

Full Length Research Paper

Socio-economic overheads of drought and household coping mechanism in India

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Accepted 25 March, 2016

Drought induces distress like food and water scarcity and it has other adverse impacts, particularly on gender. The paper analyses socio-economic costs of drought and household coping mechanism in India in two different development scenarios. It highlights unequal and inadequate access and use of land, water and other resources in semi-arid areas as it continues to pose challenge for agricultural growth, occupational mobility and gender equity. Long term drought measures, integrated regional land and water management and strengthening local institutions are suggested for better access to basic resources, to reduce household distress, enhance coping capability and to improve gender equity.

Key words: Drought, agriculture, household risk coping, gender, India.

INTRODUCTION

Drought has been a major constraint on food production and water availability in the semiarid areas. It causes enormous socio-economic and environmental impact in terms of food and livelihood insecurity, increasing poverty and vulnerability, loss of vegetation and adverse gender inequity. Though there is some confusion between droughts and famines, droughts are often considered the precursor of famines (Anderson and Woodrow, 1993). In recent years, water scarcity¹ already affected every region and group across the world. Almost one-fifth of the world's population live in areas of physical scarcity, and many people are approaching this situation. About 1.6 billion people, or almost one quarter of the world's population, face economic water shortage² (FAO, 2012). However, impacts of water scarcity, causing drought like situation, could be different for different regions and social groups. Here, this study focuses mainly on agricultural drought which refers to the shortage of the sufficient water available for a crop at any given stage of

its development resulting in impaired growth, wilting and ultimately reduced crop yields. The present paper analyses impact of drought on agriculture, food security, livelihood, household coping strategy and gender equity in regional contexts in India.

Despite the increase in food production during the past decades, food security is still a concern in India. On the other hand, average land holding size has declined almost to half during 1971 (2.28 ha) and 2011 (1.16 ha) in the country (Government of India, 2012).

A large number of rural people, living in marginalized rural area, semi-arid areas, tribal mountainous or resource-poor areas, are still suffering from food shortage. Though some policy measures are undertaken to reduce drought impacts, much is not known about worsening household coping mechanism and gender equity in drought affected regions. Findings of this paper will help in understanding of the socio-economic impact of drought and farmers' coping mechanisms, essential for designing policy interventions to reduce drought induced vulnerability. Of late, agriculture development and access to controlled water and management of resources in agriculture was seen as an essential condition for food security, gender neutrality and human development. In India by and large, agriculture and land and water management are traditionally the domain of men. While rising demand for multiple land and water uses do not match with existing practices, it can have severe

¹ Water scarcity is defined as the point at which the aggregate impact of all users impinges on the supply or quality of water under prevailing institutional arrangements to the extent that the demand by all sectors, including the environment, cannot be satisfied fully. Hydrologists typically assess scarcity by looking at the population-water equation. An area is experiencing water stress when annual water supplies drop below 1,700 m³ per person. When annual water supplies drop below 1,000 m³ per person, the population faces water scarcity, and below 500 cubic meters "absolute scarcity"

² where countries lack the necessary infrastructure to take water from rivers and aquifers

consequences on gender. As such, this study made a modest attempt to discuss some aspects of drought in two different development conditions in India. Here, it focuses mainly on agricultural drought which refers to the shortage of required water available for a crop at any given stage of its development resulting in reduced crop yields and ultimately crop output. India still does not have a well-defined drought policy and there is no common or approved pattern for the states. Major policy initiatives³ in drought-proofing have little to show in terms of mitigating the adverse effects of drought on a permanent basis.

Farming households make various adjustments in their production, consumption and livelihood practices and adopt conservative measures to reduce the negative impact of drought. The production adjustments and conservative measures reduce direct production losses. The consumption and livelihood adjustments, on the other hand, help in smoothing consumption costs and income. But impact of these adjustments, themselves, may not be gender neutral in terms of work burden, consumption expenditure and hardships. The present paper analyses socio-economic impact of drought and farmers' coping mechanisms in some drought prone areas in East India (Odisha) and West India (Gujarat). Given the wider regional and group variations in availability and use of water and other resources, this study's discussion concentrates around different agro-climatic zones, and captures the range of land based activities, levels of economic development, rice yields and institutional setups and land size classes representing social classes. By focusing on water and food security in two different parts of the country, an effort was made to understand some aspects of household coping behaviour and its impacts on gender in group and regional contexts. This would add to existing knowledge and conventional development policy approaches.

ANALYTICAL APPROACH, METHODOLOGY AND STUDY AREAS

There are numbers of studies on drought and household coping with food insecurity and vulnerability. Using a base line survey data, Parsuraman and Rajaratnam (2011) found that the higher the food crops production, the lower the under-nutrition levels amongst different groups in the Vidarbha region (one of the most drought prone areas in India). Shivakumar and Kerbart (2004) study on Rajasthan examined the manifestation of drought in poor people's everyday lives - specifically the ways food and water shortages impact men, women and children, and found adverse long-run impact of drought on people's assets and livelihoods and the coping strategies they adopt. Similarly, Rao and Deshpande

(2002) with the help of data from two drought-prone districts of Karnataka, attempted to demonstrate the feasibility of a decentralised system operated by local institutions (PRI) based on the local staples consumed by the poor.

Using household survey data in Bihar, Somnathan and Somnathan (2009) found out that flood affected households showed remarkable resilience in the immediate aftermath of the flood – another weather based risk event. However, their long-term prospects remain grim and the poor are particularly vulnerable to these changes because of their limited access to insurance and credit. Reardon et al. (1988) tried to examine strategies used by rural households in two different zones of Burkina Faso to ensure food security in the face of drought-induced cropping short-falls. They found out that about three-quarters of the average household income come from non-cropping sources which are differently diversified regionally and sectorally.

Despite sharp variation in annual average rainfall, occurrence of drought has been observed as a regular event in India and in both low rainfall (350-750 mm in Gujarat) and high rainfall (700-1500 mm in Odisha) regions. The broad objective of this paper is to analyse different impact of drought and household coping mechanism in both high and low rainfall regions. Some specific objectives are given as follows:

- To discuss whether or not the drought induced scarcity (water, employment, food, fodder etc.) is gender neutral in backward agriculture.
- Whether household risk sharing (intra-household risk sharing) during drought are different for different regions and social groups.
- Based on findings of the study, suitable policies are suggested to enhance household's coping capability to improve livelihood and food security.

A three-stage approach was followed for assessing women participation in agriculture, water, coping strategy and other aspects with emphasis on regional and groups specific features in Odisha and Gujarat. Intra-household risk coping behaviour was reemphasized to argue whether access to water and impact of water scarcity is gender neutral or not. Some local adaptation and practices to minimize food and water scarcity and its impact on gender are discussed in the context of both tribal and non-tribal, and low rainfall and high rainfall regions. Two different states - Gujarat and Odisha - were identified based on secondary data. Selection of the study areas for survey was based on: (i) primarily drought prone⁴ (moderate to severe) and (ii) subsistence small-

³ Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP), Integrated Wasteland Development Programme (IWDP), Employment Assurance Scheme (EAS), Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)

⁴ The term "drought prone" is often used loosely and ambiguously. In Bangladesh it is sometimes used to refer to the driest parts of the country – the "dry zone" – where the mean annual rainfall and short length of rainy season impose restrictions on agricultural production which are not experienced in wetter parts of the country.

Table A1. Selected study areas for field survey in Odisha and Gujarat.

S/N	District	Talula/Block	Drought area	Region	Type of irrigation
Odisha					
1.	Bolangir	Turekala	DPAP	Tribal	Community (Pani-Panchayat)
2.	Kendrapada	Rajnagar	DPAP	Coastal	Community (Pani-Panchayat) Canal, River
Gujarat					
3	Surendranagar	Lakhtar	DDP	Inland	Well
4	Panchmahal	Halol	DPAP	Tribal	Well

Source: (Field Survey, 2009-2010) Information collected from District Statistical Hand Books, Economic Survey and other Government Publications at State Level.

Table 1B. Distribution of sample HH by Caste (%). Source: Field Survey (2009-2010).

Castes	Odisha	Gujarat	All
Gen	1.5	18.0	9.5
OBC	70.5	16.5	43.5
SC	7.0	2.5	4.5
ST	17.5	57.5	37.5

scale agriculture which is a major livelihood activity (Table 1A).

Two different districts in both states and then one village from four selected districts were selected. Selection of the study areas was based on the first-hand information of the local experts and Government officers. Out of the four sample villages selected, two were from tribal regions and two were from non-tribal irrigated regions. Sources of irrigation for these villages came from tube wells installed by self or in groups. The local adaptation practices in agriculture and water uses were mostly traditional and hereditary.

Selection of one sample village was done on the basis of remoteness in location, access to local resources (forest, community land and water bodies, etc.) and public assets (road, community centres, canal/well etc.), nature and pattern of occupation, size of villages, type of irrigation and land based activities and nature of drought proofing and other interventions. Selection of sample households was made by following a stratified sampling to determine different categories of households selected for detail survey from each village based on their land holding size and occupations. Due representation of households was given to capture out-migration, women workers, food deficit households, participation in water user groups, etc. Caste wise distribution of total sample households from four districts (two each from Odisha and Gujarat) is presented in Table 1B. It may be noted that OBC households, particularly in Orissa (73% of total HH) are not in much better positions than backward castes. Most of these households are falling under below poverty line (BPL).

IMPACTS OF DROUGHT AND HOUSEHOLD COPING MECHANISM

Incidence of poverty and rising abiotic stress is believed to be high in drought affected regions mainly due to water scarcity that adversely affect the poor, women and other marginal groups who are engaged in variety of land and water based activities for their livelihood. Both Odisha and Gujarat continue to experience water stress and frequent droughts with varying intra-region and inter-region severity and frequency⁵. However, despite having high water resources (about 1400 mm rainfall per year), Odisha experienced frequent water scarcity. Gujarat receives average annual rainfall less than half of the Odisha, but the state has initiated active community level water management programme and watershed development in some parts of the state. But there are some commonalities between the two states - occurrence of drought, substantial tribal population, peasant farming, out migration, new institutions, initiatives in water sector and new water policy in the perspective of agricultural and rural development. Public intervention was used to promote alternate water provisioning like watershed development, community irrigation, tube well and institutionalizing it through people's participation found in both states. In this regard, *Panipanchayat*⁶ in Odisha and initiatives by the local community for water management and development in Gujarat are well documented. But the

⁵ In the past ten years, both of the states have been hit by severe drought for about three to four times.

⁶ Sahu (2008)

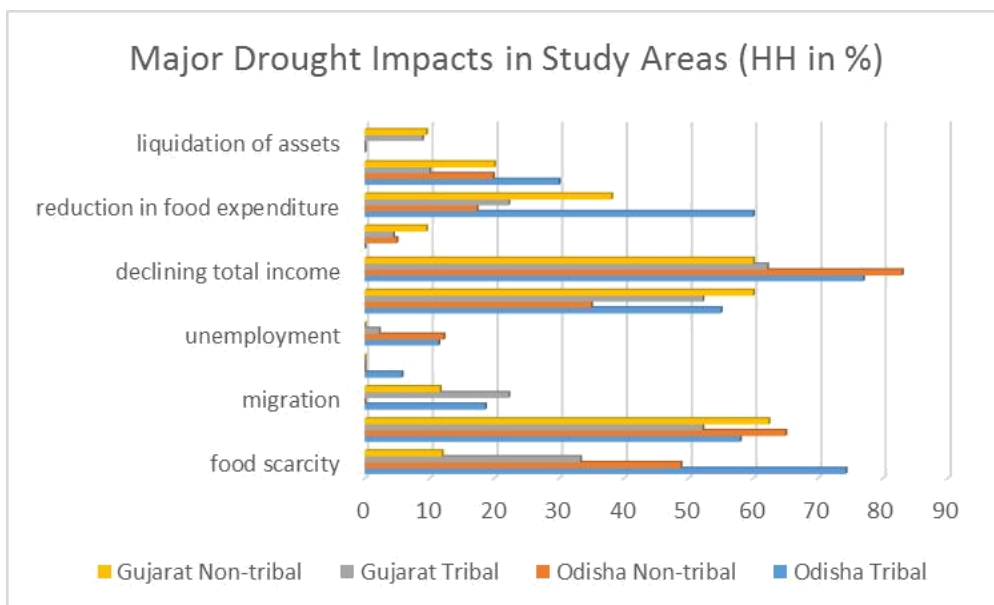


Figure 1. Major drought impacts in study areas (HH in %).

Table 2. Major impacts of drought on agriculture in study areas (responses of HH in %).

Area	Origin	HH (No.)	Failure of major food crops (yield)	Crop failure at different stages (area)	Shortage of fodder	Water scarcity for non-crop activity	Total
			(I)	(II)	(III)	(IV)	
Odisha	Tribal	35	97.1	2.9	0.0	0.0	100
	Non-tribal	41	63.4	20.2	4.9	10.1	100
Gujarat	Tribal	45	48.9	46.6	12.2	12.2	100
	Non-tribal	42	45.3	45.2	22.4	17.1	100
All		80	55.5	26.3	10.0	8.0	100

Source: Field Survey (2009-2010).

problems of conservation and distribution of water at community level continue to be bias against the poor, women and weaker sections. Participation and representation of women in water sector, particularly in decision making, was found abysmally low in the study areas. But the perceptions and priority of impacts of drought and water scarcity was different for different social groups across study areas (Figure 1).

Drought has been historically associated with water scarcity, food shortage and lack of employment of varying intensities. Data presented in Table 2 show some basic understanding about drought impacts in regional perspective and in terms of household priority, which can have both direct and indirect implication on household coping with scarcity. This is in contrast to uniform public policy interventions for most of the drought prone areas. As expected, inadequate water availability and failure of food crop production are perceived as major adverse

impact on households in Odisha, where endowment of water resources is relatively high. However, it is different in Gujarat, which is a water and food deficit state⁷. It appears the state manages water resources and food better. Therefore, provision of assured water availability and local food production are important along with public provisioning in drought prone areas. Overall, the data show broad impacts of water scarcity and household priority in regional perspective.

As food crops yield is more sensitive to drought during the flowering and grain- formation stages (that is, in late season), late season drought is generally more damaging than that in early season. More than half of the total respondents reported that they experience shortfall in food production during drought and it was worse in the tribal areas of Odisha than in other study areas. As a

⁷ deficit in terms of domestic food production

result, female work participation and outmigration from villages was reported much higher among land poor household and in dry regions. It substantiates the argument of feminisation of agriculture in backward and dry areas, where access to and distribution of land and water resources are highly unequal. In many cases, female members are responsible for household farming in the absence of their male members. But at the household level, crop production losses are much higher for Odisha (eastern India) than for the study area in Gujarat (western India). It may be noted that production losses resulted from both yield loss and area loss. The loss in yield, however, accounted for the major share of production losses. Across the study areas, production losses were higher in upland Odisha than plain coastal lands, which tend to have more favourable hydrological conditions.

Despite high rainfall in Odisha, food scarcity emerged as single most household shocks. On the other hand, it was reflected in terms of crop failure, reduction in expenditure, out migration and food scarcity in Gujarat. Interestingly, unemployment was not found as a major drought shock for sample households in some study areas may be due to availability of non-farm avenues in nearby urban places or some of them may be resilient to local low wage employment. In this regard, the situation in Odisha was desperate in terms of non-availability of employment as many poor households could not afford to be unemployed during dry season, which can have direct impact on gender. In contrast, more than one-fifth of households in Gujarat reported health related problems during drought and more among women and in non-tribal areas. The loss in major crop yield during drought years was estimated to be in the range of 63 - 97% in Odisha, but was less than half in Gujarat, where proportion of crop failure in terms of area (at different stages) was almost similar during drought. This highlights the regressive impact of drought in terms of scarcity of food, income, water, fodder, etc. Earnings from farm labour also dropped substantially, due to the reduced labour demand. Though households try to undertake additional earning from non-farm employment including out-migration during drought, it is clearly inadequate to compensate the loss in agricultural income and livestock income, resulting in a drop in total income.

Most of the respondents viewed shortfall in food production consumption as a major problem during scarcity period that might outpaced other problems like reduction in health, education and social expenditure which can have deteriorating effects on gender. About 45% of tribal households in Odisha reported having health problems. Since health problems are common especially among women, not given much importance by the poor household even during normal year, it is possible that household priority for food arrangement will undermine their health related issues. Water related health problems were reported in the study areas

followed by fever, pregnancy related and body weakness, etc., due to inadequate availability of food and drinking water. Relatively lesser decline in food expenditure in Odisha than Gujarat does not implies that households were better off in Odisha than in Gujarat as many of them do not have any specific food budget and they do manage shortfall in food consumption with local food arrangement from forest and other sources depending on the seasonal and local availability and access. In most of the cases, the female members of the household share the burden unequally due to socio-economic-cultural practices.

Farming households relied on three main mechanisms to recoup this loss in total income: sale of livestock and other assets, outmigration and borrowing. These adjustment mechanisms helped recover only marginal loss in total income due to drought. Thus, all the different coping mechanisms farmers deployed were found to be inadequate and ineffective to prevent a shortfall in income (and most likely in consumption) during drought years. In recent years, many households opt for out migration as an important coping strategy to compensate income and consumption shortfalls, but fail, rather it results in shift of larger burden to non-migrating female members. The impact of an income drop on the social groups may have different implications on household vulnerability, poverty and gender.

Data presented in Table 3 show drought induced vulnerability at regional and group contexts. Vulnerability refers to the capacity of a population to anticipate, cope with, prevent major decline in well-being, and recover from the adverse impact of shocks.

Drought vulnerability refers to the degree to which households are susceptible to the adverse effects of drought. It appears that situation is more of distress driven in Odisha tribal areas than their counterparts in Gujarat.

Liquidation of asset or distress sale of assets also reported in the study areas which substantiate incidence of multiple and adverse drought also have impact among sample households.

Sharp rise in food prices during drought years was also reported. In summary, people's perception and priority about impact of drought was beyond food crop production and consumption shortfalls. It could have adverse impact on women that widening gender inequality and rising drudgery.

Practices of social caste discrimination on denying equal access to land, water and other resources, as reported in some areas, can aggravate the situation. Household vulnerability that depends on a combination of factors such as income, occupation, family structure, gender, social class, caste, cultural factors and health is reiterated from this study.

The data presented in Table 3 indicate that households in tribal areas, small farm size, a high proportion of upland area, and high incidence of outmigration are

Table 3. Overall impacts of drought on households in study areas.

Impact	Odisha		Gujarat		All	
	Tribal	Non-tribal	Tribal	Non-tribal	Tribal	Non-tribal
Food scarcity	74.3	48.8	33.3	11.9	51.3	30.1
Health problem	58.0	65.0	52.2	62.4	54.3	64.2
Migration	18.6	0.0	22.2	11.6	19.3	9.5
Distress migration	5.7	0.0	0.0	0.0	2.5	0.0
Unemployment	11.4	12.2	2.2	0.0	6.3	6.0
Water scarcity for daily usage	55.0	35.0	52.2	60.0	51.3	42.0
Declining total income	77.0	83.0	62.2	60.0	67.3	72.4
Decline in skilled based activity	0.0	4.9	4.4	9.5	2.5	7.2
Reduction in food expenditure	60.0	17.3	22.2	38.1	42.5	22.9
Increase in Borrowing	30.0	19.8	10.0	20.0	20.0	18.8
Liquidation of assets	0.0	0.0	8.9	9.5	5.0	4.8
Total response (%)	100	100	100	100	100	100

Source: Field Survey (2009-2010).

more vulnerable to drought.

CHANGE IN HOUSEHOLD OCCUPATIONS IN STUDY AREAS

Under stress situation like drought, households reallocate its resources, mainly family land and labour, to minimize adverse impact on income and consumption shortfalls. It could be undertaking multiple occupations, increasing average working hours, pushing women and children into labour market, outmigration and undertaking non-farm activity which are mostly called as distress diversification of household occupation. It is evident in the study areas during drought period that farmers are largely tempted by water scarcity because they do not seem to have much flexibility in making farm or crop management. Since timing of drought is not predictable and there is lack of suitable technological options, it does not create flexibility to make tactical adjustments in crop management practices. As a result, most of the farming households seem to have developed an outward-looking strategy of generating employment and income through migration in times of drought. In order to better understand the effect of household diversification during scarcity period, here this study focused on changes in income-earning activities undertaken by sample households. First, few activities listed by households were selected to analyse impact of changes in household portfolios on gender.

Concentration of women workers in agriculture and other land and water based activities and rise in their participation during scarcity is clearly emerged from the survey data. It has direct implication on gender particularly in case of caste based and forest based activities. Despite the inadequate access to resources (water, land, credit and other inputs) and having low human development, female members share more hardships in terms of working hours, managing water,

food, fodder, fuel and other risks. Data presented in Table 4 show some distress driven occupational diversification induced by acute shortage of water, food and employment in the study areas. It may be noted that with limited scope for change in land and water based occupations in the rural economy, there might be reduction in proportion of workers (mostly younger male workers who try to migrate out) in agriculture during drought season, but it could push women into such activities. The trend was observed in Odisha where there is a decline in agricultural wage labour and cultivators and it is more pronounced in tribal areas where the forest based activities reported declined and were restricted. Another important observation on distress diversification found in the study areas is decline in livestock activity in which participation of women was expectedly higher than their men counterpart. To some extent, distress driven occupational change and feminization of low return land based activity seem to emerge as the household coping strategy in study areas during scarcity period (Figure 2).

In any case, there is adverse impact of scarcity shift from male to female members at household level. Household decision to change its occupation or resource allocation during distress period may contribute to minimize adverse impacts of land and water based income earning activities, but it may not be always gender neutral. The data reveal that household occupational diversification in drought affected areas does not support gender neutrality in employment, income, work condition and resource use pattern. This could be largely due to inadequate access to basic resources like land and water.

COPING WITH DROUGHT: HOUSEHOLD CONSUMPTION STRATEGIES

Many sample households in the study areas were in food

Table 4. Change in major occupations in study areas.

Sources of income	During survey (workers in numbers)		During last 10 years other than the survey year (workers in numbers)		% Change in major occupation	
	Odisha	Gujarat	Odisha	Gujarat	Odisha	Gujarat
	(1)	(2)	(3)	(4)	(col.1-col.3)/col.1	(col.2-col.4)/col.2
Tribal						
Cultivation	60	82	87	94	-45.0	-14.6
Livestock	1	17	5	19	-400.0	-11.8
Non-farm activity	3	4	1	2	66.7	50.0
Agricultural wage labourer	4	24	15	18	-275.0	25.0
Skilled base	3	24	2	10	33.3	58.3
Regular job	3	3	0	2	100.0	33.3
Trading	2	2	0	1	100.0	50.0
Caste base			2	2		
Forest base	1	1	15	8	-1400.0	-700.0
Migration	72		22		69.4	
Total	149	156	149	156	0.0	0.0
Non tribal						
Cultivation	58	46	64	60	-10.3	-30.4
Livestock		16	2	18	-400.0	-12.5
Non-farm wage labourer	1	10	0	8	100.0	20.0
Agricultural wage labourer	2	33	17	24	-750.0	27.3
Skilled base	5	4	1	2	80.0	50.0
Regular job	8	4	1	2	87.5	50.0
Trading	5		0	2	100.0	
Caste base		4	2	3		25.0
Migration	10	2	2	0	80.0	100.0
Total	89	119	89	119	0.0	0.0

Source: Field survey (2009-2010).

stress for 3 to 6 months in a year. Landlessness, marginal and small land holdings and lack of irrigation facility in the sample villages are the major cause of food insecurity. Having inadequate asset ownership, lack of access to water and forests, depleting common properties resources

and poor provision of public assets and development program made many poor households in the study areas try to adjust their consumption and expenditure practices. This study data indicate that all possible consumption adjustments are made by the households in

varying degrees and across social groups. As subsistence farming is pre-dominant, any production loss can be expected to result in distorting household food balance and adjustment. It ranges from reduced sale of food grains, consumption of seed retained for next year, purchase grains from

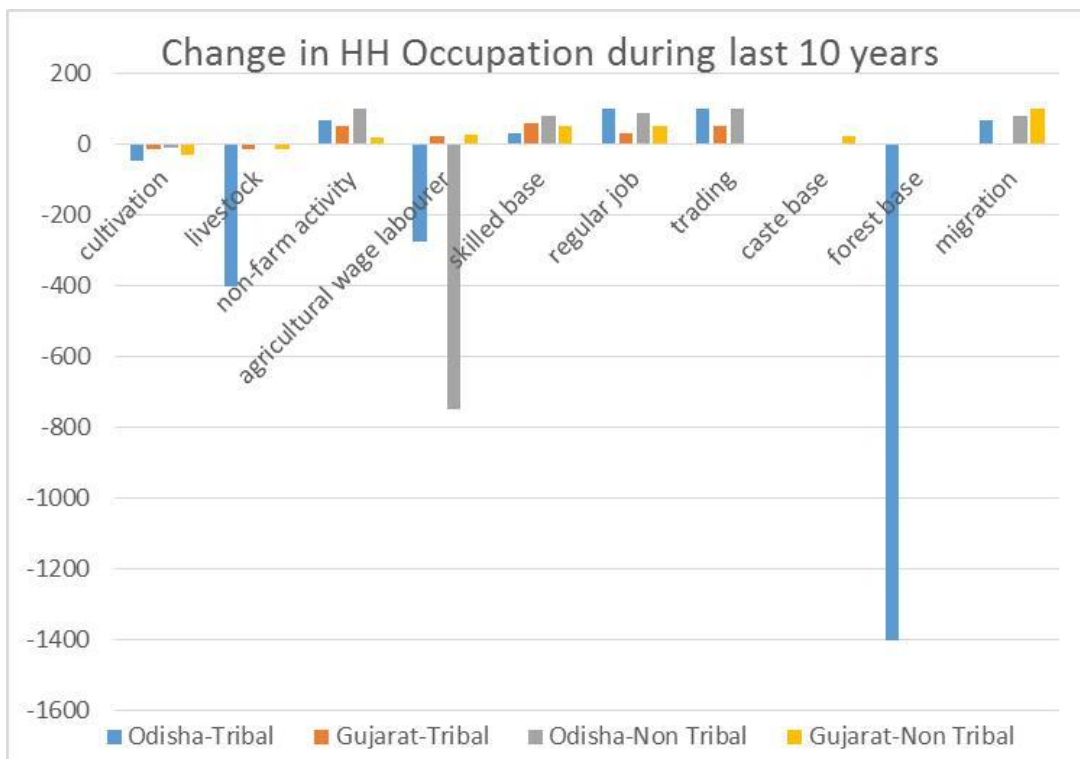


Figure 2. Change in HH occupation during last 10 years.

Table 5. Changes in household food consumption (in %).

Decline in consumption of food items	Extent of decline	Odisha		Gujarat		All	
		Tribal	Non-tribal	Tribal	Non-tribal	Tribal	Non-tribal
Quantity	Marginal (<5%)	85.8	24.7	55.9	14.0	69.2	19.5
	Average (5-15%)	14.2	75.3	39.0	64.7	28.0	70.2
	High (>15%)	0.0	0.0	4.5	19.1	2.5	9.2
	No change	0.0	0.0	0.6	2.2	0.3	1.1
Quality	Marginal (<5%)	85.8	8.2	10.2	9.6	43.7	8.9
	Average (5-15%)	14.2	91.8	31.1	45.6	23.6	69.5
	High (>15%)	0.0	0.0	46.9	32.4	26.1	15.6
	No change	0.0	0.0	4.5	5.1	2.5	2.5

Source: Field Survey (2009-2010).

market, substitution for low cost staple food, supplementation of the food deficit by food not normally consumed, a reduction in quantity and quality of food consumption. This study’s survey data presented in Table 5 shows consumption shortfall in terms of quantity and frequency of food intake during stress period, particularly when they buy food from market. The data also capture the magnitude of decline in food consumption that explains some important aspects of household coping behaviour like intra- household consumption inequality,

changes in quality and quantity of food intake, skipping regular meals, alternate food arrangements, particularly in tribal areas where, there was a shift in staple food consumption, mainly from maize, millet and *bajra* to wheat and rice mainly attributed to the drought relief work payments⁸.

About two-third of sample households experienced a fall in quality of food, diet imbalance and drop in quantity

⁸ Drought relief works has a wheat/rice component.

Table 6. Intra-household food consumption (%).

State/District	Sex	Decline in quantity of food (in %)				Decline in quality of food (in %)				
		Marginal (<5%)	Average (5-15%)	High (>15%)	Total	Marginal (<5%)	Average (5-15%)	High (>15%)	Total	
Odisha + Gujarat	Male	11.4	13.5	12.0	12.5	23.7	26.7	25.7	25.0	
	Female	30.0	35.7	33.0	33.2	23.0	28.0	36.5	30.2	
	Non-Tribal	Boy child	11.4	27.0	20.0	17.0	18.0	14.7	16.9	17.0
		Girl child	10.9	36.0	30.0	28.9	22.3	14.7	16.9	18.9
		Others	16.4	7.9	0.0	13.5	12.9	16.0	12.0	13.5
Tribal	Male	30.9	26.3	23.1	25.7	28.0	25.6	25.0	25.7	
	Female	32.7	27.3	36.9	33.7	32.0	27.6	25.0	27.7	
	Boy child	9.1	16.2	15.4	15.2	10.0	15.8	15.9	14.2	
	Girl child	12.7	17.2	23.1	16.3	22.0	16.3	20.5	19.3	
	Others	14.5	13.1	11.5	13.1	8.0	12.8	13.6	13.1	

Source: Field Survey (2009-2010).

of food consumption. Sharp decline in consumption of vital food items like milk and milk products, vegetables, fish, egg, meat, etc., during scarcity period was also reported. It can have serious adverse impact on women and children. As social practice, women are generally the last to eat their meals and hence are likely to receive a much lesser quantity than others. Prolonged malnutrition and increased workload during drought adversely affect women's health.

Therefore, household adjustments related to income and consumption shortfalls during drought found not gender neutral.

On the supply front, food production loss due to drought tends to reduce market surplus, quantity stored for seed and future use in subsequent year. Reduction in marketable surplus would obviously have a price effect in the local market, which, if not counteracted by inflow of grains from other areas, would result in an overall reduction in consumption per capita. It may be noted that due to high outmigration in the study areas, incidence

of food grain storage, food exchange and food production declined over years.

Regarding intra-household food consumption adjustment, the data presented in Table 6 shows gender inequality across study areas. In response to our question "who faced bigger drop in food consumption", it was observed that almost all people were affected but it was more in tribal pockets and among women. All female members are first who suffer in terms of consumption shortfall followed by male and others. About two-third of adult females and male member experienced overall decline in food consumption with higher degree. In non-tribal areas, the reduction in food consumption during scarcity period was also reported but at lower level. It is evident that disproportionate amount of consumption shortfall was absorbed by women.

Children were perhaps „protected“ to whatever extent possible. It seems female members of the family appear to sacrifice in favour of working male members and children. Strong presence of

gender inequality in drought affected areas is reiterated if one looks at the pattern and trends in food consumption by sex, region and land size groups (Table 6). Very high portion of women (about one-third) reported that they reduced their food intake to the maximum extent. This was partially true for the men and in tribal areas showing the severity of food scarcity in tribal areas. Similarly, reduction in quality of food consumption evident from the data shows distress driven coping behaviour of farming households where women are worse hit.

CONCLUSION AND POLICY SUGGESTIONS

Drought in semi-arid areas affects the poor and women in both low rainfall and high rainfall regions. At household level, the total cost of drought includes the value of production losses, loss of employment, distress sale, forced outmigration, inefficient resource uses and decline in human development. In addition, it also accrues

the cost of use of conservative risk coping practices which has long-term adverse effects on poor households. To cope with drought induced scarcity, they follow multiple strategies - consumption adjustment, expenditure adjustment, borrowings, distress sale, outmigration, reliance on drought relief supports, etc.

The findings of this paper show that a disproportionate amount of drought induced adverse impacts has been absorbed by women in terms of increasing working hours and reduction in consumption and expenditure, often ignored by the policy makers and others. In many cases, these impacts go beyond food and water scarcity, crop failure and income loss and have serious consequence on resource use, intra-household gender relations and overall development. The study's analysis suggests that households tend to use women members for „labour smoothing“ and „consumption smoothing“ during distress period leading to unequal intra-household gender relations. Therefore, policy options and strategies should be appropriate to regions and socio-economic groups. Specific policy to expand access and ownership of resources like water, land, credit and other inputs to women in agriculture is suggested. Strengthening of local water institutions, conservation, management and distribution of resources, ensuring women participation and decision making are reemphasized.

On the other hand, the existing drought interventions (agriculture technology, water management, drought preparedness, crop insurance and rural development programme) appear to fail to mitigate drought impacts at household level. In the absence of long-term dependable drought proofing measures, household or community level risk coping efforts proved inadequate. Under this situation, drought induced poverty, vulnerability and gender inequality is expected to rise. The analysis of this study supports the argument that the poor and women in backward agriculture continue to suffer disproportionately with little or no access to land, water, credit and other resources. Increasing water scarcity and failure of community based water management augment their adversity.

Given the strong linkage between drought, agriculture and household vulnerability, it is important to include drought mitigation as an integral part of agricultural and rural development strategy. Access to land, water, credit, farm input and public assets is essential to strengthen household and community level capability to cope with drought. Long term drought policy measures include: irrigation (small and medium), watershed development (conservation and management), renovating local water bodies, improvement in crop production technology (drought resistance varieties), rural infrastructure development (storage, road and markets), innovative crop insurance and promotion of off-farm activities (livestock, household enterprise). Therefore, there is need for region and group specific drought interventions beyond simply provision of relief which has been the main government

drought management approach so far.

ACKNOWLEDGEMENTS

This paper is a part of a major research study on “Livelihoods for the poor: coping with Drought and Food insecurity in India” carried out at Indian Institute of Foreign Trade, New Delhi, India, with financial support from the Indian Council for Social Science Research, New Delhi. The author would like to thank respondents/farmers, particularly women in Odisha and Gujarat in India who were interviewed for the study.

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