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Awareness and Adoption Level of Farmers Towards Water Harvesting Practices

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ABSTRACT

Rainwater harvesting has multi uses as it can be used for watering gardens in our homes and crop plants in agricultural fields. Water requirement is mainly supplied by supplemental crop irrigation due to low and uncertain annual rainfall dryland regions. These reduce the reliance of farmers on other sources of water supply to save money. The harvested water can also be committed to longer-term storage or groundwater recharge. Rainwater harvesting and its utilization have a very important role to play in harnessing the production potential within dryland systems. The study was undertaken in Fatehabad and Hisar districts of Haryana to assess the Awareness level of farmers about and to assess the Adoption level of farmers about water harvesting practices during monsoon. The results of the study concluded that a majority (78.75%) of the respondents were aware about Rainwater harvesting practices during monsoon season, 76.25 per cent of the farmers were aware about 'Rainwater harvesting and storage by different methods, about three-fourth (70.00%) of respondents were aware that 'Rainwater harvesting reduces the cost for pumping of groundwater'. About one-third (35.00%) of the respondents were fully adopted 'Laser Land Leveller technology to harvest rainwater uniformly in the field followed by 'Field bunding of farm for rainwater harvesting (31.25%), and 27.50 per cent of the respondents were adopted Rainwater harvesting schemes initiated by the Govt. of Haryana. It is also suggested a movement for popularizing the water harvesting practices should be started among farmers and villagers by all agricultural departments to save the water for further & future use for different purposes.

Key words: Water harvesting practices; Resource; Awareness; Adoption level, Monsoon

As a resource, water is a gift of nature that is most invaluable to humans. Water is also one of the most exploited, mismanaged, and taken-for-granted resources. As populations increase on the planet, this precious resource is becoming stretched and thus requiring attention to make sure it is available to those who are in the greatest need. Population growth, rapid commercialization and exploitation have led to a dire situation. Getting access to water entails a huge investment in human labor in many parts of rural India that do not have access to potable water. The government and individuals have begun to realize that harnessing this resource requires a public partnership approach, a change in mindset across communities. One area that has drawn immediate attention and focus is rainwater harvesting. After the prime minister recently exhorted

the people to adopt rainwater harvesting, this effort has gained immediate focus.

Water is the major limiting factor for crop production in semi-arid and arid regions of the world. In the absence of adequate surface water quantity, groundwater has become the main sources of irrigation in the state and irrigated area has increased from 1.75 million ha in 1975-76 to 3.1 million ha in 2011-2012. The number of tube wells has also increased from 0.20 million in 1975-76 to 0.73 million in 2011-2012. The over exploitation of groundwater resources has resulted in extra power consumption, ecological degradation and the sustainability of agricultural production. Generally, water harvesting is direct rainwater collection. Rain is primary water source while lakes, groundwater and rivers are the secondary water source. Rainwater

harvesting is a type of harvest in which the rain water are collected and stored for the future use, instead of allowing them to run off. Rainwater harvesting can be done at individual household level and at community level in both urban as well as rural areas. At household level, harvesting can be done through roof catchments and at community level through ground catchments. It helps in preventing urban flooding due to excess rain. The stored water can be used for irrigation practices in farming region. The water can be used for daily use and help in reducing water bills in the towns and cities. Now, we are in a climate change era where intense rainfall is expected. Its uses include watering gardens, livestock, irrigation of field crops, domestic use with proper treatment, domestic heating and kitchen gardening. The harvested water can also be committed to longer-term storage or groundwater recharge.

Rain water harvesting is essential because surface water is inadequate to meet our demand and we have to depend on ground water. Due to rapid urbanization, infiltration of rain water into the sub-soil has decreased drastically and recharging of ground water has diminished and conserving water by harvesting and managing this natural resource by artificially recharging the system. Rainwater harvesting and its utilization have a very important role to play in harnessing the production potential within dryland areas/system. The awareness of people regarding rain water harvesting is must because proper awareness about any programmes/schemes resulted in its proper implementation and utilization. Based on this analysis, the results will be generalized to formulate different policy and institutional options proposed for promoting farm-level rainwater-harvesting for dryland agriculture.

METHODOLOGY

The study was undertaken in Haryana State. Amongst twenty-one (21) districts of the State; Fatehabad and Hisar districts and four villages from each district were selected randomly to conduct the study. The villages, namely, Bure, Dubeta, Payal and Chirod from Hisar-I block of Hisar district and villages viz., Bighar, Dharniya, Barseen and Majra from Fatehabad block of Fatehabad district were selected randomly. Hence, fifteen farmers from each selected village were also selected randomly for making the sample 120 farmers for study purpose. The information/data were

collected with the help of random sampling technique. Appropriate statistical design/methods i.e. mean, frequency; percentage and rank order were applied to draw meaningful inferences.

RESULTS AND DISCUSSION

Personal profile of respondents: The data in Table 1 revealed that about two-third of respondents (60.00%) belonged to middle age group (31 to 50 years) followed by old (51 years and above) to the extent of 30.00 per cent. The remaining only 10.00 per cent belonged to young age group (up to 30 years). The data further reported that 25.00 per cent of the respondents were higher secondary followed by 23.33 per cent, 22.50 per cent, 15.00 per cent, 06.67 per cent, 05.00 per cent and only 02.50 per cent having matriculation, graduate, middle, post graduate, primary and illiterate, respectively. The data in Table 1 also reported that about one-third (32.50%) of the respondents have land holding above 5 acres up to 10.00 acres, followed by above 2.5 acres up to 5.00 acres (27.50%), above 10 acres up to 15 acres (17.50%), less than 2.5 acres (12.50%), and above 15 acres (10.00%), respectively.

Irrigation facilities, farming System and cropping pattern : It is revealed from Table 2 that majority of the respondents (80.50%), having both source of irrigation

Table 1. Profile of respondents(N=120)

Variable(s)	No.	%
<i>Age</i>		
Young (up to 30)	12	10.00
Middle (31 to 50)	72	60.00
Old (51 and above)	36	30.00
<i>Education</i>		
Illiterate	3	02.50
Primary	6	05.00
Middle	18	15.00
Matriculation	28	23.33
Higher Secondary	30	25.00
Graduate	27	22.50
Post Graduate	8	06.67
<i>Land holding</i>		
Less than 2.5 acre	15	12.50
Above 2.5 and up to 5 acres	33	27.50
Above 5 and up to 10 acres	39	32.50
Above 10 to 15 acres	21	17.50
Above 15 Acres	12	10.00

Table 2. Irrigation facilities, Cropping Pattern and Farming System (N=120)

Available facilities	No.	%
Source of irrigation		
Submersible pump/Tube well	48	60.00
Canal	56	70.00
Both (Canal+ Tube well/ Submersible pump)	68	80.50
Cropping pattern		
Sole cropping	78	65.00
Mixed cropping	18	15.00
Inter cropping	14	11.67
Multiple cropping	10	08.33
Farming System		
Livestock	106	88.33
Poultry	02	01.67
Fishery	02	01.67
Bee keeping	06	05.00
Organic farming	04	03.33
Mushroom cultivation	09	07.50
Integrated Farming System	18	15.00
Polyhouse vegetable production	12	10.00
*Multiple responses		

Table 3. Crop rotation (N=120)

Crop rotation	No.	%
Rice-Wheat	48	40.00
Cotton-Wheat	98	81.67
Sugarcane Based	08	06.67
Rice-Other crops	12	10.00
Cotton-Other crops	18	15.00
Bajra/Jawar/Guar-Wheat	10	08.33
Bajra/Jawar/Guar-Fallow	08	06.67
Fallow-Wheat	03	02.50
Bajra/Fallow-Mustard	03	02.50
Bajra/Fallow-Pulses	03	02.50

*Multiple responses

Table 4. Mass Media Exposure (N=120)

Mass Media	Used	Extent of utilization			TS	WMS	Rank
		Daily	Often	Sometime			
Newspaper	80	30	30	20	180	1.50	I
	66.67	90.00	60.00	20.00			
Television	90	25	30	35	170	1.41	II
	75.00	75.00	60.00	35.00			
Radio	25	10	08	07	053	0.44	III
	20.83	30.00	16	07.00			

Table 5. Extension Contact (N=80)

Extension Officials	Frequency of contact					TS	WMS	Rank order
	Weekly (4)	Fortnightly (3)	Monthly (2)	Whenever needed (1)	None (0)			
Progressive Farmers	32 (128)	32 (96)	30 (60)	18 (18)	8 (00)	302	2.51	I
ADOs/HDOs	30 (120)	30 (90)	22 (44)	30 (30)	8 (00)	284	2.37	II
Scientists	22 (88)	28 (81)	32 (64)	18 (18)	20 (00)	251	2.09	III
NGO/Coop. Society	19 (76)	17 (51)	24 (48)	38 (38)	22 (00)	213	1.77	IV
Others (Input dealers/Sales rep.)	16 (64)	24 (72)	22 (44)	28 (28)	30	208	1.73	V
SDAO/SMS	10 (40)	12 (36)	21 (42)	35(35)	32 (00)	193	1.61	VI

Figures given in parenthesis indicates percentage

(canal + tube well/submersible pump) followed canal (70.00%) and submersible/tube well alone (60.00%), respectively. In was also observed in Table 2 that a vast majority (88.33%) were doing livestock with agriculture followed by integrated farming system (15.00%), polyhouse vegetable production (10.00%), mushroom cultivation (7.50%), beekeeping (5.00%), organic farming (3.33%), poultry as well as fisheries (1.67%), respectively. It was further observed in table 2 that 65.00 per cent of the respondents practicing sole cropping pattern followed by mixed cropping (15.00%), intercropping (11.67%) and multiple cropping (08.33%), respectively.

Crop rotation: The data showed in Table 3 that majority of the respondents (81.67%) has cotton –wheat cropping

system followed by rice-wheat (40.00%), cotton-other crops (15.00%), rice-other crops (10.00%), bajra/jowar/guar-wheat (8.33%), sugarcane based (6.67%), bajra/jowar/guar-fellow (6.67%), bajra/fellow-mustard (2.50%), fellow-wheat (2.50%) and bajra/fellow-pulses (2.50%), respectively.

Mass Media Exposure: It was depicted from Table 4 that newspaper ranked first with weighted mean score of 1.50 followed by television and radio ranked second and third with weighted mean score of 1.41 and 0.44, respectively as mass media. It was also reported in table 6 that farmers used online solution (32.50%) of respondents followed by farm magazine (27.50%) and Kisan Sewa Kendra (10.00%) to get the information but not in regular use (as and when required).

Table 6. Social media used for Information (N=120)

Social media/ICT tools	No.	%
WhatsApp	92	76.67
Face book	65	54.17
YouTube	60	50.00
Websites	35	29.17
Portal	32	26.67
Apps (e-Mausum)	52	43.33
Any others (twitters, telegram etc.)	12	10.00
*Multiple responses		

Extension Contact: The data depicted in Table 5 revealed that among the extension contact of the farmers, the most popular were the progressive farmers with weighted mean score of 2.51 followed by ADOs/HDOs, Scientists, NGOs/Coop society, input dealer/sales representatives and SDAO/SMS ranked second, third, fourth, fifth and sixth, respectively.

Social media used for getting information: The data from Table 6 reported that 76.67 per cent of respondents got information through WhatsApp followed by Facebook (54.17%), YouTube (50.00%), Apps like e-Mausam

Table 7. Awareness of farmers towards water harvesting practices during monsoon (N=120)

Statements	Awareness level			
	Aware		Not Aware	
	No.	%	No.	%
Are you aware about the rainwater harvesting practices during monsoon	95	79.17	25	20.83
Are you aware about rainwater harvesting practices can increase area under irrigation?	80	66.67	40	33.33
Do you know that rainwater harvesting will increase cropping intensity of your farm?	70	58.33	50	41.67
Can harvested rainwater be stored for future use?	65	54.17	55	45.83
Can harvested rainwater be utilized to revitalize the ground level water and improve its quality?	54	45.00	66	55.00
Is harvested rainwater helps to raise the level of ground water which then can be easily accessible.	62	51.67	58	48.33
Is rainwater harvesting reducing the cost for pumping of groundwater	84	70.00	36	30.00
Is harvested water provides very high-quality water, soft & low in minerals.	40	33.33	80	66.67
Do you know about different practices of rainwater harvesting methods?	63	52.50	38	47.50
Is rainwater harvesting practices reduces soil erosion, water runoff, flooding, and pollution of surface water with fertilizers, pesticides, metals and other sediments.	60	50.00	60	50.00
Harvesting rainwater allows for the collection of large amounts of water and mitigates the effects of drought.	68	56.67	52	43.33
Is water harvesting improving farm yield and climate change	65	53.75	55	45.83
Are you aware about rainwater harvesting and storage by different methods like: (a) Channel tank, (b) On-farm basin, (c) Infiltration channel, (d) Check dams, (e) Infiltration well, and (f) Water harvesting bank?	92	76.67	28	23.33
Is harvested rainwater increases available water for irrigation and other uses (domestic, industry, municipal, etc).	55	45.83	65	53.75
Storing rainwater for direct use.	62	51.67	58	48.33
Recharging ground water aquifers with runoff from roof top.	75	62.50	45	37.50
Recharging ground water aquifers with runoff from ground area.	90	75.00	30	25.00
Storage of harvested rainwater to cater to demands of water for drinking, domestic & irrigation purpose	74	61.67	46	38.33
Is harvested rainwater may be source of drinking water, food security and various needs for crowded millions of the state.	92	76.67	28	23.33
Mean awareness score			11.65	
Overall awareness level			61.31%	

Table 8. Adoption Level of Farmers towards water Harvesting Practices (N=120)

Statements	Adoption level					
	Fully adopted		Partially adopted		Not adopted	
	No.	%	No.	%	No.	%
Laser Land Leveler technology to harvest rainwater uniformly in the field.	42	35.0	33	27.50	45	37.50
Field bunding of farm for rainwater harvesting	38	31.7	30	25.00	52	43.33
Deep ploughing during summer to conserve rainwater	36	30.0	27	22.50	52	43.33
Recharge pit (water recharge structures) for water harvesting	35	29.2	20	16.67	65	54.17
Rainwater harvesting schemes initiated by the Govt. of Haryana	33	27.5	18	15.00	69	57.50
UGPL for collection of harvested rain water	21	17.5	15	12.50	84	70.00
Rooftops rainwater harvesting	20	16.7	14	11.67	86	71.67
Trenching across the slope of field	18	15.0	12	10.00	90	75.00
Farm pond for rainwater harvesting	14	11.7	08	06.67	92	76.67
Community based watershed for rainwater harvesting	10	8.3	05	04.17	105	87.50
Check dam/ Pond across the Nalas/ Roadsides for rainwater harvesting	08	6.7	03	02.50	109	90.83
Mean adoption score			3.51			
Overall adoption level			15.95%			

(43.33%) Websites (29.17%), Portal (26.67%) and any other means like Twitter, Telegram (10.00%), respectively.

Awareness of farmers towards water harvesting practices : The results presented in Table 7 showed that a majority (79.17%) of the respondents aware about 'Rainwater harvesting practices during monsoon season' followed by 'Harvested rainwater may be source of drinking water, food security and meet the needs of water for crowded millions of the state (76.67%)'; 'Rainwater harvesting and storage by different methods like channel tank, on farm basin, infiltration channel, check dam, infiltration tank and water harvesting tank (76.67%)'; 'Recharging ground water aquifers with runoff from ground areas (75.00%)'; 'Storage of harvested rainwater cater to the demand of water for drinking, domestic and irrigation purpose (76.67%)'; 'Harvested rainwater reduce the cost of pumping of ground water (70.00%)'; 'Harvesting practices can increase area under irrigation (66.67%)'; 'Recharging ground water aquifers with runoff from roof top (62.50%)'; 'Harvested rainwater helps to raise the level of ground water which can easily be accessible (51.67%)'; 'Rainwater harvesting practices reduces soil erosion, water runoff, flooding, and pollution of surface water with fertilizers, pesticides, metals and other sediments (50.00%)'; 'Rainwater harvesting will increase cropping intensity of the farm (58.33%)';

'Harvesting rainwater allows the collection of large amounts of water and mitigates the effects of drought (56.67%)'; 'Harvested rain water can be stored for future use (54.17%)'; 'Rainwater harvesting improve farm yield and climate change (53.75%)'; 'Different practices of rainwater harvesting methods (52.50%)'; 'Storing rainwater for direct use (51.67%)'; 'Harvested rainwater increases available water for irrigation and other uses i.e. for domestic, industry, municipal, etc 45.83%); 'Harvested rainwater can be utilized to revitalize the ground level water and improve its quality (45.00%)' and aware about 'Harvested rainwater provides very high quality water, soft & low in minerals' to the extent of 33.33 per cent, respectively. The mean awareness score of the respondents was 11.65 with overall awareness level of 61.31 per cent. The results of this study are in conformity with the results of studies conducted by Singh *et.al.* (2020) and Singh *et. al.* 2019, respectively.

Adoption level of farmers towards water harvesting practices : The data depicted in Table 8 regarding adoption level of farmers towards water harvesting practices are concerned, showed that about one-third of the respondents were fully adopted 'Laser Land Leveller technology to harvest rainwater uniformly in the field (35.00%)'; 'Field bunding of farm for rainwater harvesting (31.70%)'; 'Deep ploughing during summer to conserve rainwater (30.00%)' followed by 'Recharge pit (water recharge structures) for water harvesting (29.2)'; 'Rainwater harvesting schemes initiated by the

Govt. of Haryana (27.50%); 'UGPL for collection of harvested rain water (17.50%); 'Rooftop rainwater harvesting (16.7); 'Trenching across the slope of field (15.00%); 'Farm pond for rainwater harvesting (11.70%); Community based watershed structure for rainwater harvesting (08.3%), and 'Check dam/Pond across the Nalas/ Roadsides for rainwater harvesting (06.70%), respectively. In case of partial adoption level of farmers about water harvesting practices the respondents to the extent of 27.50, 25.00, 22.50, 16.67, 15.00, 12.50, 11.67, 10.00, 6.67, 4.17, and 2.50 per cent, respectively were partially adopted the water harvesting practices. As for as non-adopted category of respondents about water harvesting practices in the sequence as stated above i.e. 37.50, 43.33, 47.50, 54.17, 57.50, 70.00, 71.67, 75.00, 76.67, 87.50, and 90.83 per cent, respectively the respondents not adopted any water harvesting practices during monsoon season. The mean adoption score of the respondents was 3.51 with overall adoption level of 15.95 per cent. The results of this study inline with the results of studies conducted by *Singh et. al. (2020)* and *Singh et. al. 2019*, respectively.

CONCLUSION

The experiment was concluded that a majority (79.17%) of the respondents were aware about 'Rainwater harvesting practices during monsoon season', 76.67 per cent of the farmers were aware about 'Rainwater harvesting and storage by different methods, about three-fourth (75.00%) of respondents were aware that 'Rainwater harvesting reduces the cost for pumping of groundwater', about one-third (35.00%) of the respondents were fully adopted 'Laser Land Leveller technology to harvest rainwater uniformly in the field followed by 'Field bunding of farm for rainwater harvesting (31.7%), and 27.50 per cent of the respondents were adopted 'Rainwater harvesting schemes initiated by the Govt. of Haryana'. It is also suggested a movement for popularizing the water harvesting practices should be started among farmers and villagers by all agricultural departments to save the water for further & future use for different purposes.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

- Anonymous (2021). PM Launch "Jal Shakti Abhiyan" on 22 March, 2021. Published by Admin/March/21, 2021/12:54 IST on Mann Ki Baat By Prime Minister of India, Sh. Narender Singh Madi on 21.03.2021.
- Singh, D.; Choudhary, M.K.; Meena, M.L. and Kumar, Chandan (2019). Rain water harvesting for food and livelihood security: A case study from Pali, India. *Open Agri.*, **4** (1) : 767-777.
- Singh, Sube; Bhakar, Sandeep and Shehrawat, P.S. (2020). Farmers' awareness and performance about agriculture development schemes in Haryana. *Intl. J. Agri. Innovations & Res.*, **8** (5): 495-502.
- Singh, Sube; Shehrawat, P.S. and Bhakar, Sandeep (2020). Farmers' Awareness and Usage of Soil Health Cards in Crop Management Practices. *Intl. J. Creative Res. Thought*, **8** (3): 275-281.
- ZuhudRozaki, Masateru Senge, Kohei Yoshiyama and Komariah (2017). Feasibility and Adoption of Rainwater harvesting by Farmers. *Reviews in Agril. Sci.* **5**:56-64. <http://dx.doi.org/10.7831/ras.5.56>.

