9th November 2018. In this context, *the second-level experiments were done with Little millet farmers in Kharif 2023 and revealed with 24.96 quintals of grain per hectare was obtained and the average productivity was 19.60 quintals/ ha through intensive natural farming practices in the field.*

PROJECT STUDY AREA:

Alluri Sitharama Raju District is one of the North Eastern districts of Andhra Pradesh and it lies between $17^{\circ} - 17'$ and $18^{\circ} - 21'$ of Northern latitude and between $80^{\circ} - 53'$ and $82^{\circ} - 50'$ in Eastern longitude. It is bounded on the North partly by the Odisha State Partly by Chattisgarh State and partly by Telangana State on the South by Anakapalli, Kakinada and East Godavari Districts on the West covered by Godavari River and East by Vijayanagaram District.



The average rainfall of this district is 1500mm. The District presents a distinct geographic division. It consists of the hilly regions covered by the Eastern Ghats with an altitude of about 900 meters dotted by several peaks exceeding 1200 meters. Soils are mainly red sandy loams and light to medium in texture. They are continuously affected due to severe weathering aberration of natural disturbances. The normal annual rainfall is 1252 mm and the mean annual temperature varies from 24 C to 35 C. May is the hottest month and January is the coolest month. Agriculture is the main source of livelihood of the people living in this area and the people practice shifting cultivation on hill slopes. Shifting cultivation is locally known as podu cultivation. The district is comprised of 22 Mandals, under 2 revenue divisions such as Paderu and Rampachodavaram.

MATERIALS AND METHODS:

Farmers were selected from Dumbriguda, G Madugula, Arakuballey, Humkumpeta and Paderu Mandals of ITDA Paderu revenue division. WASSAN organized a training program for farmers on (System of Millet Intensification) SMI Sama in the field of Navgana Murthy of Pedagaruvu village of Kotnapalli GP of Hukumpeta Mandal on 3rd July 2023. Farmer's orientation was done on methodology and packages of practices which are to be followed under this experimentation. A total of 45 farmers and Natural farming field staff were attended. After the training program, 14 farmers were finalized and split into two groups, 11 farmers as the experimental group and 3 as the control group. A mobile application was developed to capture data from farmers every fortnightly and used the "Peddasama" local landrace for this trial for both control and experimental groups. Geo-tagging of study plots was done to ensure similar types of soil across all the plots, sandy loam soils are predominant in the area. crop-cutting experiments were conducted in all the plots by using 5*5 mts plots to measure the yield per acre. Invited Agricultural research stations to be part of the evaluators along with Agri extension officers and AP Community Managed Natural Farming staff to evaluate the crop yield scientifically. At the time of the CCE experiments, ribbons are tied to demark plots and tools like a Ragi thresher, a digital moisture meter, a weighing scale and a tarpaulin sheet were carried to the fields. The format was developed to capture farmer's practices and grain yield details and got the signatures from the evaluators who participated in the

CC experiment. The actual grain was calculated while discounting the moisture content. The table 1 presents the package of practices followed in experimental and control plots.

Table 1: Recommended POPs in experimental and control plots.

Experimental Plot packages	Control Plot practices
<ol style="list-style-type: none"> 1. Use of local landrace known as “Peddasama” seeds which is 150 days crop duration. 2. Seeds to be treated with Beejamrutham 3. Raised bed nursery 40sft (4*10ft)and used seedlings (between 20 days to 30 days old) for transplantation in the main field by line sowing method 4. Recommended 1-ton FYM and 0.4 tons of Ghana Jeeramrutham on the mainland before transplantation. 5. 3 times application of Drava Jeemarmutham (600 litres) 6. One-time weeding is to be done 15 days after the transplantation 	<p>Allowed farmers to follow their own practices by cultivating Peddasama.</p> <p>Broadcasting method</p> <p>Weeding is the farmer's choice</p> <p>FYM application/ NF application is purely farmers' choice.</p>

There is a high potential to increase yield when farmers do weeding twice and enhance tillering capacity in such plots. Farmers can use seedlings up to 30 days old for the best yield.

Table-2: Inputs in the Experimental group:

Plot	GJA / per acre in kgs	FYM/ acre In kgs	DJA used (litres/ acre)	Seedlings age (days)	spacing between plants in (feet)	No of times weeding done	Average manicles per heap	Grain yield in kg/ha
1	200	200	200	30	1	1	5	2336.8
2	0	400	400	25	1	2	10	2040.7
3	400	400	0	27	1	1	9	1904.7
4	1000	2500	200	22	1	1	7	1999.9
5	0	1000	0	30	0.5	1	9	2068.7
6	600	0	600	25	1	1	5	1892.7
7	2000	2000	0	20	1	1	8	2023.9
8	400	400	400	21	1	1	10	2200.8
9	500	400	200	21	1	2	9	2496.9
10	167	0	400	21	1	1	6	1260.4
11	1333	1333	0	25	1	0	7	1314.5



A young tribal farmer in his Millet farm in Gorapur village of Dumbriguda Mandal

JETIR

Marking plots for CC Experiments in farmer's fields



RESULTS AND DISCUSSION:

Farmers generally get 544kg/per ha under the traditional farming system as shown in table 2, , whereas frontline demonstrations carried out by AICRP in their university research stations recorded a mean average of 1483kg/ha from 55 farmers when they did trials under the conventional method across 6 states on Little Millet. The tribal farmers of ASR districts revealed that 1958kg/ha through natural farming practices.

Table-3: Yield obtained under different farming practices

S.No	Methods	Variety of Little Millet	Average yield obtained (Kg/ha)
1	Traditional Farming System	Desi seeds	544
2	Front line demonstrations (AICRP) under conventional method	BL6	1483
3	ARS, Vizianagaram (AICRP) under conventional method	BL6	1745
4	Natural Farming Practices	Pedda sama (Landrace)	1958

In the experiment plots: farmers who have used seedlings between 20 to 30 days old achieved yield ranges from 1260 kg/ ha to 2496kg/per ha, average yield was 1958 kg/ha. The Agricultural research station at Vizianagaram recorded an average grain yield of 1745kg/ha (BL6 variety) through their field-level demonstration under the conventional method (AICRP-SM FLD report 2023).

Table-4:Experimental Plots:

Plot	Farmer Name	Latitude	Longitude	Date of CCE done	Grain weight (12% moisture) in 5*5mt plot	Grain yield in g/ha
1	Gillo Jamuna	18.35249	82.819448	31-Oct-2023	5.84	2336.8
2	Jimudu Nando	18.427055	82.796473	30-Oct-2023	5.10	2040.7
3	Thangula Anand	18.433718	82.80723	30-Oct-2023	4.76	1904.7
4	Corra Daneswararao	18.207535	82.778557	1-Nov-2023	5.00	1999.9
5	anni Dharma	18.314844	82.922356	6-Nov-2023	5.17	2068.7
6	Thangula Thulasi	18.434086	82.807464	4-Nov-2023	4.73	1892.7
7	angi Purushottham	18.350188	82.789443	5-Nov-2023	5.06	2023.9
8	Gillo Govind	18.371971	82.844579	28-Oct-2023	5.50	2200.8
9	okkoyi Ramana	18.350181	82.789442	11-Nov-2023	6.24	2496.9
10	urru Laxmayya	18.062511	82.647704	7-Nov-2023	3.15	1260.4
11	ake Gopi	18.207485	82.782923	5-Nov-2023	3.29	1314.5
					Mean	1958.2

In the control group farmers followed their own practices like broadcasting method by using Peddasama seeds. Applied inputs like 200kg of FYM and one time of Jeevamrutham and weeding was not done. The crop-cutting data reveals that farmers can get a yield range from 984.3kg/ha to 1732kg/ha with an average of 1233kg/ha. (see table-5)

Table-5:Control Plots:

Plot	Farmer Name	Latitude	Longitude	Date of CCE done	Grain weight (at 12% moisture in 5*5 mt Plot)	Grain yield in kg/ha
12	Gillo Subbarao	17.953076	82.598359	2-Nov-2023	2.46	984.3
13	angi Subbarao	17.952213	82.597447	2-Nov-2023	4.33	1732.6
14	Gillo Mahadev	18.372737	82.840514	2-Nov-2023	2.46	984.3
				Average		1233.8

CONCLUSION:

All India Coordinated Research on Small Millets (AICRP-SM) recommends the little millet seed rate of 8kg/ha for line sowing and 12kg/ha is required for the broadcasting method, 5tons of FYM per ha along with chemical fertilizers for better yield. However, the study reveals that tribal farmers can achieve an average of 1958kg/ha through natural farming practices when farmers follow the transplantation method. These results are breaking barriers on Little Millet productivity through local landrace. Universities can include Peddasama seeds in their varietal trial process and FLD trials to record the yield potentiality and also recognize Peddasama landraces under PPVFR to bring them into mainstream seed supply systems.

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