

Finger Millet (Ragi) Intensification: Applying principles of SRI - A Training Report



Venue: Laya Resource Centre, Paderu, Visakhapatnam

Date: 21st May 2016



Department of Agriculture,
Government of Andhra Pradesh



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System of Ragi Intensification

Finger Millet (Ragi) is an important millet crop in the north coastal tribal areas of AP; both in the tribal food cultures and in the farming systems. The average productivity is around 400 kg per acre. As a part of the “Siri Dhanyam” program (*see box*), a training program was organized on improved agronomic measures and application of SRI principles to improve productivity without chemical inputs.

Participants

35 farmer resource persons and 11 members from the facilitating agencies from East Godavari, Visakhapatnam, Vizianagaram and Srikakulam Districts participated in the training. 6 members from RRA Malkangiri team from Odisha also attended (*Annexure - 1*).

Resource Person

Jacob Nellithanam, from anchoring a Centre for Indigenous Farming Systems, Chhattisgarh and Dr. M.L. Sanyasi Rao from WASSAN facilitated the training. LAYA hosted the program in Paderu in their training center with Ravi Kumar helping in logistics.

“Siri Dhanyam Kaaryakramam”

Comprehensive Revival of Millets, a program of Department of Agriculture, AP intends to revive millets in rainfed farming systems and household consumption.

Including diverse millets in crop systems, improving productivity, promoting processing enterprises, inclusion of millets in state nutrition programs and promoting markets are the strategic areas of intervention.

Web link: www.wassan.org/Millets.htm



Objective of the training

- To introduce SRI system on ragi to enhance productivity in the tribal area.
- To convert farmers to adapt and grow ragi under SRI system.
- To increase the capacities of CRPs on best agronomy practices to enhance millets productivity.

All participants reached training venue at 10 am however RRA Malkangiri team reached at 11.30am.

After the registration and self-introduction, context and objective of the training was explained by MLS Rao.

First session

Initial interaction brought out that broadcasting seeds is a dominant method of ragi cultivation in tribal areas; transplanting is rarely practiced but yields about two quintals additional yield (4 to 6 qt per acre) with 2-3 tillers more than broadcasted crop.

Jacob posed the central question as how to increase ragi yields to 15

quintals per acre. LAYA, Vikasa and Kovel foundation are promoting SRI in Rice. Laya is working with 400 farmers on SRI and VISAKA with 50 farmers and Kovel Foundation with 24 farmers. But there is no experience in applying SRI principles to rainfed Ragi cultivation. Drawing from the experiences in Chhattisgarh, Jacob explained the potential of applying SRI practices and principles in ragi cultivation with some precautions.

Precautions

- **Locally adapted seed to be chosen for cultivation.**
- **Aware about the rainfall pattern in the area**
- **Ensuring protective irrigation facility**
- **Ensuring the availability of tools like markers and weeders**
- **Timely application of Bio fertilizers other packages of practices.**

SRI in Ragi cultivation

(see powerpoint in the Annexure - 3)

Seed Selection

- Quality and best suitable variety to be chosen.
- Select variety as per the soil condition and crop duration.



Nursery bed preparation

- Preparation of raised bed 40 sq.mt or 4 beds of 4 m length and 1 m width will be sufficient for an acre of land.
- While making bed mix 500kg fully decomposed FYM.
- 400g of seeds sufficient to develop seedlings in the nursery bed which will be sufficient to transplant them in an acre of land.
- Seed treatment to be done with locally available material (Put the seeds into the water and remove floated seeds and particles from the water.
- Soak seeds in Panchagavya (35 ml in one litre of water) for 7 - 8 hours before sowing for the production of disease free seedlings.
- Treated seeds should be mixed either with sand or vermicompost while sowing seeds on the nursery bed, ensure seeds should be spread equally.
- Apply thin layer of vermicompost or fully decomposed FYM on the bed after seed is sown.
- Spray *Jeevamrutham* by adding water at 1:10 ratio on nursery bed (it can be done within 3days of seed sown it makes root zone more friable).
- During sunny days (temperature above 35°C) having a green shade net until germination would be useful; it can be used as protection from birds too.
- Ideal age of ragi seedlings to transplant on actual land is 15 to 20 days; but should not exceed 30days.

Land preparation

- Well ploughed plain land is ideal for SRI cultivation though it can also be tried in lands with slope lands.
- Add 2tons of fully digested FYM in an acre of land and incorporate.
- If manure is not available, green manure crops like sun hemp, *Crotalaria*, *Sesbania*, etc, can be incorporated. Mulching with such biomass will also help in regulating weeds.
- Make the lines before furrow making at 12" spacing by wooden marker.



- Mark the lines across the slope to prevent soil erosion (possibly contour lines).
- Preparation of ridge and furrow by cycle wheel hoe.
- Open up the lines marked using marker.
- This will create ridge and furrow.
- Planting point marking by fine compost/ash at 10" spacing.
- Use rope shifting it across furrow at 10".
- Take care not damage the ridges
- Put compost on side of ridge not inside furrow.

Transplantation in Main field



- Collect seedlings without root damage at 15-25 days of age and plant it in the furrows one side where compost is placed at 10 inch mark.
- Don't plant the seedling deep by pressing down. Rather cover by putting soil after placing seedling

Weeding and top dressing

- Weeding should be done at 10-12 days interval by cycle wheel hoe.
- Apply Jeevamrta / Vermicompost immediately after interculture or weeding.

- Weeding should be done three times during the crop season.
- Do weeding at 12-15 days interval when the soil is friable.
- Cycle wheel hoe and simple hand weeding tools can be used.
- Using a light *rolling log* press down the seedling bending them without damage.



Pest and Diseases:

- Sucking pest, stem borer & some fungal infection may occur. Apply solution of Garlic-ginger/ Nimastra in its recommended dose.

Field Based Training



weeding and watering etc. 4 such beds will be sufficient for an acre of land.

Field visit was organized to Sukraput village of Dumbriguda Mandal for the participants to get practical experiences on SRI method. Sri Ram Naidu hosted the training in his plot. Ram Naidu already prepared two raised beds one was seeded on 2nd may and the second was on 9th May 2016 as a part of the preparatory work. Jacob suggested nursery bed must be raised manner with one-meter width and 4 meters length so that it will be easier for

Participants leveled the ploughed land (main field) with wooden tool/ Patta. Marking made by using pick axe, rope and twigs. Space between two rows was 25 cm and ensured the same for plant to plant as well. Furrows were prepared across the slope. Furrows will also prevent the soil erosion and retains the soil moisture for longer period. Rope was used to mark and charcoal ash was used to make spot for planting seedlings. All participants actively involved in land preparation, marking and transplantation. In this demo Jacob suggested to use 20 days old seedlings to plantation.



Jacob explained the benefits of using light weight wooden log after weeding; It helps in better establishment of plant root system.

Due to non availability of cycle weeder in the field, trainees could not get demonstration on weeding through cycle weeder.

Preparation of Jeevamrutham

Sri.TataBabu from SMILE, demonstrated preparation of Jeevamrutham. He mixed the following (quantities sufficient for an acre).

- | | |
|-----------------------|--|
| ✓ Cow urine- 5 liters | ✓ Ant hill mud/
Puttamatti-
100g |
| ✓ Cow dung-5kg | |
| ✓ Pulses flour- 1kg | |
| ✓ Jaggery- 1kg | |



The material was mixed and rotated clock wise till all ingredients are mixed well (rotate in one direction only) and left to ferment. Jeevamrutam can be used after preparation from the 3rd day and can be kept for a week. Apply Jeevamrutham after diluting it with water in 1:10 ratio (Jeevamrutham and water).

Sunny facilitated discussion about the follow up of on this training. All participants agreed to adapt the practice and mobilize 50 farmers from each group for cultivation of Ragi through SRI method in 50 acres.

Narsing Rao handed over the manual on SRI to each NGO which was prepared by WASSAN. Seeds like Sri Chaitanya (Ragi), OLM 203, Co3, Peddasama (Sama) and CSV 15 (Jonnalu), Pitta ganti seeds are distributed to the NGOs for conducting varietal trials along with indigenous varieties.

Video documentation has covered this training and edited version will be shared with concerned groups later.

Annexure - 1: List of Participants

Participants who were attended the training programme on Ragi cultivation on SRI method

Sl no	Name Of The Participant	Organization	District	Contact Number
1	S. Nageswararao	vikasa	Visakhapatnam	9493426835
2	S. Ramunaidu	vikasa	Visakhapatnam	9492400457
3	P. Ammaji	Sanjeevini	Visakhapatnam	9441482812
4	P. Rajababu	Kovel	Visakhapatnam	9493026127
5	G. Raja Prakash	Kovel	Visakhapatnam	9492822446
6	P. Devullu	Sanjeevini	Visakhapatnam	9440119789
7	Gollachinnamangireddy	Kovel	East Godavari	9494542522
8	Illa Venkatareddy	Sakti	East Godavari	
9	Ontikudamallireddy	Kovel	East Godavari	
10	Arikakrishnarao	ARTS	Srikakulam	9949725199
11	Bichchikakameswararao	ARTS	Srikakulam	9493436891
12	Savara Ramesh	CRP	Srikakulam	8897502781
13	Savarapentayya	CAVS	Srikakulam	8374758038
14	Savara Suresh	CRP	Srikakulam	9502074290
15	Villi Appannadora	CRP	Srikakulam	7382086683
16	Vanthalabonjubabu	CRP	Srikakulam	9494462792
17	B. Eswararao	Kovel	Visakhapatnam	9177237616
18	K. Saithone	Sanjeevini	Visakhapatnam	9494312081
19	M. Satarusena	Laya	East Godavari	
20	M. Koteswararao	Laya	East Godavari	9493563092
21	M. Laxmayya	Laya	East Godavari	
22	S. Krishnapadal	Laya	East Godavari	8330947430
23	S. Masosu	CAVS	Srikakulam	9100818252
24	S. Pinnalarao	Smile	Visakhapatnam	7382512560
25	L. Lingannadora	CRP	Visakhapatnam	9494456535
26	P. Tatababu	Smile	Visakhapatnam	9491786935
27	B. Preethi	ARTS	Srikakulam	9515259456
28	Ch. Rajatareddy	SVDS	Visakhapatnam	7382388064
29	M. Venkata Reddy	Kovel	East Godavari	8333033781

SI no	Name Of The Participant	Organization	District	Contact Number
30	K. Koteswararao	Laya	East Godavari	9440541298
31	Meesalamurali	Jattu	Vizainagaram	9494012228
32	Gottasuryanarayana	AASRA	Vizainagaram	7093442376
33	Ramani	RRA network	Malkangiri	9178896965
34	Sanjay Ku Saha	RRA network	Malkangiri	8895232694
35	Jyothirmayeebiswas	RRA network	Malkangiri	9438553543
36	Subhalaxmi Das	RRA network	Malkangiri	7077672571
37	Simon Batshed	RRA network	Malkangiri	9438655562
38	Rakesh Kumohana	RRA network	Malkangiri	9437814744
39	Mamatamohaptra	RRA network	Malkangiri	9668487937
40	Killothharmarao	Sanjeevini	Visakhapatnam	9493653968
41	S. Madhu	Nature CRP	Visakhapatnam	9441839525
42	K. Ramachandoor	Nature	Visakhapatnam	9441102318
43	T. Narasingarao	WASSAN	Visakhapatnam	9491787476
44	A. Padmavathi	Laya	Visakhapatnam	9492312925
45	M. Satyanarayana	Farmer	Visakhapatnam	9490352253
46	T. Harinadharao	Farmer	Visakhapatnam	9640228123
47	N. Srinivas Anand	Laya	East Godavari	9491806314
48	Mata Puskkararao	Laya	East Godavari	8985942285
49	M.L.S. Rao	WASSAN	Visakhapatnam	9440561846
50	Jacob Nellithanam	Richcharia Campaign	MP	9425560950
51	Boinichittibabu	Farmer	East Godavari	9491871056
52	Masadi Hari Krishna	Farmer	East Godavari	9490049152

Annexure - 2: Seed distribution for Varietal Trials

Sl no	Name of the district	Organisation	Sri. Chaitanya	Indi. var	PeddaSama	Ind. var	OLM 203	CO- 3	Sajja	Sorghum
1	Srikakulam	ARTS	1 kg		1 kg		1 kg	1 kg		
2	Srikakulam	CAVS	1 kg		1 kg		1 kg	1 kg		
3	Srikakulam	SWEEP	1 kg		1 kg					
4	Vizainagaram	JATTU	1 kg		1 kg		1 kg	1 kg		
5	Vizainagaram	AASARA	1 kg		1 kg		1 kg	1 kg		
6	Visakhapatnam	SANJEEVINI	2 kg		1 kg		1 kg	1 kg		
7	Visakhapatnam	NATURE	1 kg		1 kg					
8	Visakhapatnam	VIKASA	1 kg		1 kg					1 kg
9	Visakhapatnam	SVDS	1 kg		1 kg					
10	Visakhapatnam	SMILE	1 kg		1 kg		1 kg	1 kg		
11	Visakhapatnam	KOVEL	1 kg		1 kg					
12	Visakhapatnam	SRDO	1 kg		1 kg					
13	East Godavari	LAYA	1 kg		1 kg				4 kg	
14	East Godavari	SAKTI	1 kg		1 kg					
15	East Godavari	KOVEL	1 kg		1 kg					
Total			15 kg		15 kg		6 kg	6 kg	4 kg	1 kg

- Ragi seed, little millet OLM 203 and CO-3 seed procured from ARS, Vizianagaram
- Peddasama purchased from Dumbriguda farmer
- Sajja and sorghum procured from CAVS

Annexure - 3: Presentation of Jacob Nellithanam

SRI-Finger-millet

Richharia Campaign
Chattisgarh- Madhya Pradesh

Seed selection & treatment

- Seed rate: 300-400 gm per acre for Finger millets.
- Seed treatment: Seed should be treated by Bijamrita as like dry seed treatment.
- Seed selection: Adapted popular local variety to be selected according to soil type and crop duration.

Seed Bed

- Mix treated seed with sand/Vermicompost
- Spread the seeds on raised dry seedbed.
- Give a thin layer of FYM on it.
- Apply Jibamrit on seed bed to make the root zone more friable.
- Fourty square metres area needed for an acre of transplanted area

Main field



- Well ploughed & friable.
- Use well digested farm yard manure before land preparation
- Can grow a green manure crop during the month of July
- Ploughed at least three times.

Line marking on main field



- Make the lines before furrow making at 12" spacing by wooden marker(in Picture).
- Mark the lines across the slope to prevent soil erosion (possibly contour lines).

Preparation of furrow



- Preparation of ridge and furrow by cycle wheel hoe.
- Open up the lines marked using marker.
- This will create ridge and furrow.

Demarkation



- Planting point marking by fine compost/ash at 10" spacing.
- Use rope shifting it across furrow at 10".
- Take care not damage the ridges
- Put compost on side of ridge not inside furrow.

Transplantation



- Remove seedlings without root damage at 15-25 days of age and plant it in the middle of furrows in one side where compost is placed at 10 inch mark.
- Don't plant the seedling deep by pressing down.
- Rather cover by putting soil after placing seedling

Weeding cum top dressing



- Weeding should be done in 10-12 days interval by cycle wheel hoe.
- Apply Jibamrit/ (Vermicompost also) immediately after interculture
- Total three weeding should be done.

Weeding the most important



- Cycle wheel hoe and simple hand weeding tools can be used.
- Do weeding at 12-15 days interval when the soil is friable.
- Using a light rolling log press down the seedling bending them without damage.

Standing crop after 1st weeding



After third weeding



Mature crop



Indigenous wheel hoe by Bhaktu at Kondagaon



Diseases & Pest

- Sucking pest, stem borer & some fungal infection may occur. Apply Handidawa/ Garlic-ginger paste/ Nimastra in it's recommended dose.
- Using locally adapted local varieties is more important to prevent diseases and pests.

Expected Yield

- SRI- in Finger millets can give 10-12 quintal per acre of yield against 4-6 quintal per acre in traditional farmers practice.
- Better soil fertility management and agronomy as suggested has potential to yield up to 15-20 Quintal/acre