

## Original Research Article

### **Socio-economic Profile of Farmers of North Eastern Haryana with Reference to Over-exploitation of Irrigation Resources**

**Comment [BW1]:** It would be useful to add in the title "India" after the name of the studied region for people unfamiliar with India's geography. It is also useful to add India in the keywords so that people looking for studies on India can find this paper in databases.

#### **ABSTRACT**

**Aim:** The main aim of this study was to know the socio-economic profile of farmers of North Eastern Haryana with reference to over-exploitation of irrigation resources.

**Place and Duration of Study:** The study was carried out in the purposively selected five districts of Haryana state due to intensive agricultural practices followed in these districts during 2021.

**Methodology:** The data were collected from 150 respondents comprising 15 respondents from randomly selected ten villages through a well-prepared interview schedule. The variables were Age, Education, Family type, Family size, Occupation, land holding, cropping pattern, Irrigation facilities, Irrigation methods, Water conservation structure, Mass media exposure, Extension contact and perception.

**Results:** The study revealed that majority of respondents belonged to the middle age group, 34.00 per cent of the respondents had the level of education up to matric only, more than two third of respondents were living in joint family, nearly half of the respondents had medium size family, majority of respondents had farming as major occupation, nearly one third of respondents had the medium size land holding, most of the respondents were following only double cropping pattern, most of the respondents were using only tubewell/borewell/submersible for irrigation, all respondents were using only flood irrigation method, vast majority of respondents had only natural pond as a water conservation structure, more than half of respondents had the medium level of mass media exposure, and majority of respondents had high level of extension contacts and high level of perception.

**Keywords:** *Irrigation, Over-exploitation, Respondents, Socio-economic, Variables*

#### **INTRODUCTION**

Agriculture is a significant part of India's social and political economy. India is one of the world's largest food producers, making the sustainability of its agricultural system of global significance. While, most of India's agricultural production chain are small scale in nature, yet they account for about 20.00 per cent of India's GDP and are India's largest employers. Moreover, the agriculture sector is the primary food supplier for India's 1.2 billion people. India is also one of the world's largest agricultural producers, and exports close to \$39 billion in raw agricultural products and over 4.4 million tons of milled rice annually. (GOI 2020 and FAO 2015). Back in mid 1960s, India was fully dependent on imports from other nations to meet domestic demands of their food products. However, two years of severe drought in 1965 and 1966 prompted India to modify its agricultural policies and realized that it could no longer rely on foreign help and imports to ensure food security. That was supported even more by India's Green Revolution. That leads to the decision of introducing

high yielding varieties, disease resistant varieties and improved agricultural techniques to increase productivity.

Groundwater extraction in India accounts for 25.00 per cent of total groundwater extraction globally. More than 80.00 per cent of the total land in Uttar Pradesh is irrigated by groundwater. Similarly, groundwater provides 77.00 per cent of Punjab's and 54.00 per cent of Haryana's irrigation water resources, as well as 85.00 per cent of India's drinking water demands. (Moenchet *al.* 2011). Water resources over-exploitation has led to drastic declines in groundwater levels, threatening to push this vital resource out of reach for millions of small-scale farmers. Historically, losing access to groundwater has decreased agricultural production and increased poverty. Over-exploitation of groundwater and intensive irrigation in major canal commands has posed serious problems for groundwater. Depletion of water tables, saltwater encroachment, drying of aquifers, groundwater pollution, water logging and salinity, etc. are major consequences of over-exploitation and intensive irrigation. Many of India's peninsular rivers are facing a serious post monsoon crisis. The flows and water tables are falling in mostly parts of India with fluoride, arsenic, mercury, even uranium found in groundwater. Overexploitation of ground water is a very serious threat to natural resources. (Anonymous, 2019).

Water crisis has evolved as a rising global challenge, particularly for rural communities depending on rainfed farming. Water scarcity continues to be a major limiting factor driving farmer vulnerability in the face of growing demand from urbanization, cultivation of water exhaustive crops, agricultural intensification, misuses and over extraction, population pressures, and the consequences of climate variability. The efficient utilization of water has great importance to increase the ground water availability. So, there are numerous methods to reduce over-exploitation of groundwater such as mulching, cropping pattern, more planting of trees, utilization of fog or dew, transfer of water from surplus areas to deficit areas by interlinking water systems through canals, use of efficient watering systems such as drip irrigation and sprinklers. Haryana must review its current trend of producing water intensive crops, such as sugarcane and paddy in water scarce areas. Also, it should review its policies related to exporting of water intensive crops such as paddy and cotton. While keeping in view of above facts present study was conducted to know the socio-economic profile of farmers of North Eastern Haryana with reference to over-exploitation of irrigation resource.

## MATERIALS AND METHODS

In this study, the investigator has attempted to describe the socio-economic variables of the farmers. The study was conducted in North Eastern part of Haryana. The data collection related to this study was carried out in the year 2021. Exploratory research design has been followed in the study. The state Haryana was purposively selected based on need and relevancy of the research problem. Taking into consideration the agricultural importance and over-exploitation of irrigation resource, five districts of Haryana state named Ambala, Kamal, Kaithal, Kurukshetra, and Yamunanagar, purposively, due to intensive agricultural practices practiced in these districts. Further, two villages from each district were selected randomly. Overall, ten villages namely Jansui and

**Comment [BW2]:** I guess that over-exploitation of groundwater causes problems to farmers and other users of water and not to water itself.

**Comment [BW3]:** Is "so" necessary here?

**Comment [BW4]:** "applied" instead of "practiced"?

**Comment [BW5]:** How was this selection conducted?

Niharsifrom Ambala, Kaul and Chandlana from Kaithal, Raison and Karsa from Karnal, Kirmich and Harthira from Kurukshetra, Aurangabad and Damla from Yamunanagar were selected randomly. Furthermore, fifteen farmers from each village were selected randomly. Thus, a total number of 150 respondents were interviewed for to study their personal and socio-economic characteristics.

**Comment [BW6]:** How was this selection conducted?

The variables were Age, Education, Family type, Family size, Occupation, land holding, cropping pattern, Irrigation facilities, Irrigation methods, Water conservation structure, Mass media exposure, Extension contact and perception. The information collected from respondents in form of responses by schedule was appropriately coded and analysed with the help of SPSS software to develop meaningful inferences by using statistical techniques.

## RESULTS AND DISCUSSION

It could be inferred from data present in table 1 that nearly half (48.67 per cent) of the respondents belonged to the medium (35-50 years) age group followed by 31.33 per cent to the old (above 50 years) age group, while only 20.00 per cent of respondents belonged to young (below 35 years) age group. The data shows that fewer respondents belonged to young age group as compared to medium and old age group. Generally, farmers of middle age group look after agriculture with great interest, while young age group is shifting from agriculture to the service sector and other occupation. Results of present study are supported the results obtained by Salibaet *et al.* (2018).

**Comment [BW7]:** What do you mean by this phrase?

As evident from data that 99.00 per cent of respondents were literate and about one third of respondents (34.00 per cent) were having the education up to matric, while 30.67 per cent of respondents were having the education level of graduate and above followed by 18.00 per cent of the respondents having education up to senior secondary. Only 13.33 per cent of respondents were having education level up to middle level and 02.67 per cent of respondents were having education up to primary, while only 01.33 per cent of total respondents were illiterate. Similar findings were also reported by Sharma *et al.* (2017) during the study conducted in Punjab region while assessing the awareness level of respondents towards the climate change and its effect on water resources.

It can be seen from table that more than three fourth (77.33 per cent) of respondents live in joint family while only 22.67 per cent respondents live in nuclear family. It may be due to traditional value and culture of the respondents as they like to live in joint family with their family members. Sharma *et al.* (2017) found the similar results in Punjab region as most of respondents belonged to joint family type.

**Comment [BW8]:** Table 1?

It can be computed from data that about half (47.33 per cent) of respondents had medium (5-7 members) size family group followed by 30.00 per cent of respondents with large (more than 7 members) size family group, while only 22.67 per cent of respondents had small size family group. Kidane *et al.* (2019) also reported the same findings.

It can be computed that majority (83.33 per cent) of respondents were engaged in farming as their main occupation, followed by shopkeeper and service sector (06.67 per cent). Further only 03.33 per cent of respondents had the main occupation as business while, none of respondents belonged to agricultural labour class. The reason might be non availability of jobs.

The data from table revealed that nearly one third (34.67 per cent) of respondents had medium size land holding, 30.00 per cent respondents had large size land holding and about one fourth (23.33 per cent) of respondents had small size land holding. Further only 12.00 per cent of respondents had marginal land holding. It could be due to that most of the respondents live in joint family. Latif *et al.* (2009) reported the same results as most of the farmers had medium size land holding.

The data from table revealed that majority (96.00 per cent) of respondents follow double cropping (mainly paddy-wheat) pattern, while only 04.00 per cent of respondents follow mono cropping (sugarcane) pattern and none of them left their land vacant. It could be due to assured irrigation facilities and high cropping intensity of the area. Malik *et al.* (2014) found the same results as the cropping intensity of area was very high.

It is depicted from the data that majority (88.00 per cent) of respondents had tubewell/borewell as source of irrigation, while only 12.00 per cent of respondents had both canal and tubewell/borewell for irrigation purpose. The reason could be that availability of canal water is not sufficient for paddy-wheat cropping pattern which is particularly followed by most of the respondents. Ahmad *et al.* (2007) reported almost the same findings.

**Table 1 Personal profile of respondents**

(n=150)

Sr. No.	Attributes	Categories	Frequency	Percentage
1.	Age	Young	30	20.00
		Middle	73	48.67
		Old	47	31.33
2.	Education	Illiterate	02	01.33
		Primary	04	02.67
		Middle	20	13.33
		High	51	34.00
		Senior Secondary	27	18.00
		Graduate & above	46	30.67
3.	Family type	Nuclear	34	22.67
		Joint	116	77.33
4.	Family size	Small (up to four members)	34	22.67
		Medium (five to seven members)	71	47.33
		Large (more than seven members)	45	30.00
5.	Occupation	Farming	125	83.33
		Agricultural Labor	00	00.00
		Shopkeeper	10	06.67
		Service	10	06.67
		Businessman	05	03.33
6.	Land holding	Marginal (< 2.5 acres)	18	12.00
		Small (2.5-5 acres)	45	30.00
		Medium (5.1-10 acres)	52	34.67
		Large (more than 10 acres)	35	23.33
7.	Cropping pattern	Fallow land	00	00.00
		Mono cropping	06	04.00
		Double cropping	144	96.00
		Multiple cropping	00	00.00

8.	Irrigation facilities	Canal	00	00.00
		Tubewell/borewell/submersible	132	88.00
		Both	18	12.00
		On hiring basis	00	00.00
9.	Irrigation methods	Flood irrigation	150	100
		Drip irrigation	00	00.00
		Sprinkler	00	00.00
		Mixed (Flood + Drip + sprinkler)	00	00.00
10.	Water conservation structures	Natural ponds	141	94.00
		Small ponds near field/ dig ponds	09	06.00
		Micro-dam reservoir/soil bunds	00	00.00
		Rain water harvesting in tanks	00	00.00
		Percolation tanks	00	00.00
11.	Mass media exposure	Low	32	21.33
		Medium	80	53.34
		High	38	25.33
12.	Extension contacts	Low	08	05.33
		Medium	121	80.67
		High	21	14.00
13.	Perception	Agree	107	71.71
		Undecided	22	14.38
		Disagree	21	13.91

**Comment [BW10]:** What is "mass media exposure" and how is it measured?

**Comment [BW11]:** How these are defined?

**Comment [BW12]:** Perception of what?

It is depicted from data that 94.00 per cent of respondents were using common or natural pond of their villages as water conservation structure, while only 06.00 per cent had small pond near their field. The reason might be that most of respondents didn't want to leave their field vacant for water conservation. Similar results were obtained by Varua *et al.* (2017) in Rajasthan.

The data from table revealed that more than half (53.34 per cent) of the respondents were from medium category of mass media exposure, one fourth (25.33 per cent) of the respondents were from high category of mass media exposure, while only 21.33 per cent of respondents were from low category of mass media exposure. This could be due to availability of literature and other mass media devices.

It is observed from data that more than three fourth (80.67 per cent) of respondents were having medium level of extension contacts followed by 14.00 per cent with high level of extension contacts, while only 05.33 per cent respondents belonged to low category of extension contacts. It could be due to shortage of extension professionals.

It is observed from data that more than two third (71.71 per cent) of respondents agreed towards the over-exploitation for irrigation water, and 14.38 per cent of respondents remained undecided towards the over-exploitation for irrigation water, while only 13.91 per cent disagreed about the over-exploitation for irrigation water. Similar results were found by Shubham *et al.* (2021) that most of the respondents agreed towards the over-exploitation of water.

## CONCLUSION

In conclusion, the study revealed that majority of respondents (48.67 per cent) belonged to the middle age group (35-50 year), 34.00 per cent of the respondents had the level of education up to matric only, more than two third (77.33 per cent) of respondents were living in joint family, nearly half (47.33 per cent) of the respondents had medium size (5-7 members) family, majority of respondents (83.33 per cent) had farming as major occupation, 34.67 per cent of respondents had the medium (5.1-10 acres) size land holding, most of the respondents (96 per cent) were following only double cropping pattern (mainly paddy-wheat), most of the respondents (88 per cent) were using only tubewell/borewell/submersible for irrigation, all respondents were using only flood irrigation method, vast majority of respondents (94 per cent) had only natural pond as a water conservation structure, more than half (53.34 per cent) of respondents had the medium level of mass media exposure, and 80.67 per cent of respondents had high level of extension contacts. The majority of respondents had high level of perception towards over-exploitation of water resources. So, there is a need to increase awareness level of farmers to elevate the adoption rate of water management practice through various methods like awareness campaigns, trainings, result and method demonstrations and providing rewards and incentives timely to the all adopters.

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