

SAGACITY ON DROUGHT : AN EMPIRICAL STUDY OF RAJASTHAN FARMERS

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ABSTRACT

The present study is carried out with an objective to understand the perceptions of farmers on constraints faced by them in the incidence of drought. A total of 202 farmers from Dausa and Tonk districts of Rajasthan were interviewed personally and also Focused-Group Discussions (FGDs) were conducted. Rank Based Quotient (RBQ) technique was used to rank the constraints that are faced by farming community during the incidence of drought. The results on perception of the farmers indicated that reduction in yield and consequent reduction in employment and decline in income are the major constraints faced by the farmers in the study area. Farmers also perceived strongly that there is an increase in price of consumables which led to increase in cost of living. Migration to other regions, sale of livestock, indebtedness were some of the other constraints as perceived by the farmers in the study area. Findings of the study revealed that the farmers felt decline in agricultural yield as major constraint with an RBQ value of 92.48. Crop yields and employment are directly proportional to each other. The constraint unemployment occupied second position with a score of 92.38 RBQ among all the constraints. The results of the study indicate that the above mentioned constraints adversely affect the wellbeing of farmers in the region. Agricultural Extension service providers can play key role in providing timely

advisories relating to occurrence of drought, selection of crops, varieties of seeds, contingency crop plan, soil and water conservation measures, cultivation practices and crop management, post-harvest and marketing.

Keywords: Drought, Focused Group Discussions, Rank Based Quotient.

1. Introduction

Drought is a result of prolonged dry weather and/or insufficiency of rain, which causes exhaustion of soil moisture, depletion of underground water supply and reduction of stream flow. Drought is frequently defined according to disciplinary perspective. The extent and intensity of impact of drought is determined by prevailing economic conditions, the structure of the agricultural sector, management of water resources, cereal reserves, internal and external conflicts, etc. (Benson and Clay, 1998). Drought is a common phenomenon in India in the states of Andhra Pradesh, Telangana, Odisha, Bihar, Gujarat, Karnataka, Maharashtra and Rajasthan.

The incidence of drought always puts the farmers under stress and make them to rethink about continuing in agriculture due to this uncertainty. Many a times, the drought conditions have led to even starvation and have long lasting impact on the minds of the farmers. The impact of drought on farming community is very severe. Drought forces the farmers to change their profession from farming to non-agricultural jobs, the farmers migrate to other cities and states and work as daily wage labour in a factory or in any business setup, etc. Drought entail loss of crop and livestock due to scarcity of water and also lost their assets due to in debtedness.

The incidence of drought could increase because of a change in the frequency of the physical event, a change in societal vulnerability to water shortages, or both. For example, poor land-use practices such as overgrazing can decrease animal carrying capacity and increase soil erosion, which exacerbates the impacts of and vulnerability to future droughts and is especially relevant in semiarid regions and in areas of hilly or sloping terrain(Wilhite DA. 2000)

These adverse effects have direct and indirect impacts on socio-economic conditions of the farmers in the region. Falling agricultural production, depleted water levels, higher livestock mortality, higher cattle migration are direct impact of droughts while, reduction in farm incomes, reduction in purchasing power, default on agricultural loans and distress sale of agricultural produce and land and livestock are indirect impacts of droughts. Farmers of Rajasthan are highly vulnerable to adverse climatic conditions like drought on a regular basis and occasionally facing problems with hail storm, heat wave, cold wave and frost.

With this background, a study is conducted with an objective to understand the perceptions of the farmers on constraints faced by them in the incidence of drought in Rajasthan state.

2. Material and Methods

Sample selection: - For the present study, primary information was collected from the farmers of Dausa and Tonk districts of Rajasthan by administering a semi-structured schedule to elicit the perceptions of farmers on drought related aspects. The following table illustrates the sample structure. Thus, a total of 202 farmers from Rajasthan state, India participated in the survey. These districts were purposively selected as they fall under Semi-Arid regions of Rajasthan.

Table1: Selection of Sample in the study areas of Rajasthan

S.No	District	Block	Village	Sample
1.	Dausa	Lawan	Digariya	25
			ShersinghRajwas	25
		Bandikui	Deladi	27
			Narayanpur	25
2.	Tonk	Newai	Kiwada	25
			Bharthala	25
		Malpura	ReedlyaBujurg	25
			Lawa	25
Total				202

Analytical tools: - The data collected on Demographic profile of the farmers was analyzed with the help of simple percentages. In order to analyze the perceptions of the farmers on drought related parameters, Likert’s scale (five-point continuum) was used, where in a set of statements were given to the respondents to rank them on a five-point continuum i.e. from strongly agree to strongly disagree. Rank based Quotients (RBQ’s) were worked out to rank the perceptions of the farmers with the below mentioned formula as given by Sabarathnam, 1998.

$$RBQ = \frac{\sum Fi (n+1-i)*100}{N*n}$$

Where

i= Ranks given to concerned statements

N=Number of farmers

n=Number of ranks

Fi= frequency of farmers for the ith rank

3. Results and Discussion

3.1 Socio-Economic Profile of the respondents

From table 2, it is evident that 24.26 percent of the farmers belonged to 51-60 years age group followed by 41-50 age group (20.79%) and 31-40 age group constitute about 19.8 percent. About 98.02percent of male respondents participated in the survey and only 1.98 percent represented women. With regard to caste, majority of the respondents are from OBC category with 42.57 percent followed by OC(33.66%), SC(14.85%) & ST(8.91%) categories and majority (97.55%) are from Hindu community followed by Muslim community (1.47%).

Table2. Socio-demographic profile of the respondents

S.no	Parameter	Frequency	Percentage
1	Age		
	20-30	20	9.90
	31-40	40	19.80
	41-50	42	20.79
	51-60	49	24.26
	61-70	39	19.31
	71-80	11	5.45
	>80	1	0.50
	Total	202	100
2	Gender		

	Male	198	98.02
	Female	4	1.98
	Total	202	100
3	Caste		
	OBC	86	42.57
	OC	68	33.66
	SC	30	14.85
	ST	18	8.91
	Total	202	100
4	Religion		
	Hindu	199	97.55
	Muslim	03	1.47
	Christian	0	0
	Parsi	0	0
	Jains	0	0
	Total	202	100
5	Educational Qualifications		
	Illiterate	60	29.70
	Primary	65	32.18
	Secondary	49	24.26
	Intermediate	09	4.46
	Graduation	14	6.93

	Post-Graduation	05	2.48
	Total	202	100
6	Marital Status		
	Married	193	95.54
	Un-married	7	3.47
	Divorced	1	0.50
	Widowed	1	0.50
	Total	202	100
7	Status of Family		
	Joint Family	167	82.67
	Nuclear Family	17	8.42
	Extended family	06	2.97
	NA	12	5.94
	Total	202	100
8	Type of House		
	Pucca	133	65.84
	Semi-pucca	31	15.35
	Kutchra house	27	13.37
	NA	11	5.45
	Total	202	100

Source: compiled and analyzed from primary survey

Education plays a vital role in one's social, economic and intellectual development. The results

with respect to education showed that 32.18 percent of the farmers studied up to primary level, followed by secondary education (24.26%), graduation (6.93%), Intermediate (4.46%), and Post-graduation (2.48%). It is concerning to note that 29.70% of them were illiterates.

From the table, it is also evident that most of the respondents (about 95.54%) are married and only 3.47 percent are unmarried and minimal percentage are divorced or widowed.

The social institution, family is the greatest positive strength in Indian context. From the above table, it is evident that majority (about 82.67%) of the respondents belong to joint family system. In a Focus Group Discussion held in Narayanpur village of Bandikui block in Dausa district, the farmers opined that in Rajasthan, majority families continue to prefer to live in joint family due to the merits associated with it. Each member of the family is occupied with one or other profession and if any one of them are unable to earn/incur loss in their occupation, the other members will compensate and help him to come out of difficult situation. Only around 8.42 percent of the respondents are from nuclear family category. About 66 percent of the respondents have pucca houses followed by 15.35 percent and 13.37 percent have semi-pucca and kutcha houses respectively.

3.2 Perceptions of farmers on drought related parameters

Perceptions of farmers on drought related parameters are shown in Table -3. For the statement on decline in application of agricultural inputs, around 55.94 percent of the farmers strongly agreed while 19.31 percent of them agreed. To sum up, around 75.25 percent of the farmers were in agreement with the statement while 7.43% of the farmers were neutral. It is evident that there is a reduction in farm income in drought years which compelled the farmers to borrow from others to meet the household consumption requirements. The debt-repayment capacity of the farmers also declines which consequently results in default and farmers face difficulty to repay the loan though they are willing to repay. About 73.27 percent of the farmers opined that there is always a decline in farm incomes during the drought years. During the Focused-Group Discussion with the farmers, it is revealed that income of the majority of the farmers was found to be declined and it was inevitable for them to borrow loans from the local money lenders with heavy interest rate.

The incidence of drought also causes reduction in income from livestock. During the discussion with the farmers, majority of the farmers opined that maintaining livestock is a major problem due to non-availability of drinking water and fodder. Due to non-availability of fodder, the productivity of the milch animals is not up to the potential.

Table 3. Perceptions of farmers on Drought Related Constraints

S.no	Statement	SA	A	N	D	SD
1	Decline in Application of Agricultural Inputs	113 (55.94)	39 (19.31)	15 (7.43)	16 (7.92)	19 (9.41)
2	Decline in income from Farming	148 (73.27)	23 (11.39)	27 (13.37)	1 (0.50)	3 (1.49)
3	Decline in Income from Livestock	140 (69.31)	39 (19.31)	19 (9.41)	3 (1.49)	1 (0.50)
4	Decline in Agricultural Yields	152 (75.25)	22 (10.89)	28 (13.86)	0 (0.00)	0 (0.00)
5	Reduction in Current and fixed assets of Rural Households	134 (66.34)	42 (20.79)	25 (12.38)	1 (0.50)	0 (0.00)
6	Reduction in employment in the village	150 (74.26)	28 (13.86)	23 (11.39)	1 (0.50)	0 (0.00)
7	Reduction in wages for daily labour work	124 (61.39)	54 (26.73)	24 (11.88)	0 (0.00)	0 (0.00)
8	Turning to non-agricultural jobs	116 (57.43)	48 (23.76)	37 (18.32)	0 (0.00)	1 (0.50)
9	Inequality in distribution of facilities and services	118 (58.42)	49 (24.26)	32 (15.84)	2 (0.99)	1 (0.50)
10	Weakening of village economy	134 (66.34)	46 (22.77)	21 (10.40)	1 (0.50)	0 (0.00)
11	Increase in prices of consumables	142 (70.30)	35 (17.33)	24 (11.88)	1 (0.50)	0 (0.00)
12	Decrease in water usage for household consumption	141 (69.80)	29 (14.36)	32 (15.84)	0 (0.00)	0 (0.00)

13	Increase in Migration	124 (61.39)	47 (23.27)	31 (15.35)	0 (0.00)	0 (0.00)
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Source: Compiled and Analyzed from primary data, SA: Strongly Agree, A: Agree, N: Neutral, D: Disagree, SD: Strongly Disagree

and thus resulting in reduction of income to the farmers. Moreover, in an inevitable situation, it is easy to sell livestock than land. In the case of severe crisis only, it was found that farmers sold their livestock. Otherwise, the farmers opined that in drought years, livestock is the only dependable source of income compared to crop sector. Cows, buffaloes and other animals with minimum inputs can be managed and can generate income to support the family.

When there search team posed a question on whether there is a decline in income from livestock, around 69.31 percent of the farmers strongly agreed to the statement followed by 19.31 percent, 9.41 percent and 1.49 percent of the farmers respectively opined agree, neutral and disagree.

The incidence of drought is always inversely proportional to the agricultural yields. There is always a difference between a normal year and drought year. In this regard, 75.25 percent strongly agreed followed by 10.89 percent, 13.86 percent of the farmers respectively opined agree and neutral. To sum up, 86.14 percent of the farmers were in agreement with this statement. Reduction in yield eventually leads to decline in income and also affects availability of fodder to livestock.

Another negative effect of drought is reduction in current and fixed assets of rural households. In the case of severe drought, due to decrease in farm yields and incomes coupled with in indebtedness, farmers are forced to sell their assets. Majority of the farmers (66.34%) strongly agreed with the statement and 20.79 percent, 12.38 percent of the farmers opted for agree and neutral respectively. To sum up, 87% fall under strongly Agree to Agree continuum in this regard. During the discussion, it is revealed that there are instances that farmers sold their assets to repay the debt.

Reduction in employment opportunities as a daily wage labour in one's own village or surrounding villages is another consequence of drought. With reduced crop production and sown area, it is apparent that significant portion of the employment opportunities dwindled and people migrate in search of jobs out side the villages and many a times, very far from the village. In this regard, about 74.26 percent of the farmers fell under strongly agree response followed by 13.86 percent and 11.39% of the farmers who opted for agree and neutral responses respectively, similar results were obtained in the study conducted by Udmale Parmeshwar et al, 2014. Reduction in employment opportunities has another negative effect i.e. reduction of income in daily wages. During the Focused Group Discussion, majority of the farmers informed that rate of wages also decrease during drought and farmers are compelled to agree to the revised wage with the hope that at least they would get some income. The same is evident from the results of primary survey mentioned above. About 61.39 percent of the farmers strongly agree with the

statement followed by 26.73 percent and 11.88 percent of the farmers who fell under agree and neutral responses respectively. To sum up, 88.12 percent of the farmers fell in between strongly agree to agree on the continuum for the statement on reduction in wages for daily labour.

About alternative employment during drought, majority of the farmers opined that it depends on the severity of the drought. If the incidence of loss is at moderate level or less, majority times they would wait for the situation to improve. In the case of severe drought, farmers migrate to Delhi, Jaipur or surrounding districts to work in factories or take up other non-agriculture works until climatic conditions improve in their villages. In this regard, when interviewed about turning to non-agricultural jobs, more than half (57.43%) of the farmers strongly agreed and about 24 percent agreed with the statement. Here again, deep rooted joint family system gives immense confidence during the difficult time and are eager to take up other employments if climatic conditions were not favorable.

Though many demerits were analyzed in the previous section, the historical socio-economic conditions of Rajasthan reveal that they resilient to the adverse situations. During the Focused Group Discussion farmers opined that Rajasthan is known for bravery and they can sustain both physical and psychological adversities as they bank on their well knitted social structure and predominant joint family system. Throughout the discussion, nowhere it was observed that farmers expressed discomfort or loss of morale. In this regard, about 66.34 percent of the farmers strongly agreed that village economy weakens with the incidence of drought followed by 22.77 percent 10.40 percent and 0.50 percent of the farmers fell under agree, neutral and disagree responses respectively.

It is apparent that less supply creates demand for the consumables. In drought years, the prices of all the consumables are high and becomes an extra burden to buy the daily consumable goods with raised prices. In the discussion, majority of the farmers stated that *they always keep some surplus grains in every home when there is a bumper crop yield as they are well aware of the frequent occurrence of drought spells and only meager proportion of marketable surplus is sold*. This resilient practice is coupled with helping nature of the people in this part of the country. Tough conditions made them to realize that helping each other is the best way to tackle the situation. In many instances, the community as a whole comes forward to help financially for the loss incurred by individuals. Further, they are always ready to help the fellow farmers by donating the food grains in villages. About 70.30 percent of the farmers felt

strongly Agree with “ Increase in prices of consumables” while 17.33 percent of the respondents agreed and 11.88 percent maintained neutral opinion in this regard.

When it comes to the statement on decreasing in water usage for household consumption, majority of the farmers i.e. 69.80 percent Strongly Agreed with the statement, followed by 14.36 percent and 15.84 percent who opted for agree and neutral responses for the statement .In some places, women travel 3 – 4 km. for fetching water in drought years. Even in normal years, in few of the villages, potable water is not available and every 3-4 days, water tankers supply water to villages. Even live stock is taken to can also which may be very far from their villages.

Migration is also one of the major adverse effects of drought. In this regard, in other states, where mostly whole family migrates, while in Rajasthan, persons who are working in farms migrate to other places to work in ceramic factories or other daily wage work in nearby cities. In this regard, about 61.39 percent and 23.27 percent of the respondents felt strongly agree and agree respectively while 15.35 percent maintained neutral response about migration from the village.

By and large, there is a prevalence of temporary migration. However, there is an element of permanent migration too, wherein, people from this region have setup business all across the country and are settled in the respective places. Although, they permanently migrated, yet once in a year, they visit their places and offer help to their native people and participate in the family functions.

3.4 Constraints faced by farming community

The constraints faced by the farming community in drought years are analyzed and presented in the table-4 along with their Rank Based Quotients (RBQ) for each constraint. From table 4, it is evident that decline in agricultural yields is a major blow to the farming community since it directly affects the total output. Reduction in agricultural yields reduces the income and thereby resulting in poor purchasing power of farmers. Hence, decline in agricultural yields (92.48RBQvalue) is perceived as the first constrain tin the study area. Reduction in Agricultural yields may result in reduction in employment opportunities also and hence, farmers chose reduction in Employment opportunities as second major constraint with 92.38 RBQ value. Increase in prices of consumables is the indirect effect of drought. With decline in supply and there is no change in the demand pattern, thus farmers are forced to pay higher prices for consumables and in the process it leads to indebtedness. This situation, in turn, may give rise to prevalence of malnutrition among the families. Hence, farmers perceived increase of prices of

consumables as the third major constraint with RBQ value of 91.49.

Keeping backyard livestock always supplements farmers with extra income and in case of drought, it may be all the more necessary due to crop failure. Yet, the farmers in the discussion felt that drinking water and arranging fodder for livestock is also a major constraint in drought years. The farmers perceived this with 91.09 RBQ value and has given fourth rank with respect to decline in income from livestock. Decline in farm yields and employment distinctly weakens the village economy. In this regard, farmers perceived weakening of village economy as the fifth major constraint with an RBQ value of 90.99. In drought years, farmers do not have much hope on the farm income and are dependent on livestock income, hence, they perceived decline in farm income as the sixth major constraint with an RBQ value of 90.89.

Table 4: Rank Based Quotient of Constraints faced by farmers

S.no	Statement	RBQ	Rank
1	Decline in Agricultural Yields	92.48	I
2	Reduction in employment in the village	92.38	II
3	Increase in prices of consumables	91.49	III
4	Decline in Income from Livestock	91.09	IV
5	Weakening of village economy	90.99	V
6	Decline in income from Farming	90.89	VI
7	Decrease in water usage for household consumption	90.79	VII
8	Reduction in Current and fixed assets of Rural Households	90.59	VIII
9	Reduction in wages for daily labour work	89.90	IX
10	Increase in Migration	89.21	X
11	Inequality in distribution of facilities and services	87.82	XI
12	Turning to non-agricultural jobs	87.52	XII
13	Decline in Application of Agricultural Inputs	80.89	XIII

Source: Compiled and Analyzed from primary data

Further, decrease in water usage for household consumption is another major constraint in the study area. In this regard, farmers perceived decrease in water usage for household consumption as seventh major constraint with 90.79 RBQ value. In case of severe drought, farmers are forced for distress sale of farm produce or even the assets. In this regard, they perceived reduction in current and fixed assets as eighth major constraint with an RBQ value of 90.59.

With reduction in farm yields coupled with reduction in employment opportunities and increase in prices of daily consumables, farmers are ready to work for low wages. Hence, they perceived

decrease in labour wages for daily labour work as the ninth constraint with an RBQ value of 89.90. Lack of employment opportunities and underemployment compels farmers to migrate to other places. Hence, the farmers perceived increase in migration as the tenth important constraint with an RBQ value of 89.21. In Equality in distribution of facilities and services attracted RBQ value of 87.82 which implies that there is disparity in distribution of facilities and services among the farming community, yet, while triangulating with farmers in Focused Group Discussion, they mentioned that there is no disparity in distribution of facilities and services. As already discussed, farmers turn to non-agricultural jobs (87.52 RBQ value) to go to nearby factories as daily wage labours or establish petty businesses up till the situation comes to normalcy in their villages. Finally, as per the farmer's opinion in table no. 3, there is decline in application of agricultural inputs with an RBQ value of 80.89.

Conclusion

It is clear from several studies globally and also in the Indian context that incidence of drought makes the farming community handicapped due to shortage of water which is one of the main resources for cultivation of crops. Decline in agricultural yields, reduction in employment in the village, increase in prices of consumables, decline in Income from livestock, weakening of village economy and decrease in water availability affect farming community severely as perceived by the farmers in the study area. From the primary data collected and several discussions held with the farmers in the survey districts, it is clear that the incidence of recurring drought makes the future of the farmers skeptical in the primary sector and leads to alternative opportunities besides agriculture. Increased climate variability, in consistent and unpredictable rain fall throws the farming community into confusion and may reduce their dependency on agriculture.

With few parameters taken into consideration, the study may not give a complete picture, yet an attempt has been made to elicit the constraints faced by farming community to the possible extent. Apart from the above discussed constraints, drought also causes shortage of drinking water, fodder, less water in dams/ reservoirs for power generation that may influence the economic growth of the country. However, in the surveyed districts in the Rajasthan state, farmers are coping with the adverse conditions by following different kind of strategies like saving significant portion of produce (food grains), fodder for livestock, temporary migration every year, working in factories in nearby cities, saving money, migration for employment, and sale of livestock for meeting the household expenditure, establishing petty businesses etc. To survive in the drought period. Their geographical, social, cultural and psychological characteristics make them more resilient to adverse situations as for the primary data collected

during the Focused Group Discussions held with the farmers.

Based on the above factors, there is an urgent need to look into the relief measures pertaining to incidence of drought. In this regard, Central and state governments may take several steps in providing relief to the drought affected farmers yet, it may be possible when the drought is declared at the right time. Rain fall deficiency, the extent of area sown, normalized difference vegetation index and moisture adequacy index are recommended as the four standard monitoring tools which could be applied in combination for drought declaration (Manual for Drought Management, 2009).

Apart from relief plans, contingency crop plans may be provided to the farmers and encourage alternate cropping patterns that are drought resistant. Promotion of less water demanding crops, crop diversification, mixed/intercropping of main crop with drought to lerant varieties, thinning of plant population, weed management, mulching for soil moisture conservation and drip/spray irrigation may be advocated. They also need to be provided a minimum number of hours of power supply.

Agricultural Extension service providers may play key role in providing timely advisories relating to on set of drought, selection of crops, varieties of seeds, contingency crops, soil and water conservation measures, cultivation practices and crop management, post-harvest and marketing.

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