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

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ABSTRACT
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 and this technology adopted by the farmers. The objective of this study was to study the extent of adoption 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. Majority of dryland farmers which having completely adopted following farming technologies like, land leveling (87.50%), mixed farming (67.50 %), FYM application (54.16%), inter-row water harvesting (55.83%), cultural method of pest management (50.83) soil characteristics (96.66%), weed management (100%) and deep ploughing. (100%) It also, partially adopted were drought resistant variety (57.50 %), chemical seed treatment (65.00%), legume – non legume crop rotation (50.83%), multiple cropping (70.00%) and mulching(42.50%).
Key words: - Adoption, 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

Summary of the farmers profile:

The study pointed out that 60.84 per cent of the farmers belonged to middle age group followed by old age group (20.00%) and young age group (19.16%). A large majority (38.33%) of farmer's undergone primary education followed by secondary (29.16%), illiterate (13.33%), higher secondary (10.83%) and graduate level (08.35%) education. Maximum numbers of the farmers have medium (59.16%) and small (32.50%) size of family. It was observed that 69.16 per cent of the farmers have medium annual income followed by 18.34 per cent have high annual income.

There are 34.16 per cent farmers have medium size of land holding ranging from 2.01 to 4.00 ha. 6. 67.50 per cent of the farmers have medium sources of information. Maximum numbers (46.66%) of the farmers have medium cosmopoliteness. There are (65.83%) of the farmers have medium risk orientation followed by 20.00 per cent having low risk orientation. It was observed that 59.16 per cent of the farmers have medium extension contact, followed by 26.66 per cent low extension contact. Maximum numbers of the farmers have medium (55.00%) and low (30.00%) innovativeness.

Practice wise adoption of dryland farming technologies by dryland farmers

Table 1: Distribution of dryland farmers according to their practice wise adoption of dryland farming technologies. (N=120)

Sr. No.	Dryland farming technology	Complete adoption		Partial adoption		No adoption	
		No.	Per cent	No.	Per cent	No.	Per cent
1	**Bunding and terracing**						
	i) Land leveling	105	87.50	15	12.50	00	00.00
	ii) Compartmental bunding	02	1.16	15	12.50	103	85.83
	iii) Contour bunding	23	19.16	47	39.16	50	41.66
	iv) Graded bunding	03	02.50	11	9.16	106	88.33
2	**Use of drought resistant/improved variety**	36	30.00	69	57.50	15	12.50
3	**Seed treatment**						
	i) Biofertilizers	05	4.16	14	11.66	101	84.16
	ii) Chemical	07	5.83	78	65.00	35	29.16
4	**Crop rotation**						

	i) Legume - non legume	43	35.83	61	50.83	32	26.66
	ii) Different root depth	10	8.33	36	30.00	74	61.66
5	**Cropping system**						
	i) Inter cropping	23	19.16	47	39.16	50	41.66
	ii) Mixed cropping	05	4.16	31	25.83	84	70.00
	iii) Multiple cropping	17	14.16	84	70.00	19	15.83
6	**Contingent cropping**						
	i) 15 Jun -30 Jun	70	58.33	31	25.33	19	15.83
	ii) 8 July -15 July	47	39.16	41	34.16	32	26.66
	iii) 16 July- 31 July	35	29.16	47	39.16	38	31.66
	iv) 1 Aug-15 Aug.	03	02.50	37	30.83	80	66.66
	v) 16 Aug -31 Aug.	09	07.50	34	28.33	77	64.16
	vi) 20 Sept- 30 Sept.	110	91.66	06	5.00	04	3.33
	vii) 1 Oct- 15 Oct.	14	11.16	21	17.50	85	70.83
	viii) 16 Oct- 1 Nov.	19	15.83	27	22.50	74	61.66
7	**Mixed farming**	81	67.50	29	24.16	10	8.33
8	**Mulching and Antitranspirants**						
	Mulching	19	15.83	51	42.50	50	41.66
	Antitranspirant	03	02.50	21	17.50	96	80.00
9	**In-situ moisture conservation**						
	i) FYM application	65	54.1	55	45.83	00	00.00
	ii) Contour cultivation	31	25.83	45	37.50	44	36.66
	iii) Wind breaks & shelter belt	12	10.00	63	52.50	45	37.50
	iv) Grassed waterways	02	1.66	28	23.33	90	75.00
	v) Strip cropping	08	6.66	23	19.16	89	74.16
	vi) Inter-row water harvesting	67	55.83	53	44.16	00	00.00
10	**Micro-irrigation**						
	i) Drip irrigation	03	2.50	34	28.33	83	69.16
	ii) Sprinkler irrigation	02	1.66	07	05.83	111	92.50
11	**Ground water recharge**	22	27.50	25	20.80	68	56.66
12	**Farm pond**	19	15.83	07	5.83	94	78.33
13	**Alternate land use**	13	10.83	30	25.00	77	64.16
14	**Integrated pest**						
	management						
	i) Cultural methods	61	50.83	59	49.16	00	00.00
	ii) Mechanical methods	13	10.83	92	76.66	15	12.50
	iii) Chemical methods	08	6.66	53	44.16	59	49.16
	iv) Biological methods	10	8.33	29	24.16	81	67.50
15	**Integrated nutrient management**	28	23.33	69	57.50	23	19.16
16	**Soil Characteristics**	116	96.66	04	03.33	00	00.00
17	**Weed Management**	120	100.0	00	00.00	00	00.00
18	**Deep ploughing**	120	100.0	00	00.00	00	00.00
19	**Zero tillage**	03	02.50	18	15.00	99	82.50
20	Minimum tillage	06	05.00	19	15.83	95	79.16

Bunding and terracing and Use of drought resistant improved varieties

It reveals from the table 1that majority i.e. 87.50 per cent of respondents complete adoption of land leveling and remaining 12.50 per cent partial adoption of land leveling. It reveals from the table 1that majority i.e. 85.83 per cent of respondents no adoption of land compartmental bunding and remaining 12.50 per cent partial adoption of compartmental bunding. It was noticed that 19.16 per cent of the respondent's complete adoption of contour bunding while that of 39.16 per cent and 41.66 per cent of the respondents partial and no adoption of contour bunding. It was found that three farmer adopted graded bunding whereas 09.16 per cent partially adoption and 88.33 per cent of respondents no-adoption of dryland technologies. It was revealed that 57.50 per cent of the respondents partial adoption of use of drought resistant or improved varieties followed by 30.00 per cent of them complete adoption and only about 15.50 per cent no -adoption.

Seed treatment, Crop rotation and Cropping system

It was noticed that none of the respondent complete adoption of bioferilizer seed treatment and about 11.66 per cent partial adoption. Vast majority of the respondents (84.16%) no- adoption of the biofertilizer seed treatment. In case of chemical seed treatment 5.83 per cent complete adoption of whereas 65.00 per cent and 29.16 per cent partial and no- adoption.

It was found that 22.50 per cent, 50.83 per cent and 26.66 per cent of dryland farmers complete partial and no adoption of crop rotation of legume, non-legume respectively. It was observed that, 61.66 per cent of the respondents no adoption followed by 30.00 per cent and 8.33 per cent partial and non-adoption respectively of the crop rotation as per different root depth. Table 1demonstrates that 19.16 per cent of the respondents complete adoption of intercropping, whereas 39.16 per cent partial adoption and 41.66 per cent no-adoption of inter cropping. It was noticed that majority (70.00%) of the respondents no adoption of mixed cropping followed by 25.83 per cent and 04.16 per cent partial and complete adoption of mixed cropping. It was revealed that 14.16 per cent of the respondent's complete adoption while that of 70.00 per cent and 15.83 per cent partial and no adoption of multiple cropping.

Contingent cropping

With respect to contingent cropping, it was observed that 58.33 per cent complete adoption while that of 25.33 per cent and 15.83 per cent partial and non-adoption about contingent cropping in 15 Jun 30 Jun, respectively. It can be seen that in case of contingent cropping in 8 July to 15 July, 39.16 per cent have complete adoption, followed by 34.16 per cent have partial adoption and to about 26.66 per cent have no adoption. It was observed that, maximum number of (39.16%) farmers partial adoption and 31.66 per cent no- adoption continent cropping in 16 to 31 July. It was observed that, maximum number of (66.66%) farmers no- adoption and 30.83 per cent partial adoption continent cropping in 1 to 15 Aug. It was observed that, maximum number of (64.16%) farmers no adoption and 28.33 per cent partial adoption and 07.50 per cent complete adoption continent cropping in 16 to 31 Aug. It was observed that, maximum number of (91.66%) farmers complete adoption and 05.00 per cent partial adoption and 03.33 per cent no adoption continent cropping in 20 to 30 Sept. It was observed that, maximum number of (70.83%) farmers no adoption and 17.50 per cent partial adoption and 11.16 per cent complete adoption continent cropping in 1 to 15 Oct. It was observed that, maximum number of (61.66%) farmers no -adoption and 22.50 per cent partial adoption per cent and 15.83 per cent complete adoption continent cropping in 16 Oct to 1Nov.

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

It was observed that, 67.50 per cent complete adoption of mixed farming whereas 24.16 per cent partial adoption and 08.33 per cent no- adoption of mixed farming. It was found that 41.66 per cent of the respondents no- adoption of mulching. It was followed by 42.50 per cent and 15.83 per cent partial and complete adoption of mulching practices, respectively. It was noticed that 02.50 per cent respondent complete adoption of antitranspirants and only 17.50 per cent partial adoption majority (80.00%) of the respondents no adoption of antitranspirants. Table 1shows that 54.16 per cent and 45.83 per cent of the respondents complete and partial adoption of FYM application respectively. It was demonstrated that 37.50 per cent partial adoption followed by 36.66 per cent and 25.83 per cent no and complete adoption of contour cultivation, respectively. It was observed that 52.50 per cent partial adoption followed by 37.50 per cent and 10.00 per cent no and complete adoption respectively of the wind breaks and shelter belts. It was revealed that 01.66 per cent respondent complete adoption of grassed waterways. There were 23.33 per cent partial and 75.00 per cent no- adoption of grassed waterways. It was found that majority 74.16 per cent no adoption of strip cropping. There were 19.16 per cent and 06.66 per cent partial and complete adoption of strip cropping. It was noticed that 55.83 per cent of the respondents complete adoption of inter-row water harvesting followed by remaining 44.16 per cent partial adoption of inter-row water harvesting

Micro-irrigation and Ground water recharge

It can be reported from table 1that 69.16 per cent of the respondents no adoption and remaining 28.33 and 02.50 per cent of them partial and complete adoption of drip irrigation. It was observed that majority i.e. 92.50 per cent of respondents no adoption of sprinkler irrigation and remaining 02.83 and 01.66 per cent partial and complete adoption. It was noticed that 56.66 per cent respondent no adoption and 22.50 per cent complete adoption of ground water recharge methods. 20.83 per cent respondent partial adoption of ground water recharge.

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

It was observed that 78.33 per cent no-adoption of farm pond whereas only 15.83 per cent complete adoption of farm pond. 05.83per cent partial adoption of farm pond. It was demonstrated that 64.16 per cent of respondents no -adoption followed by 25.00 per cent and 10.83 per cent complete adoption of alternate land use, respectively.

Integrated pest and disease management

It was found that 50.83 per cent of the respondents complete adoption and remaining 49.16 per cent partial adoption of cultural methods of pest and disease control. It was noticed that majority (76.66%) of the respondents partial adoption followed by 12.50 per cent and 10.83 per cent no and complete adoption, respectively of mechanical methods of pest and disease control. It was revealed that 06.66 per cent, 44.16 per cent and 49.16 per cent complete, partial and no adoption respectively of the chemical methods of pest and disease control. It was observed that majority (67.50%) no-adoption followed by 24.16 per cent and 08.33 per cent partial and complete respectively with respect to biological methods of pest and disease control.

Soil Characteristics and Integrated Nutrient Management

It was observed that 96.66 per cent complete adoption of soil characteristics whereas 03.33 per cent partial adoption of soil characteristics. It was observed that 57.50 per cent partial adoption of integrated nutrient management, whereas 23.33 per cent complete adoption and 19.16 per cent no -adoption of integrated nutrient management.

Weed Management and Deep Ploughing

It was observed that 100.00 per cent complete adoption of weed management. It was observed that 100.00 per cent complete adoption of deep ploughing.

Zero Tillage and Minimum Tillage

It was observed that 82.50 per cent no-adoption of zero tillage, whereas 15.00 per cent partial adoption and 02.50 per cent adoption adoption of zero tillage. It was observed that 79.16 per cent no adoption of minimum tillage, whereas 15.83 per cent partial adoption and 05.00 per cent complete adoption of minimum tillage.

3. Overall adoption of dryland farming technologies by dryland farmers

***Adoption*-"**Process of adoption as the mental process through which an individual passes from first hearing about an innovation to final adoption. The data pertaining to extent of adoption of dryland farming technologies"

Table 2: Overall adoption of dryland farming technologies by the dryland farmers.

Sr. No	Adoption	Respondents (n= 120)	
		Number	percent
1	Low (Up to 26)	8	06.66
2	Medium (27 to 40)	100	83.34
3	High (41 and above)	12	10.00
	Total	**120**	**100.00**

The data in Table 2 indicates that more than half (83.34%) of the dryland farmers medium level of adoption. It is followed by 06.66 per cent low and 10.00 per cent high level of adoption. It can be said that the level of adoption of the dryland farming technologies of the respondents was about medium level. This result is in line of the finding of Kushreshtha *et al.* [3], Benal *et al*. [1] and Verma *et al* [5].

CONCLUSION

The findings of the study indicates that the, Majority of the dryland farmers were middle aged, educated. They were having medium size of family, medium level of annual income, medium land holding, medium cosmopoliteness, medium risk orientation, medium use of sources of information, medium knowledge about dryland farming technologies and medium adoption of dryland farming technologies. Lack of information about various technologies is the constraints of respondents. To overcome this and for making farmers aware about new schemes and guidance from officer, there is need that Agricultural Assistant should be regular present in office. The newspaper like Agrowon, agricultural magazines should

be placed in Grampanchayat office so that farmer can easily get required information and improve their knowledge and adoption.

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