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## **Coping with Food and Nutrition Insecurity by Rural Women in Drought-prone Bolangir District of Western Odisha<sup>§</sup>**

**Mrutyunjay Swain**

Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar-388 120, Gujarat

### **Abstract**

Among various disadvantaged groups, rural women in the poverty stricken region are the most vulnerable section in the society. This paper has analysed the nature and sources of consumption baskets of the rural women in Bolangir district of Odisha and their coping mechanism in the face of frequent droughts and seasonality. The study finds that these rural women have been significantly affected by the direct and indirect impacts of drought. They have been hit hard in the form of consumption shortfalls and decreased access to water resources for drinking and domestic purposes. The reduced access to water resources has compelled them to walk a longer distance to collect utilizable water. The steep decline in income from agriculture has forced them to accept increased family responsibility with lesser food intake. The reduced food consumption, irregularity in consumption and increased levels of physical strain and mental stress have resulted in adverse health impacts for the majority of affected women folk. For adjusting with drought-induced scarcity situations, they have resorted more to non-timber forest produces (NTFPs) and have diversified their activities through their involvement in village level institutions like SHGs so as to tackle food insecurity and nutrition deficiency.

**Key words:** Drought, food security, nutrition security, rural women, coping mechanism, western Odisha

**JEL Classification:** Q54, Q18, Q12, Q23

### **Introduction**

Drought is considered by many to be the most complex but least understood of all natural hazards, affecting more people than any other hazard (IPCC, 2014). It is a slow onset insidious disaster, which is gradually increasing in intensity and frequency both spatially and temporally due to development pressure, population increase and environmental degradation (ISDR, 2002). The impacts of drought span all sectors and all livelihood groups in a rural economy. It not only hits hard on ecology and environment in a region, but also sends wide ranging economic and social ripples

throughout the affected area. For example, during moderate to severe drought year, a fairly significant proportion of population migrates from the affected area in search of work and hope of better life. These families encounter new hardships and obstacles that would require ingenuity, resilience, and humility. Those who decide to remain in the drought-affected region, are forced to endure severe difficulties with diminished incomes, animal infestations, and physical and emotional stress over their uncertain future. The total cost of drought — social, economic and environmental — sometimes, crosses the coping capacity of drought-hit vulnerable section of the society.

The nature of drought vulnerability and magnitude of impact also differ for different strata of society. The factors like class, caste, gender, education, economic strength and social status do significantly influence the

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Email: mrutyunjay77@gmail.com

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level of drought vulnerability and coping capacity. The rural women being a vulnerable section of the society are quite differently affected by drought compared to their male counterparts (Bari and Bari, 2005). The drought-induced crisis situations like reduced agricultural output and financial resources, increasing level of out-migration and decreased access to water resources distinctly affect the rural women on many fronts. However, the severity depends on the intensity of drought impacts and their coping capacity. It is worth mentioning that, since drought continues to prevail over a prolonged period unlike other kinds of disasters, its impacts on rural women are quite different. Women's subordinate position vis-à-vis men in all social relationships impinges on their experiences of droughts in terms of risks and exposure to risk, preparedness, access to information and recovery from the disastrous situations.

In this context, this paper has analysed how rural women from disadvantaged livelihood groups were affected by and responded to drought vulnerability in a continually drought-prone Bolangir district in western Odisha. In other words, how drought-induced forced out-migration, reduced consumption levels, reduced access to water, etc. have affected their food and nutritional security<sup>1</sup> and how they have coped with such distress conditions?

### Data and Methodology

For selecting sample households, multi-stage random sampling method was used in the study. The Bolangir district being the most vulnerable to droughts was selected (Roy *et al.*, 2004), and then on the basis of degree of drought vulnerability<sup>2</sup>, three blocks namely Saintala (most vulnerable), Titlagarh (least vulnerable), and Patnagarh (moderately vulnerable) were selected.

At third stage, three villages, one from each selected blocks, namely Samara village of Saintala block, Mundamahul of Patnagarh block and Bijepur of Titlagarh block were chosen. Finally, sample households were selected randomly from each selected village covering all major livelihood groups, viz. (i) large farmer (more than 4 hectares), (ii) medium farmer (2.01-4 hectares), (iii) small farmer (1.01-2 hectares), (iv) marginal farmer (less than 1.01 hectares) (v) agricultural labourers (vi) non-agricultural labourers (vii) forest resource dependant, (viii) rural artisans, (ix) businessman, (x) service holder (xi) livestock rearers, and (xii) others including fishing community, potters and stone merchants. About 20 per cent of households were selected randomly from each of the livelihood groups resulting in sample size of 139. The women from disadvantaged livelihood groups were taken into consideration for a focused study. The information was obtained through interviews using well-designed questionnaires.

### Nature of Drought Vulnerability in Bolangir District

Bolangir district is one of the constituent districts of the KBK (Kalahandi-Bolangir-Koraput) region of Odisha<sup>3</sup>. The district being largely rural, the proportion of rural area is about 98.5 per cent. The proportion of rural population is very high (88.03%). The proportion of scheduled castes (SCs) and scheduled tribes (STs) in total population is around 17.9 per cent and 21.1 per cent, respectively. The overall literacy rate is about 56.2 per cent and women literacy rate is 53.8 per cent in the district.

The district is known for prevalence of chronic poverty, malnutrition, hunger and starvation death, periodic out-migration, and unusual high day

<sup>1</sup> FAO (2002) defines food security as 'a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'. Nutrition security requires simultaneously 'food', 'health' and 'care'. So, there is no way to achieve nutrition security without food security at household level (FAO, 2009).

<sup>2</sup> The degree of drought vulnerability was measured by constructing a Composite Drought Vulnerability Index (CDVI) with two sets of variables for all the 14 blocks of Bolangir district. The variables included 6 bio-physical (drought frequency, drought intensity, rainfall variability, water holding capacity of the soil, land slope, ground water table) and 13 socio-economic variables covering irrigation, agricultural production and yield variability, poverty, education, land use pattern and other socio-economic factors. The factors those significantly influenced the drought vulnerability were chosen for indexing purpose (for details, see Swain and Swain, 2011).

<sup>3</sup> The KBK region was earlier constituted by three districts, namely Kalahandi, Bolangir and Koraput, which in 1992-93 were divided into eight districts, viz. Kalahandi, Nuapara, Bolangir, Sonepur, Koraput, Rayagada, Nowrangpur and Malkanagiri.

temperature (Pattnaik, 1998). About 2.01 lakh families (61.1% of total) live below the poverty line (BPL) in the district (GoO, 2002). Agriculture is the major source of livelihood and about 63.8 per cent of total main workers are agricultural labourers in the district (GoI, 2011).

Drought is a recurring and single most insidious phenomenon, which is largely accountable for its chronic backwardness in the district (Pattnaik, 1998; Roy *et al.*, 2004). The district has been affected by droughts of different intensities in twenty out of past fifty years (1962-63 to 2011-12). Further, the intensity and frequency of the drought episodes appear to increase with each passing year (Swain, 2010). The socio-economic backwardness has resulted in vicious circle of poverty for fairly a large proportion of population. The presence of persistent level of poverty and illiteracy has compounded the extent of drought vulnerability in the region.

### **Drought Vulnerability of Rural Women**

The rural women in tribal belts of western Odisha play a more active role in household level management of resources compared to women in coastal Odisha. They play a critical role in earning livelihoods from various sources like agriculture, agricultural and non-agricultural labour works, non-timber forest resources, artisanal works and livestock-rearing. The women in the study region always remain at the centre of household management. Obviously, burden on women increases significantly during the period of distress and scarcity like recurrent drought-induced shortages. In this section, we have analyzed three major aspects of women's vulnerability and adaptability as a result of occurrence of severe drought of 2002. These are: (i) consumption shortfall due to reduced agricultural output and financial resources, (ii) reduced access to water resources, and (iii) drought impacts on women's physical and mental health.

Before analysing the key issues, we may examine some demographic and socioeconomic characteristics of rural women in the study villages. According to Census Reports, the female population in all the study villages is about half of the total population. In Saintala village, 7.5 per cent population belongs to STs, 5.2 per cent to SCs and 36 per cent to either OBCs or general castes (1991 Census). In all the reference years, the

female literacy rate remained at disappointing level, for example, in Saintala it was only 5.2 per cent as per 1991 Census, which increased to 9.4 per cent in 2004.

### **Consumption Shortfall and Adjustment**

In this section, we have examined the extent of consumption shortfall of women folk from different livelihood groups due to drought-induced shortages and subsequent adjustments made by them in the study region. Out of 12 types of livelihood groups considered in the study, cultivators constituted 28.6 per cent followed by agricultural labourers (22.7%). Forest resource dependants were about 16.8 per cent in the sample. Table 1 shows the extent of reduction in food intake due to drought by male and female members of the family in terms of number of meals in one day taking 3 meals — breakfast, lunch and dinner as the base. We have excluded the cases of occasional voluntary reduction in food intake by some family members. We have investigated how many days were spent with lower number of meals in a year. It was noted that none of the family members of large and medium farmers and service holder categories faced the situation of drought or scarcity induced reduction in food intake. In case of small farmers also, the average number of days of food reduction was not too high. On an average, the women from small farmers category have accepted a single meal in a day by allowing others to take two meals for 8.6 days in the drought year compared to 5.7 days in a normal year.

In the case of marginal farmers, agricultural labourers, forest resource dependants and livestock rearers, the reduction in average number of food intake in a day by the women members was observed much higher than the same for other livelihood groups. Particularly in the case of agricultural labourer, the women adjusted by accepting two or less number of meals in 76 days in drought year which is 54.2 per cent higher than that in the normal year. The number of days with one meal or less for women was 37.7 in the drought year. The women from marginal farmers group were the next severely affected in the drought year in terms of reduced food intake. The total number of days with deficient food intake by adult female members of the group was 64 (an increase of 38.2% over a normal year) and number of days with one meal or less was 46.4 (an increase of 66.2% over a normal year). They were also forced to see their children

**Table 1. Rural women's drought-induced food consumption adjustments**  
(Base: 3 meals per day for both male and female)

Livelihood group of households	Year*	No. of days in a year with No. of meals/day								
		Male 3 meals+ female 2 meals	Both male and female 2 meals each	Male 2 meals+ female 1 meal	Both male and female 1 meal each	1 meal for male and no meals for female	No meals for both male and female	Children had to starve	Female 2 meals or less (sum of cols.3 to 8)	Female 1 meal or less (sum of cols.5 to 8)
Small farmer	Normal	8.6	9.7	5.7	0.0	0.0	0.0	0.0	24.0	5.7
	Drought	11.0	13.5	8.6	0.0	0.0	0.0	0.0	33.1	8.6
	Change (%)	27.9	39.2	50.5	-	-	-	-	37.8	50.5
Marginal farmer	Normal	16.4	12.7	10.5	2.1	3.1	1.5	2.6	46.3	17.2
	Drought	18.6	16.8	15.6	5.3	4.8	2.9	4.7	64.0	28.6
	Change (%)	13.4	32.3	48.6	152.4	54.8	92.0	80.8	38.2	66.2
Agricultural labourers	Normal	14.7	10.3	9.2	10.0	2.4	2.7	1.0	49.3	24.3
	Drought	23.5	14.8	17.6	11.8	4.8	3.5	3.0	76.0	37.7
	Change (%)	59.9	43.7	91.3	18.0	100.0	29.6	200.0	54.2	55.1
Rural artisans	Normal	16.4	7.5	7.5	2.0	2.5	2.4	2.3	38.3	14.4
	Drought	20.5	10.6	11.8	4.6	3.6	3.3	2.4	54.4	23.3
	Change (%)	25.0	41.3	57.3	130.0	44.0	37.5	4.3	42.0	61.8
Forest resources dependent	Normal	15.5	8.2	10.2	2.3	2.9	6.0	3.2	45.1	21.4
	Drought	21.4	11.4	14.6	5.5	3.1	7.4	4.2	63.4	30.6
	Change (%)	38.1	39.0	42.6	139.1	7.2	23.3	29.3	40.5	42.8
Livestock rearers	Normal	11.8	17.8	9.3	2.6	2.4	0.5	0.0	44.4	14.8
	Drought	15.8	22.7	12.3	5.2	3.5	0.8	0.0	60.3	21.8
	Change (%)	33.9	27.5	32.3	98.1	45.8	60.0	-	35.7	47.0
All households	Normal	9.4	8.3	5.9	1.8	1.4	1.0	0.8	27.8	10.1
	Drought	12.4	11.9	8.7	3.3	2.0	1.4	1.3	39.7	15.5
	Change (%)	31.9	43.5	47.1	82.0	45.6	43.6	60.7	43.0	52.9

Source: Author's computation from field data

starving for 4.7 days in the drought year. The forest resource dependant women also faced similar consequences with 63.4 days of food deficiency and 45.1 days with one or less number of meals per day in the drought year.

Different kinds of non-timber forest produces are being used intensively for self consumption or livelihood, as shown in Table 2. The increase in depletion of forest resources from trees, bushes and grasses was about 25.8 per cent, 24.6 per cent and 17.3 per cent respectively. Char (*Buchanania lanjan*), kendu leaf (*Diospyros melanoxylon*), neem (*Azadirachta*

*indica*), tamarind (*Tamarindus Indica*), mahul and sal (*Shorea robusta*) were some of the species of commercial importance which were heavily depleted due to drought-induced scarcity situation.

The resource-poor households in one of the sample villages, Bijepur, were mostly dependent on forest resources, though the forest was 4 km far from the village. Some landless labourers of the village informed that they used to travel to and stay within the forests everyday from 3.00 am to 11.30 am throughout the year to collect about 50 kg of fuel wood which is sold for ₹ 25-30. They are very much dependant on forest



**Table 2. Non-timber forest produces (NTFPs) as the source of livelihood or food**

Type of NTFP	Name of produces	Nature of use	Per cent increase in use in drought year 2002
Trees	<i>Mahul, char, kendu, sal, sahaj, phalsa, karla, neem, mango, tentuli, drumstick, kusanga, and emblic myrebalan (amla), black myrebalan (harida), bahada, jamba, and palm</i>	Self-consumption and sale of fruits, flower, extracted oil, fuel wood, resin, leaf plates, seeds, vegetables and other eatables	25.8
Grass	<i>Kala duba, samana, charana, kaensa, panesh, shukuna and kanchei, etc.</i>	Rope, sweeping mop, broom etc.	17.3
Bushes	Bamboo, date palm, and other bushes	Straw, rope, scuttle, basket, broom	24.6

Source: Author's own computation from field data

resources. About 60 per cent to 70 per cent of their livelihoods directly or indirectly depend on forest resources. About half of the households in the village were dependant on forests for their subsidiary income sources. On an average, a forest resource dependant earned ₹ 24345 in the drought year by either consuming or using for their own households or selling of NTFPs, as shown in Table 3. Among these products, the *char* and *toll* were mainly used or consumed during the months of April and May; *mahul* was used as food or liquor during the months of February and March; mushroom (locally known as *chhatu*) and *kardi*<sup>4</sup> were specifically consumed as a food during June to September; *sabai* grass was used for making ropes during November to December.

### Reduced Access to Water Resources

Scarcity of water for drinking and other domestic uses considerably increases the stress level of rural women. Drying up of reservoirs, ponds and falling groundwater levels in dug-wells and tube-wells forced the rural women to take extra pains to collect water. Since some tube-wells in the study villages were not working properly due to steep fall in groundwater level and over-utilization of tube-wells, women had to walk longer distances for collecting drinking water. Sometimes they had to wait for their turn to collect water from few usable water resources. This caused more physical strain and mental stress for the rural women. They had to sometimes substitute dug-well water as drinking water.

**Table 3. Average annual income per forest resource dependant household from forest resources in drought year**

Forest resource	Income generated* (₹)
Fuel wood	3000
<i>Kendu</i>	945
<i>Kardi</i>	12600
<i>Kurdu</i>	1500
<i>Char</i>	2400
<i>Dumber</i>	960
<i>Mahul/Toll</i>	2315
<i>Others</i>	625
Total	24345

Note: \*includes the forest resources used for self-consumption.

Source: Group discussion with forest resource dependant women.

Table 4 shows the access of rural women to different water resources available in the villages. The women from almost all the livelihood groups access tube-wells for drinking water and dug-wells and ponds for domestic purposes in both normal year and drought year. The frequency of use of water from river and check dam for domestic purposes is much less compared to the use of tube-well and dug-well. The dependence on these sources is basically for irrigation and livestock bathing. However in a drought year, people use these sources more intensively for different purposes. Considering all the livelihood groups, the

<sup>4</sup> The bamboo seedling at very early stage is known as *kardi* which is cooked and consumed by local people.

**Table 4. Access to water resources by different livelihood groups during drought year**

Livelihood group	Year	Total No. of households	No. of households having access to water sources				
			Tube-well	Dug-well	Pond/tank	Rivers/nalla	Checkdam/chua, etc.
Small farmers	Normal	23	22	14	16	10	3
	Drought		20	14	16	17	12
Marginal farmers	Normal	27	26	13	25	12	6
	Drought		25	13	25	18	11
Agricultural labourers	Normal	73	73	39	73	20	14
	Drought		73	34	73	36	31
Rural artisans	Normal	9	9	9	9	5	0
	Drought		9	9	9	6	6
Forest resources dependents	Normal	54	54	54	54	9	6
	Drought		54	54	54	24	24
Livestock rearers	Normal	13	13	13	13	2	2
	Drought		13	13	13	8	8
All households*	Normal	322	317	253	296	122	70
	Drought		314	246	296	180	164

Note: \*Due to multiple responses, the total number of households exceeds actual total.

Source: Author's computation from field data

average number of tube-wells, dug-wells and tanks were 1.7, 1.6, and 1.6, respectively in a normal year compared to 1.3, 1.3 and 1.2, respectively in the drought year. The reduction in access to dug wells and tanks in the drought year is understandable but such a significant decline in access to tube-well, which is considered as the reliable source in the drought year, is a major cause of concern since it was basically due to the damages caused by the more intensive use by the local people and the lack of *ex-ante* precautionary measures which should have been taken by the local administration. Some of the tube-wells were also partially damaged earlier and their over-utilization in the drought year made these structures defunct. However, the decline in groundwater level partly contributed to the failure of some tube-wells in the drought year.

Table 5 depicts the average distance that had to be covered by women from different livelihood groups for collecting water for drinking and other domestic purposes. To fetch water from tube-well, women from all livelihood groups covered similar distances in a normal year as well as in the drought year. On an average, they had to cross about 36.6 per cent more distance for collecting drinking water from tube-wells.

Among livelihood groups, women from livestock-rearers group had to cover maximum of 114 per cent more distance. They usually travel 0.15 km in a normal year but they had to cross 0.25 km in the drought year. The majority of them in village Samara live in one hamlet called Pradhan Para (with 21 households and 115 population) for which only one tube-well is available but it does not function properly during water-scarce period. As a result, women had to go to nearby other hamlets for collecting drinking water. Despite repeated requests, authorities have not addressed their drinking water problem and their demand for providing additional tube-well in the area.

While tube-wells are basically used as a water resource for drinking water and domestic uses, dug-wells are used for both the purposes. The dug-well water is utilized mainly for irrigation, but a significant proportion of women utilise it for domestic activities (Table 6). The dug-wells used for domestic purposes were usually within their residential area. But the dug-well used for agriculture were in the farm lands at a longer distance. As a result, the average distance from dug-wells is much larger than that from tube-wells for most of the livelihood groups.

**Table 5. Average distance covered by women for accessing water harvesting structures**

(in km)

Livelihood group	Year	Water harvesting structures accessed				
		Tube-well	Dug-well	Pond/tank	Rivers/nalla	Checkdam/ chua etc.
Small farmers	Normal	0.12	0.74	0.32	2.89	2.60
	Drought	0.16	0.85	0.36	3.10	3.10
	Change (%)	31.7	14.9	12.7	7.3	19.2
Marginal farmers	Normal	0.12	0.66	0.31	2.89	2.60
	Drought	0.21	0.87	0.36	3.10	3.10
	Change (%)	72.6	31.8	16.0	7.3	19.2
Agricultural labourers	Normal	0.15	0.41	0.25	2.89	2.60
	Drought	0.26	0.56	0.35	3.10	3.10
	Change (%)	72.0	36.6	37.9	7.3	19.2
Rural artisans	Normal	0.21	0.75	0.26	2.89	2.60
	Drought	0.33	0.85	0.29	3.10	3.10
	Change (%)	55.4	13.3	9.7	7.3	19.2
Forest resources dependent	Normal	0.13	0.24	0.25	2.89	2.60
	Drought	0.19	0.35	0.32	3.10	3.10
	Change (%)	51.6	45.8	27.7	7.3	19.2
Livestock-rearers	Normal	0.15	0.66	0.21	2.89	2.60
	Drought	0.25	0.87	0.28	3.10	3.10
	Change (%)	69.3	31.8	30.3	7.3	19.2
All households	Normal	0.15	0.69	0.28	2.89	2.60
	Drought	0.20	0.82	0.34	3.11	3.10
	Change (%)	36.6	17.7	22.7	7.6	19.2

*Source:* Author's computation from field data**Table 6. Nature of utilization of water from water harvesting structures during agricultural season**

Type of use	Tube-well	Dug-well	Pond	River	Dam	Chua
<b>Percentage people used water harvesting structures in normal year</b>						
Drinking	100.0	3.8	0.0	0.0	0.0	0.0
Bathing	12.5	19.9	72.8	1.5	2.5	0.0
Cooking	3.6	35.7	69.3	0.0	0.0	0.0
Crop cultivation	0.0	76.4	23.3	16.2	13.5	0.0
Artisanal works	1.3	3.1	3.3	0.0	0.0	0.0
Livestock rearing	1.1	3.6	87.0	19.3	11.8	0.0
<b>Percentage people used water harvesting structures in drought year</b>						
Drinking	98.8	5.0	0.0	0.0	0.0	0.0
Bathing	14.5	23.6	63.9	4.0	2.6	17.5
Cooking	9.5	52.3	51.2	0.0	0.0	0.0
Crop cultivation	0.0	78.9	19.3	14.3	13.4	0.0
Artisanal works	1.7	3.3	3.2	0.0	0.0	0.0
Livestock-rearing	2.2	6.7	74.5	16.7	14.2	10.5

*Source:* Author's computation from field data



Though rural women did not face much difficulties in terms of distance travelled, the extent of use of pond water had significantly declined in the drought year due to low water depth and poor water quality with high level of contamination.

The village ponds could hardly be used for domestic purposes like cooking and bathing in the drought year. It could be utilised to some extent for bathing and feeding of livestock in the drought year. The use of such poor quality of water for livestock feeding was also a major reason for high level of incidence of livestock diseases and mass death of livestock in the region. River was particularly used for livestock rearing and irrigation in both normal and drought years. Due to drying of river bed, people have created small dug-well like structures in the river bed called *Chua* which was used only in the drought year for ablution and bathing of 17.5 per cent of people including women and children.

### Impact on Physical and Mental Health of Women

Reduced food consumption, irregularity in consumption and increased levels of physical strain and mental stress significantly affected health of

majority of women. It is evident from Table 7 that vulnerable women are affected by different kinds of diseases in a normal and more so in a drought year. Some diseases like malaria, diarrhoea and joint pain have increasingly affected them in the drought year.

With low level of coping capacity, falling incomes from major livelihood activities like agriculture, labour, etc., increasing financial requirements for consumption and debt repayments, absence of male members in the family due to out-migration have significantly raised the level of worry and dissatisfaction across poor vulnerable women from marginal farmers and landless labour categories in the study villages. Women from middle class family can neither take part in different forms of labour works including food for works, nor do they have enough resources for adjustment with the drought risk. The existence of harsh social norms simply adds to their misery.

### Seasonality of Drought and Food Insecurity

The seasonality of drought impacts on rural women has been presented in Table 8. It was found that the sale and mortgage of liquid assets are usually undertaken during July to October when cultivators

**Table 7. Seasonality and magnitude of occurrence of diseases in the study villages**

(% of sample households affected)

Major diseases	Months of prevalence											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
<b>Normal year</b>												
Malaria	3.6					11.0	9.8	8.0	7.5	9.5	8.8	2.9
Diarrhoea					3.0	5.0	7.0	7.5	5.0			
Cough and cold, fever							15.0	21.0	17.0			
Skin disease						1.0	5.0	2.0				
Joint-pain							11.0	13.0	15.0	11.0	12.0	9.0
High temperature					1.5	2.3						
<b>Drought year</b>												
Malaria	2.5	7.2	2.0			15.0	8.2	9.2	11.0	8.5	10.0	7.0
Diarrhoea						3.2	10.0	7.3				
Cough and cold fever							11.0	9.7				
Skin disease						2.5	2.6	1.9	2.2	1.5		
Joint-pain							14.0	13.0	12.0	10.0	11.0	12.0
High temperature					2.0	3.5						

Source: Author's computation from field data

**Table 8: Temporal dimension of drought vulnerability of women folk**

(Seasonal calendar: Average time frame within which impact is felt in the study village Samara)

Sl. No.	Impact	Months of prevalence											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1	Sale/mortgage of liquid assets	←→	←→					←→	←→				
2	Sale/mortgage of long-term assets		←→										
3	Migration		●→				←●						
4	Reducing or modifying consumption		←→	←→	←→	←→	←→	←→	←→	←→	←→	←→	←→
5	Spending from savings		←→	←→	←→	←→	←→	←→	←→	←→	←→	←→	←→
6	Debt requirements/borrowing						←→	←→					
7	Employment problem		←→	←→	←→	←→	←→	←→	←→	←→	←→	←→	←→
8	Oxen problem	←→	←→			←→	←→	←→	←→	←→	←→	←→	←→
9	Poultry problem (hen/duckery diseases)			←→	←→					←→	←→	←→	←→
10	Shortage of feed and drinking water					←→	←→	←→	←→	←→	←→	←→	←→
11	Livestock sale				←→	←→	←→	←→	←→	←→	←→	←→	←→
12	Reduced milk production	←→	←→		←→	←→	←→	←→	←→	←→	←→	←→	←→
13	Heavy drawing upon common property resources			←→	←→	←→	←→	←→	←→	←→	←→	←→	←→
14	Severe mental stress								←→	←→	←→	←→	←→

Source: Field Survey

require finances for purchasing agricultural inputs and farm implements. January to April is another period during which most of the vulnerable households resort to informal borrowings at exorbitant interest rates from village money lenders. Due to reduction in employment at their places, people start migrating in the month of February to earn some livelihoods and return in the month of June or July to join in their own agricultural work or to do labour work in their locality.

During severe scarcity situation after occurrence of the drought, people reduced their consumption and spent from savings in the period ranging February to October. This is the period during which they heavily rely on common property resources (CPRs) like forests resources, village ponds, etc. Livestock and poultry related problems usually occur during water-scarce period. Due to reduced feeding and extreme temperature, milk production also falls in the months of April to June, as expressed by the respondent women. Some families experienced severe mental stress in the months of August to November of the following year due to exacerbated scarcity situations and pressure for arranging credit for agricultural operation and current consumption.

The women folk adopted a variety of adjustment mechanisms to deal with drought-induced scarcity situations. The women from higher strata of the society did not require shouldering additional burden since they had enough resources for adjustment. Women from medium class families failed to enter into some sorts of adjustmental activities like participating in Food for Work Programme and other kinds of labour works that poor women from landless and marginal farmer categories could be able to do comfortably. However, women from middle class families played an active role in institutional building to face drought. They took part in women-headed self-help groups (SHGs) to generate additional resources for their families.

## Conclusions

The study has revealed that rural women in the drought-prone Bolangir district have been significantly affected by direct and indirect impacts of drought. Among family members, they have heavily suffered due to drought-induced scarcity situations. They have been hard hit in the form of consumption shortfalls and decreased access to water resources for drinking and domestic purposes. The reduced access to water

resources has compelled them to walk a longer distance to collect utilizable water. A steep decline in income from agriculture has forced them to accept increased responsibility with additional physical stress. Out-migration of male members, non-availability of resources and inability to help the children and other family members have generated much discontentment and mental stress. The reduced food consumption, irregularity in consumption and increased level of physical strain and mental stress have resulted in adverse health impacts for majority of affected women folk.

For adjusting with drought-induced scarcity situations, they have relied more on NTFPs and supported their family through their involvement in village level institutions like SHGs. They have also encouraged other unemployed family members and youths for generating additional resources.

The study has not observed any effort by the government to assess the impact of drought on women. The absence of female staff in need assessments and relief operations, despite availability of a large number of female teachers, health workers present in the region who could have been involved in such an exercise, indicates the gender blindness of our administrators and policy makers responsible for drought management. Since drought generates differential impacts specifically on women, a sufficient number of women experts should be included in the drought management team.

The women-headed institutions have to be given more incentives and support. Providing proper marketing facilities for selling the products of SHGs; providing technical know-how to make women innovative; and supporting them with financial incentives are some of the vital steps for reducing their level of drought vulnerability and consequent food insecurity.

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