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A study on recommended finger millet production technology by the farmers from Kolhapur district of Maharashtra, India

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Abstract
Millets are small grained cereals, referred as “Poor man’s cereals”. Millets are known in India from Vedic times and have their own position at religious functions and consumed in fasting. As small millets are highly nutritious now called as nutri millets even superior to rice and wheat in certain constituents like calcium, iron etc. In view of this millet diet is advocated to children's, pregnant women's, patients recovered from prolonged illness and anemic patients. The study was undertaken in Kolhapur district of Maharashtra State during the year 2016-17. Four tahasils namely Panhala, Karveer, Radhanagari and Shahuwadi were selected purposively for the study having good area under Finger Millet crop. On the basis of the highest area, 3 villages from each tahasil were selected. 10 Finger Millet growing farmers were selected on the basis of highest area for interview from the selected villages. Thus, in all 120 farmers were finally selected for the study. Most of the respondents had knowledge about the Finger Millet cultivation practices like type of soil and pre-cultivation (100.00 per cent), sowing distance with seed drill (93.33 per cent), seed rate (90.83 per cent), threshing and harvesting (100.00 per cent) and yields (88.33 per cent). In case of chemical seed treatment (15.84 per cent), organic seed treatment (3.33 per cent), crop protection from heliothis (13.33 per cent) and spraying of Zyneb against the control of blast disease (32.50 per cent) the respondents had little knowledge. Majority of the respondents had completely adopted the Finger Millet cultivation practices in respect of soil (92.50 per cent), Pre-cultivation like plowing and harrowing (88.33 per cent), weeding (100.00 per cent) and harvesting and threshing (100.00 per cent). A very few respondents had completely adopted the Finger Millet cultivation practices like application of FYM (5.00 per cent), chemical seed treatment (2.50 per cent). In case of plant protection, the adoption is very low i.e. control of aphids, leaf and grain cutting larvae (7.50 per cent), control of heliothis (1.66 per cent) and spraying of Zyneb against blast disease (7.50 per cent).

Keywords: Finger millet, production technology, knowledge, adoption, constraints

Introduction
Millets are small grained cereals, referred as “Poor man’s cereals”. These hardy cereals are grown where other cereals failed to yield satisfactorily due to unfavorable agro-climatic conditions. Millets are known in India from Vedic times and have their own position at religious functions and consumed in fasting. As small millets are highly nutritious now called as nutri millets even superior to rice and wheat in certain constituents like calcium, iron etc. In view of this millet diet is advocated to children's, pregnant women's, patients recovered from prolonged illness and anemic patients.

Small millets formed a group of six minor coarse cereals, namely Finger millet (*Eleuasine coracana*), Little millet (*Panicum miliare*), Kodo millet (*Paspalum scrobiculatum*), Foxtail millet (*Setaria italica*), Barnyard millet (*Echinochlola frumentacea*) and Proso millet (*Panicum miliaceum*).

Finger millet also known as Ragi, Finger Millet or Nachani is one of the important millets of semi- arid topics particularly of India and East Africa. It is supposed to be originated in Ethiopia and latter transferred to India during pre- aryan periods. It is extensively grown in the state of Karnataka, Andhra Pradesh, Orissa, Bihar, Gujarat, Tamil Nadu and Maharashtra. Finger millet is the most important millet grown in Maharashtra State which alone accounts tentatively for about 50 percent area and more than 2/3 rd production of total small millets. The area, production and productively of finger millet in Maharashtra (Table-1) revealed that, the area under finger millet was highest during 2000-01. However the production and productivity was highest during 2001-02.

The area and production of finger millet during the period of 1999 to 2010 shows declining trend (173600 has to 115700has and 168000tons to 97000 tons respectively). While the productivity of finger millet also seems to be fluctuate from 830 kg/ha to 1205 kg/ha. The average production of finger millet of state is 903 kg/ha and Kolhapur region is 1396 kg/ha. Thus the study was undertaken with the following objectives.

Objectives

1) To study the knowledge level of Finger Millet growers about the recommended cultivation practices.
2) To study the extent of adoption of recommended cultivation practices by the Finger Millet growers.
3) To study the constraints faced and suggestions made by the Finger Millet growers for efficient use of Finger Millet production Technology.

Methodology

The study was undertaken in Kolhapur district of Maharashtra State. Four tahasils namely Radhanagari, Shahuwadi, Gaganbawada and Karveer were selected purposively for the study having good area under Finger Millet crop. On the basis of highest area, 3 villages from each tahasil were selected. The villeges selected were Pungaon, Shirgaon and Dhamod from Radhanagari; Shembawane, Barki and Mosam from Shahuwadi; Kode Khurd, Dhundawade and Jargi from Gaganbawada and Berkalwadi, Mandhare and Chafodi from Karveer tahasil. With the consultation of Taluka Agril. Officer of the concerned tahasil, 10 Finger Millet growing farmers were selected on the basis of highest area for interview from the selected villages. Thus, in all 120 farmers were finally selected for the study.

Results

Knowledge and adoption of farmers about the Finger Millet production technology

The efforts were made to know the knowledge and adoption of farmers about the recommended Finger Millet Production Technology. The data thus, obtained is presented in Table 1.

Table 1: Distribution of the farmers according to their knowledge and adoption of the Finger Millet production Technology

Sr. No.	Production Technology	Knowledge (N=120)	Adoption		
			Complete	Partial	No
1	**Soil** Light to medium, well drained, having sufficient quantity of Organic material.	107 (89.17)	95 (79.17)	12 (10.00)	13 (10.83)
2	**Pre-cultivation** a) Plowing and 2 Harrowing	118 (98.33)	113 (94.17)	5 (4.17)	2 (1.66)
	b) Mixing of 20 to 25 cartload FYM at the time of harrowing.	73 (60.83)	27 (22.50)	39 (32.50)	54 (45.00)
	c) Laying of Continuous contour trenches or vegetative bunds at specific distance for rain water conservation.	91 (75.83)	33 (27.50)	13 (10.83)	74 (61.67)
3	**Sowing distance** a) Sowing with seed drill at 22.5 cm (9 inches) distance	79 (65.83)	39 (32.50)	29 (24.17)	52 (43.33)
	b) Transplanting at 22.5 x 10 cm distance	67 (55.83)	31 (25.83)	23 (19.17)	66 (55.00)
4	**Seed rate** 3 to 4 kg/ha	89 (74.17)	57 (47.50)	29 (24.17)	34 (28.33)
5	For transplanting preparation of seedlings on raised beds and transplanting after 25 to 30 days	97 (80.83)	73 (60.83)	24 (20.00)	23 (19.17)
6	Sowing by seed drill in low rain fall area.	29 (24.17)	13 (10.83)	12 (10.00)	95 (79.17)
7	Transplanting from nursery in high rainfall area.	90 (75.00)	69 (57.50)	21 (17.50)	30 (25.00)
8	**Improved varieties** a) Early: V.L. 149, P.E.S. 400, G.P.V. 26 b) Mid late: R.A.V.8, H.R. 374,Dapoli 1, G.P.U. 28 c) Late: P.R. 202, P.E.S. 110, Indaf - 8	38 (31.67)	33 (27.50)	5 (4.17)	82 (68.33)
9	**Seed Treatment** a) **Chemical** – Use of 3 to 4 gm Thirum or Folidol for 1 kg of seed before sowing.	19 (15.83)	3 (2.50)	6 (5.00)	111 (92.50)
	b) **Organic**- Use of 25 gm Azospirilum brosilence and Aspergilus abomori each for 1 kg of seed before sowing.	12 (10.00)	3 (2.50)	2 (1.66)	115 (95.84)
10	**Nursery Management** Raised beds of 1 to 1.5 m width, 8 to 10 cm high and long as per the slope. Use of 3 kg of FYM per sq. meter area, use of 1 kg Urea/ Gunta, 1 to 2 cm deep line sowing with 7 to 8 cm distance between two lines, use of 1 kg urea/Gunta after 15 days from sowing and transplanting after 25 to 30 days from sowing.	76 (63.33)	55 (45.84)	19 (15.83)	46 (38.33)
11	**Fertilizer management** a) Lighter type of soil: Use of 30 kg N and 20 kg P.	54 (45.00)	43 (35.83)	12 (9.17)	66 (55.00)
	b) Medium deep type of soil use of 60 kg N and 30 kg P	19 (15.83)	4 (3.33)	7 (5.84)	109 (90.83)
12	**Inter culturing** a) Thinning after 20 to 25 days from sowing and retaining of 1 healthy plant at one place.	103 (85.83)	53 (44.17)	19 (15.83)	48 (40.00)
	b) Weeding and hoeing as per need during first month.	120 (100.00)	120 (100.00)	-	-
	c) Spraying of weedicides i.e. Oxiflorophen (Gol) 100 gm/ 500 liters of water or Osoproturon 50% w.s. 375 gm/500 liter of water.	5 (4.17)	-	-	120 (100.00)

13	**Crop Protection** a) 10 ml. Rogor and 15 ml Endosulphan per 10 liter of water are to be sprayed for controlling aphids, leaf and grain cutting larvae.	69 (57.50)	21 (17.50)	9 (7.50)	90 (75.00)
	b) Dusting of 2% Methyl parathion 20 kg powder/ha. for the control of heliothis.	13 (10.83)	2 (1.66)	3 (2.50)	115 (95.84)
	c) Spraying of zyneb or Carbendenzim (Bavistin) or Mancozeb 2.5 to 3.0 gm/liter water for the control of blast disease.	33 (27.50)	17 (14.17)	7 (5.83)	96 (80.00)
14	**Harvesting and threshing** a) Harvesting by cutting the ear heads by sickle after maturity.	120 (100.00)	120 (100.00)	--	--
	b) Threshing with beating of ear heads by sticks.	120 (100.00)	120 (100.00)	--	--
15	**Yield** Yield - 25 to 30 quintals/ha	97 (80.83)	24 (20.00)	--	96 (80.00)

(Figures in parenthesis indicates percentage.)

The data from Table 1 indicates that, most of the respondents had knowledge in respect of recommended Finger Millet Production Technology like type of soil (89.17 per cent), pre-cultivation (98.33 per cent), Sowing distance (65.83 per cent), Seed rate (74.17 per cent), preparation of seedlings (80.83 per cent), nursery managements (63.33 per cent), inter culturing (100.00 per cent), harvesting and threshing (100.00 per cent) and about yields (80.83 per cent).

Also, it is observed that 45.00 per cent of the respondents had knowledge about the use of chemical fertilizers in lighter type of soil and improved varieties (31.67 per cent).

While, in case of chemical seed treatment (15.83 per cent), Organic seed treatment (10.00 per cent), Crop protection from heliothis (10.83 per cent) and spraying of Zyneb against the control of blast disease (27.50 per cent) the respondents had little knowledge.

The data in respect of adoption of recommended Finger Millet production Technology reveals that the level of adoption is less as compared to their level of knowledge. Further, the data indicates that, majority of the respondents had completely adopted the Finger Millet Production Technology in respect of Soil (79.17 per cent), pre-cultivation like plowing and harrowing (94.17 per cent), preparation of seedlings for transplanting (60.83 per cent), Nursery management (45.84 per cent) and harvesting and threshing (100.00 per cent).

However, very few respondents had completely adopted the Finger Millet production technology like sowing of Finger Millet by seed drill (10.83 per cent), use of improved varieties (27.50 per cent), chemical seed treatment (2.50 per cent), organic seed treatment (2.50 per cent), applying control measures against the aphids and leaf and grain cutting larvae (17.50 per cent), control of halitosis (1.66 per cent) and spraying of Zyneb against blast disease (14.17 per cent). Only 20.00 per cent of the respondents received the recommended yield.

Constraints faced by the Finger Millet growers in the adoption of Finger Millet Cultivation Technology

The efforts were made to know the constraints of the Finger Millet growers in effective adoption of Finger Millet cultivation practices. The data thus, obtained are presented in Table 2.

Table 2: Distribution of the respondents according to their constraints.

Sr. No.	Constraints	Frequency (N=120)	Per cent
1	Lack of remunerative price for the produce	106	88.33
2	Heavy price of fertilizers	103	85.83
3	Un-certainly of yield	89	74.17
4	Heavy labor rates	83	69.17
5	Lack of knowledge of improved variety	77	64.17
6	Un-availability of laborers	76	63.33
7	Un-availability of improved varieties	69	57.50

The data in Table 2 revealed that the Finger Millet cultivators faced the constraints like lack of remunerative price for the produce (88.33 per cent). Heavy price of fertilizers (85.83 per cent), Uncertainty of yield (74.17 per cent), Heavy labor rates (69.17 per cent), Lack of knowledge of improved variety (64.17 per cent), un-availability of labors (63.33 per cent) and un-availability of improved varieties (57.50 per cent), in the adoption of recommended Finger Millet Production Technology.

Conclusions

1. Most of the respondents had knowledge about the Finger Millet Production Technology like type of soil (89.17 per cent), Pre-cultivation (98.33 per cent), Sowing distance (65.83 per cent), Seed rate (74.17 per cent), Preparation of seedlings (80.83 per cent), nursery management (63.33 per cent), interculturing (100.00 per cent), threshing and harvesting (100.00 per cent) and about yields (80.83 per cent).
2. In case of chemical seed treatment (15.83 per cent), organic seed treatment (10.00 per cent), crop protection from heliothis (10.83 per cent) and spraying of Zyneb against the control of blast disease (27.50 per cent) the respondents had little knowledge.
3. The level of adoption is less as compared to their level of knowledge.
4. Majority of the respondents had completely adopted the Finger Millet Production Technology in respect of soil (79.17 per cent), Pre-cultivation like plowing and harrowing (94.17 per cent), preparation of seedlings for transplanting (60.83 per cent) and harvesting and threshing (100.00 per cent).
5. A very few respondents had completely adopted the Finger Millet Production Technology like sowing of Finger Millet by seed drill (10.83 per cent), use of improved varieties (27.50 per cent) and seed treatment (2.50 per cent).

6. In case of plant protection the adoption is very low i.e. control of aphids, leaf and grain cutter larvae (17.50 per cent), control of heliothis (1.66 per cent) and spraying of Zyneb against blast disease (14.17 per cent).
7. The Finger Millet growers faced the constraints like lack of remunerative price for the produce (88.33 per cent), Heavy price of fertilizers (85.83 per cent), uncertainty of yield (74.17 per cent) lack of knowledge of improved varieties (64.17 per cent) and unavailability of improved varieties (57.50 per cent).

Implications

1. The agribusiness based on the Finger Millet crop such as papad making, biscuit making may be generated on large scale for the unemployed youth and training may be given accordingly.
2. The seed of improved varieties may be made easily available to the Finger Millet growers though the personnel from the Department of Agriculture.
3. Remunerative price in the market for the Finger Millet may be fixed by the Government.

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