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Study of Dryland Farming Technologies by the Dryland Farmer's In Beed District of Maharashtra State

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ABSTRACT
In Maharashtra 84.00 per cent area under dryland agriculture Only 16.00 per cent area has irrigation facility in Maharashtra which cannot be increased to more than 25.00 per cent of total crop area. Beed district comes under the scarcity and assured rainfall zone. Due to adverse climatic conditions and lack of irrigation Facilities. The production and productivity of agriculture is low Vasantrao Naik Mrathwada Krishi Vidyapeeth, Parbhani and Dryland Agriculture Research Station, Parbhani are playing major role in evolving various major dryland farming technologies in Marathwada. Hence the present study was conducted in Ambajogai, Ashti and Gevarai talukas of Beed district as majority of area is under dryland farming practices. The objective of this study was to study the knowledge of dryland farming technologies by the dryland farmers. The sample was constituted 120 dryland farmers. The ex-post facto research design was used for the present study. More than half 65.83 per cent dryland farmer's medium level of knowledge, 17.51 per cent of them high knowledge level and 16.66 per cent low level of knowledge of dryland farming technologies.
Keywords: Key words: - Agriculture, Knowledge, Dryland Farming and Technologies

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INTRODUCTION

Agriculture is an important sector of Indian Economy as more than half of its population relies on Agriculture as main source of income. India has about 108 million ha of rainfed area which constitute nearly 75.00 per cent of the total 143 million of arable land. As many as 115 districts of the country of the dryland farming spread over the two third of cultivated area of country and about 280 million people are living in this belt. India has about 47 million ha. Under dryland out of about 108 million ha. of total cultivated area for food grain production of country. These area produce 75.00 per cent of pulses, 65.00 per cent of cotton, 80.00 per cent of oilseed and more than 90.00 per cent of sorghum and other millet from arid and semi-arid regions. It supports 40.00 per cent of country population and 65.00 per cent of livestock population. Thus dryland and rainfed farming will continue to play a dominant role in Indian agriculture. (Comprehensive District Agriculture plan 2012 -2017). Dryland area besides being high temperature during summer, high evaporation rates, high humidity, high runoff, soil erosion and water deficient. The water is the most important factor of crop production, inadequacy and uncertainty of rainfall cause partial or complete failure of crops which deals to period of scarcities and famine. In Maharashtra 84.00 per cent area is under dryland agriculture. Only 16.00 per cent area has irrigation facility in Maharashtra which cannot be increased to more than 25.00 per cent of total crop area. Nearly 40.00 per cent of total cropped area of the state is affected by chronic scarcity conditions. The rainfall in this area ranges from 500 to 700 mm accompanied with dry spell of longer or shorter duration. The rainfall is erratic, inadequate and uncertain where the crop are grown within the available rainfall. The drought prone area distributed the state in 114 tahsils of 15 districts comprising 11,801 villages, drought affected (reliefweb.net).

About 70.00 to 75.00 per cent of dryland area is cropped during rabi season (Economic survey of Maharashtra 2015-2016). In Maharashtra, the fortune of agriculture on a large chunk of area depend on

temporal and spatial distribution of South-West monsoon rains. In Maharashtra, the fortune of agriculture on a large chunk of area depend on temporal and spatial distribution of South-West monsoon rains. Therefore, some farmers have adopted the dryland technologies for farming.

MATERIAL AND METHODS

The present study was conducted during the year 2017-2018 by following Ex-post–Facto research design. This study was conducted in Ambajogai, Ashti and Gevarai talukas of Beed district as majority of area is under dryland farming practices.

Sampling procedure

Selections of taluka

The study was purposively conducted in Ambajogai, Ashti and Gevarai tahasil of beed district on the basis of maximum dryland technology adopted by the farmers.

Selection of villages

Four villages was selected purposively from each taluka, thus total 12 villages was selected for the present study.

Selection of respondents

From selected village, list of dryland technology adopted farmers were prepare with the help of Agriculture Assistance and from that list 10 respondents were selected from each village to comprise total sample 120.

Tools and techniques of data collection

The data was collected with the help of specially designed interview schedule by keeping in view the objectives of study.

RESULT AND DISCUSSION

Practice wise knowledge of dryland farming technologies

The practice wise knowledge of the dryland farmers with respect to selected dryland farming technologies is also studied with a view of know whether the farmers possessed complete, partial or no knowledge about these practices.

Table 1: Distribution of dryland farmers according to their practice wise knowledge of dryland farming technologies.

Sr. No.	Dryland farming technology	Complete knowledge		Partial knowledge		No knowledge	
		No.	Per cent	No.	Per cent	No.	Per cent
1	**Bunding and terracing**						
	i) Land leveling	120	100.00	00	00.00	00	00.00
	ii) Compartmental bunding	23	19.16	61	50.83	36	30.00
	iii) Contour bunding	31	25.83	61	50.83	28	23.33
	iv) Graded bunding	15	12.50	45	37.50	60	50.00
2	**Use of drought resistant/improved variety**	59	49.16	42	35.00	19	15.83
3	**Seed treatment**						
	i) Biofertilizers	07	05.83	33	27.50	80	66.66
	ii) Chemical	05	04.16	99	82.50	16	13.33
4	**Crop rotation**						
	i) Legume - non legume	43	35.83	67	55.83	10	8.33
	ii) Different root depth	29	24.16	42	35.00	49	40.35
5	**Cropping system**						
	i) Inter cropping	35	29.16	85	70.83	00	00. 00
	ii) Mixed cropping	57	47.50	63	52.50	00	00. 00
	iii) Multiple cropping	76	63.33	44	36.66	00	00. 00
6	**Contingent cropping**						
	i) 15 Jun -30 Jun	54	45.00	43	35.83	23	19.16
	ii) 8 July -15 July	47	39.16	49	40.83	24	20.00
	iii) 16 July- 31 July	56	46.66	63	52.50	01	0.83
	iv) 1 Aug-15 Aug.	09	07.50	57	47.50	54	45.00
	v) 16 Aug -31 Aug.	30	25.00	51	42.50	39	32.50
	vi) 20 Sept- 30 Sept.	110	91.00	09	7.50	01	0.83
	vii) 1 Oct- 15 Oct.	23	19.66	34	28.33	63	52.50

	viii) 16 Oct- 1 Nov.	17	14.16	28	23.33	75	62.50
7	**Mixed farming**	116	96.66	04	3.33	00	00. 00
8	**Mulching and Antitranspirants**						
	Mulching	46	38.33	52	43.33	22	18.33
	Antitranspirant	00	00. 00	56	46.66	64	53.33
9	**In-situ moisture conservation**						
	i) FYM application	67	55.83	53	44.16	00	00. 00
	ii) Contour cultivation	31	25.83	37	30.83	52	43.33
	iii) Wind breaks & shelter belt	12	10.00	54	45.00	54	45.00
	iv) Grassed waterways	00	00. 00	33	27.50	87	72.50
	v) Strip cropping	07	5.83	19	15.83	94	78.33
	vi) Inter-row water harvesting	70	58.33	50	41.66	00	00. 00
10	**Micro-irrigation**						
	i) Drip irrigation	60	50.00	29	24.16	31	25.83
	ii) Sprinkler irrigation	47	39.16	4	3.33	69	57.50
11	**Ground water recharge**	27	22.50	19	15.83	74	61.66
12	**Farm pond**	19	15.83	00	00. 00	101	84.16
13	**Alternate land use**	15	12.50	21	17.50	84	70.00
14	**Integrated pest**						
	management						
	i) Cultural methods	61	50.83	59	49.16	00	00. 00
	ii) Mechanical methods	11	9.16	86	71.66	23	19.16
	iii) Chemical methods	13	10.83	41	34.16	66	55.00
	iv) Biological methods	11	9.16	30	25.00	79	65.83
15	**Integrated nutrient management**	18	15.00	39	32.50	63	52.50
16	**Soil Characteristics**	110	91.66	10	08.33	00	00. 00
17	**Weed Management**	114	95.00	06	05.00	00	00. 00
18	**Deep ploughing**	117	97.50	03	2.50	00	00. 00
19	**Zero tillage**	07	5.83	67	55.83	46	38.33
20	Minimum tillage	11	09.16	75	62.50	34	28.33

Bunding and terracing and Use of drought resistant improved varieties

It was observed that dryland farmers have complete knowledge about land leveling. It was also observed that 50.83 per cent of the farmer's partial knowledge of compartmental bunding, 50.83 per cent partial knowledge, high knowledge 05.83 per cent and no knowledge 23.33 per cent of contour bunding. About 50.00 per cent of the farmers no knowledge of graded bunding while that of 37.50 per cent partial knowledge and only 12.50 per cent of them complete knowledge. From the table 1 it reveals that 49.51 per cent of the respondents have complete knowledge of use of drought resistant or improved varieties followed by 35.00 per cent of them with partial knowledge and 15.83 per cent with no knowledge. It is revealed that maximum number of (66.66%) farmers no knowledge about bioferlilizers seed treatment. is followed by 27.50 per cent with partial knowledge and only 5.83 per cent high knowledge of chemical seed treatment. It is revealed that maximum number of (82.50%) farmer's partial knowledge about chemical seed treatment. is followed by 13.33 per cent with no knowledge and only 04.16 per cent high knowledge of chemical seed treatment.

Crop rotation and Cropping system

It was observed that 55.83 per cent of the respondent partial knowledge followed by 35.83 per cent and 08.33 per cent complete and no knowledge of legume non-legume crop rotation. It was also observed that 40.33 per cent, 35.00 per cent and 24.16 per cent of the respondents no, partial and complete knowledge of crop rotation as per different root depth respectively. It can be seen from Table 1 that 70.83 per cent of the respondents have partial knowledge and 29.16 per cent of them have full knowledge

regarding intercropping, 52.50 per cent of the respondents partial while that of 47.50 per cent complete knowledge of the mixed cropping. It was observed that 63.33 per cent of the respondents complete knowledge and 36.66 per cent of them partial knowledge of multiple cropping.

Contingent cropping

With respect to contingent cropping, it was observed that 45.00 per cent complete knowledge while that of 35.83 per cent and 19.16 per cent partial and no knowledge about contingent cropping in 15 Jun. to 30 Jun, respectively. It can be seen that in case of contingent cropping in 8 July to 15 July, 40.83 per cent have partial knowledge, followed by 39.16 per cent have complete knowledge and to about 20.00 per cent have no knowledge. It was observed that, maximum number of (52.50%) farmers partial knowledge and 46.66 per cent complete knowledge continent cropping in 16 to 31 July. It was observed that, maximum number of (45.00%) farmers no knowledge and 47.50 per cent partial knowledge continent cropping in 1 to 15 Aug. It was observed that, maximum number of (42.50%) farmers partial knowledge and 32.50 per cent no knowledge and 25.00 per cent complete knowledge continent cropping in 16 to 31 Aug. It was observed that, maximum number of (91.00%) farmers complete knowledge and 7.50 per cent partial knowledge continent cropping in 20 to 30 Sept. It was observed that, maximum number (52.50%) of farmers no knowledge and 28.33 partial knowledge per cent and 19.66 per cent complete knowledge continent cropping in 1 to 15 Oct. It was observed that, maximum number (62.50%) of farmers no knowledge and 23.33 per cent partial knowledge per cent and 14.16 per cent complete knowledge continent cropping in 16 Oct. to 1 Nov.

Mixed farming, Mulching and Antitranspirants and In-situ moisture conservation

It is also clear from Table 1 that among the (96.66%) of the dryland farmer's complete knowledge at mixed farming while that 03.33 per cent partial knowledge of mixed farming.It was observed that 43.33 per cent of dryland farmers partial knowledge of mulching while 38.33 per cent complete knowledge and 18.33 per cent no knowledge of mulching. It was observed that not a single farmer complete knowledge about antitranspirants 46.66 per cent of the farmers partial knowledge and 53.33 per cent no knowledge of antitranspirants. It was observed that 55.83 per cent respondents complete knowledge FYM application and remaining 44.16 per cent partial knowledge regarding contour cultivation, it was observed that 43.33 per cent respondents no knowledge, while 30.83 per cent and 25.83 per cent partial and complete knowledge respectively. It was observed that 45.00 per cent of the respondent partial knowledge whereas 45.00 per cent no knowledge and 10.00 per cent complete knowledge of wind breaks and shelter belts. It was observed that 72.50 per cent and 27.50 per cent of the respondent dryland farmers no knowledge and partial knowledge, respectively with respect to grassed waterways. It was observed that 78.33 per cent farmers no knowledge of strip cropping white 15.83 per cent and 05.83 per cent partial and complete knowledge, respectively. With respect to inter-row water harvesting it was observed that 58.33 per cent of the dryland farmers complete knowledge about it while that of 41.66 per cent partial knowledge.

Micro-irrigation and Ground water recharge

It was observed that 50.00 per cent of the farmers complete knowledge of drip irrigation while that of 25.83 per cent and 24.16 per cent no and partial knowledge about drip irrigation, respectively. It was observed that, about half of the (57.50%) total number of respondents no knowledge while that of complete and no knowledge respondents were about equal in number about 39.16 per cent and 03.33 per cent, respectively. It was observed that, about 61.66 per cent of the dryland farmers no knowledge of ground water recharge followed by 22.50 per cent and 15.83 per cent of the exponents complete knowledge and partial knowledge, respectively.

Water harvesting and recycling (farm pond) and Alternate land use

It was observed that, 84.16 per cent of the respondent dryland farmers no knowledge about farm pond while that of 15.83 per cent complete knowledge about water harvesting and recycling (farm pond).It can be seen from Table 15 that 70.00 per cent of the respondents no knowledge of alternate land use. It is seen that majority (17.50%) of them partial knowledge and only 12.50 per cent complete knowledge of alternate land use.

Integrated pest and disease management

It was observed that 50.83 per cent of the respondent dryland farmers complete knowledge and remaining 49.16 per cent of them partial knowledge about cultural methods of pest and disease control. Regarding mechanical method of pest disease control, it was revealed that 71.66 per cent respondents partial knowledge and remaining 19.16 and 09.16 per cent No and complete knowledge. It can be seen from Table 15 that 55.00 per cent of the respondents no knowledge about chemical methods of disease and pest control followed by 34.16 per cent and 10.83 per cent partial knowledge and complete knowledge about chemical method of pests and disease control.

With respect to biological method of pest and disease control it is seen that about half at the respondents (65.83%) no knowledge while that of 25.00 per cent partial knowledge and 09.16 per cent complete knowledge about pests and disease control.

Soil Characteristics and Integrated Nutrient Management

It can be seen from Table 15 that 91.66 per cent of the respondents complete knowledge of soil characteristics. Only 08.33 per cent partial knowledge of soil characteristics. It can be seen from Table 15 that 52.50 per cent of the respondents no knowledge of integrated nutrient management. It is seen that majority (32.50%) of them partial knowledge and only 15.00 per cent complete knowledge of integrated nutrient management.

Weed Management and Deep Ploughing

It can be seen from Table 15 that 95.00 per cent of the respondents complete knowledge of weed management and only 05.00 per cent partial knowledge of weed management. It can be seen from Table 15 that 97.50 per cent of the respondents complete knowledge of deep ploughing and only 02.50 per cent partial knowledge of deep ploughing.

Zero Tillage and Minimum Tillage

It can be seen from Table 15 that 55.83 per cent of the respondent's partial knowledge of zero tillage. No and complete knowledge 38.33 and 05.83 per cent respectively. It can be seen from Table 15 that 62.50 per cent of the respondent's partial knowledge of zero tillage. No and complete knowledge 28.33 and 09.16 per cent respectively. This result is in line of the finding of Suman [7].

Overall knowledge level of dryland farmers

***Knowledge*-"**The term knowledge was operationalized as the farmer's awareness about the dryland farming technologies. The information pertaining to knowledge level of the dryland farmers presented here"

Table 2: Distribution of dryland farmer according their level of knowledge is presented is presented is below.

Sr. No	Overall Knowledge	N=120	
		Number	percent
1	Low (up to 39)	20	16.66
2	Medium (40 to 51)	79	65.83
3	High (52 and above)	21	17.51
	Total	**120**	**100.00**

The data in Table 2 indicates that more than half (65.83%) dryland farmers have medium level of knowledge. While 17.51 per cent of them have high knowledge level and 16.66 per cent have low level of knowledge of dryland farming technologies. It is indicated that the knowledge level of majority of the respondents was medium. The medium knowledge level might be due to the fact that they been exposed to different sources of information at medium level. Most of the intercultural practices were generally known to the respondents but new recommended dryland farming technologies were not known to the respondents. The finding is in line with the finding of Suman [7], Kumar [4].

CONCLUSION

The practices about which respondents have complete knowledge were land leveling (100.00%), drought resistant variety (49.46%), multiple cropping (63.33%) mixed farming (96.66%), (91.00%), cultural methods of pests control , (91.66%), weed management (100.00%), deep ploughing, antitranspirants (53.33 %), grassed waterways (72.50 %), strip cropping (78.33 %), sprinkler irrigation (57.50%), ground water recharge (61.66%), alternate land use (70.00%), chemical method of pest management (55.00%), biological method of pest management (65.83%). The findings of the study indicates that the, there is need to motivate the farmers by the extension agencies, NGOs for adoption of dryland farming technologies. The farmers should be made aware about declining ground water level, agricultural officers from banks and Government should arrange programmes for economic literacy so that farmers can regularly repay the loan get the benefit of interest subsidy and credit generation in banks of taking loans for drip irrigation etc.

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