



## Research Article

# WATER SCARCITY: ISSUES AND ADAPTATION STRATEGIES BY FARMERS

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**Abstract:** Recent times the people were facing water scarcity issues enormously. In this context the study was undertaken with an objective, to encounter the water scarcity issues and adaptation measures among the farming community. The study was conducted in Coimbatore district of Tamil Nadu. The total sample size of the study was 30, samples are drawn randomly. The data was collected by employing Focused group discussion and using well-structured interview schedule. The farmers faced highly both direct and indirect effects because of water scarcity. The effects are, insufficient water availability, yield loss, poor nut size and quality and low productivity. According to adoption strategies by crops, it could be inferred that, majority of the respondents had awareness and knowledge about drip irrigation methods, diversified agriculture and shifting their cropping pattern. With respect to management by water structure, in general majority of them had awareness and knowledge about all the water structures but in adoption case only some of the practices adopted in their field level. To overcome this issue central and state governments can, empower local groups with knowledge.

**Keywords:** Water Resources, Adoption Strategies, Diversified Agriculture

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## Introduction

The lack of available water resources to meet the needs of people in a region is termed as water scarcity. In worldwide people were facing the general problems like, 1.1 billion people lack access to water (82 percent rural and 18 percent urban), in every year almost \$24 billion is lost economically while gathering water, Inadequate sanitation is also a problem for 2.4 billion people, annually 443 million school hours are lost due to water borne diseases. In agriculture sector facing the problems are drying up and too polluted - Rivers, lakes and aquifers, more than half the world's wetlands have disappeared, cattle were sold for 20-30 percent less price, low food grain production and production of pulses and oil seeds also fell drastically (international water management institute).

### Reasons for water scarcity

- Population growth
- Variation in the seasonal and annual rainfall
- Over exploitation and excessive use of water
- Unequal access to water among various social groups
- Industrialization
- Urbanization
- Rising standard of living
- Land use change
- Political realities
- Biofuel production
- Lack of infrastructures to supply water
- Improper maintenance of water bodies

### Review of literature

World Bank stated that drought-resilient strategies are important for rural livelihoods and the rural economy [1].

Pereira *et al.*, found that for eradicate water crisis changing agricultural farming practices continually in terms of mechanization, the adoption of high-yielding varieties and technological advancements [2].

Gebrehiwot and Veen noted serious consequences of drought for agriculture and food security, consequently, the livelihood of rain-fed agriculture-dependent farming communities [3].

### Status of water scarcity

Table-1 Water Stress/Scarcity in India

Year	Population (in millions)	Per capita availability	
		Cu m/year	Liter/day
2001	1027 (Census)	1820	5000
2010	1210 (Census)	1545	4230
2025	1394 (Projected)	1340	3670
2050	1640 (Projected)	1140	3120
Recommended quantity		1700	4650

Table-2 Water used by different sectors in the world in percentage

Place	Irrigation	Industries	Domestic
World average	69	23	8
India	85	10	5
All developing countries	90	10	
All developed countries	50	50	

### Methodology

The study was conducted in Coimbatore district of Tamil Nadu. The total sample size of the study was 30, samples are drawn randomly. The data was collected by employing Focused group discussion and using well-structured interview schedule [4-6].

### Findings and discussion

Collected data were tabulated and discussed below,

### Issues of water scarcity

The following issues are collected from the focused group discussion and the issues are classified into two categories *i.e.*, Direct effect and Indirect effect.



Low Productive Coconut tree



Barren Land



Insufficient Fodder



Availability Reduced Field work



Crop withering



Pic-1 Issues of water scarcity

Table-3 Issues of water scarcity

SN	Issues of water scarcity
	<b>Direct effects</b>
1	Water level in wells (capacity one hr/day) reduced
2	Productivity and yield of crops reduced
3	In adequate fodder availability
4	Reduced the size and quality of coconuts
5	Reduced the milk productivity
6	Withering of crops
7	Animals prone to diseases
	<b>Indirect effects</b>
1	Down the products price rate
2	Income shortage
3	Increased the number of Bore wells
4	Expenditure for water consumption increased
5	Land conversion take place
6	Migration
7	Debt of famers increased

From the result, the farmers faced both direct and indirect effects highly because of water scarcity. The direct effects are, insufficient water availability leads to ground water depletion, so the water level of water bodies reduced and crop withering take place automatically. Another problem is insufficient water availability of crops hints the problems like yield loss, poor nut size and quality, low productivity. In animal aspects extreme water loss causes disease and low productivity of milk. These are the major problems hindered farmers to face indirect effects in daily life. Poor quality of the products decreases the consumer preference in the market, so demand of the produce reduced and it may the reason for poor price rate and finally farmers receive low income and also their debt was increased. Another important fact is because of this scenario the farmers. Involvement in agriculture decreased and they move towards another attractive income-oriented business activity. It may affect the life of agriculture wage earners livelihood. In lake of quality water availability the consumption rate of water increased, it also increases the daily family expenditure. Totally all the problems join together and reduce the people livelihood.

#### Adaptation measures

Adaptation measures are collected by interview method. Collected information are tabulated and percentage analysis was used for data interpretation.

Table-4 Adaptation measures

SN	Adaptation measures	Awareness	Knowledge	Adoption
I	Adaptation strategies by Crops			
1	Altering fertilizer application	77.14	68.57	48.57
2	Changing irrigation time and sowing time	74.29	65.71	57.14
3	Shifting cropping pattern	82.86	77.14	77.14
4	Managing water losses by using drip	97.14	97.14	68.57
5	Adopting diversified agriculture	94.29	94.29	85.71
6	Use of drought-resistant and drought-escaping crops and varieties	60	48.57	31.43
II	MANAGEMENT BY WATER STRUCTURES			
1	Percolation pond	77.14	71.43	28.57
2	Farm pond	88.57	77.14	48.57
3	Gully plug	68.57	62.86	25.71
4	Dug well recharge	60	57.14	37.14
5	Gabion structure	74.29	57.14	25.71
6	Contour bund	91.43	77.14	60
7	Contour trench	57.14	57.14	31.43
8	Stone walls	77.14	68.57	28.57
9	Compartmental bunding	82.86	71.43	22.86

According to adoption strategies by crops, it could be inferred that, majority of the respondents had awareness and knowledge about drip irrigation methods, diversified agriculture and shifting their cropping pattern. The notable point in that is majority of them adopted these practices only. This may be due to the fact that their experience motivates to do substantial income generated agricultural operations. More than half of them aware and had knowledge about remaining practices but in adoption case their less technical knowledge and low educational qualification obstruct to adopt the other practices in their field level. With respect to management by water structure, in general majority of them had awareness and knowledge about all the water structures but in adoption case only some of the practices adopted in their field level. This may be the fact that most of the farmers have marginal and small holdings only, so they concern about their land size and productivity they not interested to adopt all those water structures.

#### Conclusion

The study was helped to know the water scarcity issues perceived by farmers and

also encounter the adaptation measures being followed to overcome the water stress. Central and State governments can, empower local groups with knowledge, understanding, and real-time information on the status of groundwater so as to manage extraction in a cooperative way and promote watershed development, educate people about the need for dams to store water, strengthen state pollution control boards to enforce effluent standards and also adopt these recommendations at all levels *i.e.*, federal, state, and local.

**Application of research:** Study shows great step toward addressing the most critical issues causing the country's water crisis

**Research Category:** Agricultural Extension and Rural Development

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**Study area / Sample Collection:** Coimbatore district of Tamil Nadu

**Cultivar / Variety name:** Nil

**Conflict of Interest:** None declared

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.  
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## References

- [1] Food and Agriculture Organization of the United Nations (FAO) (2011) Climate Change, Water and Food Security; FAO Water Reports No. 36; FAO: Rome, Italy.
- [2] Pereira L.S., Oweis T. and Zairi A. (2002) *Agricultural Water Management*, 57, 175–206.
- [3] Gebrehiwot T. (2013) *Environmental Management*, 52, 29–44.
- [4] International Water Management Institute (IWMI). Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture; Earth scan: London, UK, 2007.
- [5] IPCC (2013a) Working group 1-Approved summary for policy makers. IPCC, Switzerland.
- [6] IPCC (2013b) Working group 1 final draft underlying scientific-technical assessment. IPCC, Switzerland.