Household Drought Coping, Food Insecurity and Women in Odisha

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In recent years, many parts of India have experienced increasingly frequent droughts, which have pushed the poor, women, and other weaker sections into vulnerable conditions. As the capacity of households to cope with droughts and other weather-based risks varies widely across groups and regions, the impact of droughts on households can be different, depending on local socio-economic conditions, geographic settings, and other factors.

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It is difficult to achieve the sustainable development goals (SDGs) for food security and sustainable agriculture, and gender equality, without reducing the adverse impacts of weather-based shocks like droughts on agriculture and other land-based activities that accommodate a sizeable proportion of the rural poor, women, and other weaker sections. As the capacity of women and men to cope with climate change varies widely across settings, local resources and uses, production conditions, and geographic situations do matter in assessing the impact of climate change at the community and household levels. Since food insecurity is a multidimensional socio-economic issue, it has different implications for different segments of society. Regions and social groups dependent on farming are more likely to be affected by weather-based adversities in terms of production, income, employment, consumption and risk coping. However, sufficient evidence is not available for region and group-specific understanding and policy analysis. Therefore, understanding the challenges of food insecurity and gender inequality[1] in drought-affected areas, which pose serious threats to the household economy and sustainable development, is important from a development policy perspective.

The household, as a decision-making unit, has to undertake various arrangements to manage resource use, basic entitlements and conflicts among the interests of its members (Sen 1981, 1983). In this context, the labour of women, and its use, is crucial for household security, particularly in areas that are susceptible to different weather-based adversities like drought. This is in spite of women's inadequate and unequal access to and use of resources, such as water, land, credit, and farm inputs. As drought-induced shortfalls in household income and employment often force male workers to migrate, women are left to manage farming together with the usual household activities, with little access to and control over resources.

There are currently renewed attempts to incorporate gender issues in development policy through access to credit, training for women, reservation for participation in public programmes, support for women's groups (such as self-help groups), gender budgeting, etc. But, these have not improved women's access to and use of resources, or their risk-coping capability. Water and food scarcities during drought periods not only accentuate household suffering, but can distort intra-household conflicts. Agarwal (1990) examined how poor rural families in India cope with the food insecurity associated

with droughts and seasonal fluctuations in agricultural production. She found that gender and age, both form the basis of intra-family inequality.

As India has experienced increasing incidence of droughts, the socio-economic cost of droughts have been found to be very high (Pandey et al 2007). The rural poor and women with inadequate access to food and water are the hardest hit. Iyer (2010) argued that intermittent, unreliable, unsafe, and inequitable water use, intractable water conflicts, poor performance of major and minor irrigation, and alarming depletion of aquifers contribute to inefficiency in water use and management in India. The existing food system, along with water use and management practices, seems to have adverse consequences on household drought-coping and gender relations. On the other hand, increasing involvement of women in agriculture and food production and procurement, without adequate access to and control of land, water, credit and other resources could worsen gender inequality and food insecurity. Underestimating the issues of gendered access to water and other resources, could have notable consequences on food security (IFAD 2007). However, much is not known about household groups across regional contexts. The present paper discusses some region- and group-specific issues relating to food security and gender relations in two different drought-affected districts in Odisha. Effort has been made to capture intra-household risk-sharing, in terms of food consumption, non-food expenditure, and labour use in different agroclimatic zones and across land-size classes.

Agriculture, Drought, Food Security and Gender

Agriculture continues to be crucial for the rural economy though progressively affected by changes in climate, which has an impact on regions and groups differently. Though men and women have different abilities to cope with climate change, the role of women is vital, particularly in food production, food distribution, and food utilisation, the three components of food security. Women comprise 20%–50% of the agricultural labour force in developing countries (FAO 2011) and agriculture is the primary economic activity for 79% of women who are economically active in least developed countries (Doss 2011). The participation of women in agriculture is increasing despite the rising volatility in the farm sector. A recent study by Oxfam India showed that women work about 3,300 hours in a crop season compared to the 1,860 hours logged by men. In India over 60% of rural women participate in agricultural production, but with a minimum role in decision-making and with little access to and ownership of resources (Sircar 2016). Female landownership rates in Asia are generally low—only 13% of landholders in India are women, dropping to 11% in the Philippines and 9% in Indonesia—despite the fact that access to land provides an important source of resilience for women who may lack other options to adapt to the effects of drought and climate change (GGCA 2016). In this regard, ownership and access to productive resources and the nature of participation of women may have different impacts on the household economy.

Recent studies analysing the changes in rural economies and in women's roles in the agricultural sector suggest that agriculture is "feminising" (Slavchevska 2016). Women play a greater role than ever as food producers, but they face obstacles of uncertain farm production, low productivity, and crop loss, especially when geared towards own food consumption. Such homestead-based food production is an important contribution to household food security and deserves support, but it also presents the risk of confirming existing gender roles and it does not favour women, nor does it truly expand women's choices (de Schutter 2013).

However, some studies based on secondary data show that there is a decline in overall rural female workforce participation in recent years, due primarily to improvement in school enrolment and rising family incomes across states in India. This could be a result of undercounting women's work, particularly in rural areas, and an underestimation of female work in various labour surveys, including those by the National Sample Survey Office (Kapsos et al 2014). The nature and type of work undertaken by poor women is often not adequately captured by macro-level surveys. With limited alternate avenues and occupational mobility, women may be forced to engage in low-productive, low-return agriculture and allied activities, unlike their male counterparts, especially during drought or scarcity periods.

In this regard, the availability, distribution and use pattern of resources such as land, water, credit, and farm inputs and techniques are key factors that can considerably influence community and household food security and gender equity. The focus on gender equity in agriculture has therefore re-emerged as a development policy objective, to enhance food security, and the risk-managing capability of women and poor farming households (ADB 2010). However, these issues are yet under-explored from the perspectives of impact of drought and climate change on gender relations.

Objectives, Research Methodology and Study Areas

Our broad objective is to analyse household drought coping, changes in household food consumption, and its implications on gendered well-being. Regional and group-specific differences in gender inequity in drought-affected areas are discussed with a focus on livelihood and food insecurity and household coping strategies. Household consumption coping strategies in the study areas have been analysed using the coping strategy index (CSI) which is used for food security assessment and monitoring (Maxwell and Cladwell 2008). Household data collected from different drought-affected areas in Odisha has been used. The specific objectives of the study are:

(i) To study the impact of droughts on household food and livelihood security and whether these are gendered.

(ii) To analyse household coping with food consumption shortfalls during droughts, with a focus on intra-household risk sharing and gendered well-being.

(iii) To understand region and group-specific variation in household coping with food insecurity and changes in gender relations.

Understanding gender equity is methodologically challenging, first, because of the complexity of interregional and inter-group diversities, and second, because of the lack of correct baseline data. Here, effort is made to highlight some broader aspects of gender equality and our focus will be on inter- and intra-region and group contexts. The approach followed here is for assessing women's participation in agriculture, food production, resource use, coping strategies and other aspects specific to the study areas. Household consumption smoothing, food management, and intra-household risk sharing are covered, in order to argue whether household food insecurity and meeting other entitlements during droughts are gender neutral or not. Some local adaptations and practices during scarcity period and their impacts on gender are also discussed. The analytical framework includes local drought adaptation and food practices to help discuss multiple impacts of droughts on gender, both in tribal and non-tribal areas, in order to highlight the complexity of interregional and inter-group diversities. Intra-household analysis of food insecurity and drought-coping is also attempted.

The study is based on primary household data collected through field surveys in two different districts in Odisha. Stratified sampling was used to determine the sample households from each study village. Survey areas were identified based on secondary data showing differences in demographic, economic, cultural, agroecological, and cropping patterns (Table 1). Since both the study areas are drought prone, the term "drought prone" is used for dry and wet areas. "Dry areas" are areas where the mean annual rainfall and short length of the rainy season impose restrictions on agricultural production in the absence of critical crop-life-saving irrigation, unlike in the wet areas. It is also used to refer to areas that have soils with low capacity to store moisture. Selection of study villages (two each from the sample districts) was on the basis of remoteness in location, occupation, size of the villages, type of irrigation and agriculture, and drought interventions.

Table 1: Basic Features of Study Areas and Sources of Water/Irrigation

Districts	Tehsil/Block	Type of Areas/ Regions	Sources of Water/Type of Irrigation
Bolangir	Turekala	DPAP (tribal)	Community pani panchayat, pond, well
Kendrapada	Rajnagar	DPAP (coastal)	Community pani panchayat, canal, river, pond, well

DPAP = Drought Prone Areas Programme.

Both the study areas have experienced frequent droughts, of varying severity and impact, in recent years. Bolangir is one of the poorest districts located in the uplands in the western part of Odisha, categorised as a drought-prone area under the Drought Prone Areas Programme (DPAP). It is a tribal area, which, despite a high average annual rainfall (1,100–1,400 millimetres/year), remains a dry area. As it is an upland area, with conventional water sources—ponds, wells, community-based water arrangements, etc—and poor irrigation facilities, recurrence of droughts have affected the kharif foodgrains, which are the major crops grown across land-size classes. Kendrapada is a coastal district, and a relatively developed area with good connectivity and multiple cropping practices. However, its high average annual rainfall and multiple sources of water, including canal irrigation, are not enough to prevent frequent crop failure, as droughts, floods and other weather-based calamities occur at regular intervals. The distribution of households by land-size classes and average landholding in the study areas are presented in Table 2.

Table 2: Land-size Classes and Average Size of Landholding (%)

Land-size Classes	Bolangir	Kendrapada
Landless	20.0	17.1
Marginal	34.3	31.7
Small	25.7	34.1
Medium	17.1	9.8
Large	2.9	7.3
Total	100.0	100.0
Average landholding (in hectare)	1.6	1.4

Source: Field survey.

Droughts due to climate change and abiotic stress affect farming and other land-based activities, making livelihood and food security risky for many rural poor families located in remote and dry areas. Inadequate provision of food, employment, water, fodder and other essential amenities further worsens their situation. In this context, land-poor households seek to reduce drought-induced scarcity and risks, by diversifying farming, livestock, non-farm activities, and through reallocation of family labour—including migration and other coping tools—where labour of women becomes critical along with others (Agarwal 1990).

Public interventions to promote food, employment and water provisioning like the public distribution system (PDS), drought relief, and assured off-farm employment—though found in both the study areas—were not regular or adequate, and women's participation was limited. Regarding irrigation and water arrangements during droughts, community-level initiatives, like water user associations or *pani* panchayats, were critical for food and other crop production, but were found to be inadequate and not dependable (Sahu 2008). The access, use and distribution of water at the community level, however, continues to be gendered, with little access by women and other socially and economically marginalised groups. As expected, the participation and representation of women in the water sector, particularly in decision-making, was found to be abysmally low in the study areas.

Household Priorities and Perceptions about Drought

Droughts have been historically associated with food shortages, water scarcity and a lack of livelihood of varying intensities. Data presented in Tables 3, 4, and 5 (p 73) shows diverse features of drought impacts across regional contexts and also highlights different household priorities with both direct and indirect implications on gender. This is in contrast to uniform public policy interventions for most of the drought-prone areas. Odisha, with better water resources and high average rainfall, still faces severe water and food shortages in many parts of the state due to poor management of its water resources and food production.

More than half of the total respondents noted that women, and those in tribal areas, were the worst affected by food

shortfalls during droughts. Women's work participation was found to be higher among the poor and the landless in dry regions, with high outmigration of male workers during the stress period. Though both the study areas were affected by droughts in recent years, household food shortages in terms of food procurement and consumption—both in quantity and quality—were reported to be more intense in dry and tribal areas like Bolangir, and among the land-poor groups. Women had to bear the household hardships disproportionately, particularly in the absence of male working members across land sizes, classes and regions.

Shortfalls in food consumption during droughts led to various health problems, particularly among women and elderly people. About 45% of tribal households in the study areas reported having a health problem (Table 5). Health problems, especially among women, do not gain much attention in poor households during periods of scarcity, as the household's priority for food becomes more significant than health. Women were the hardest hit during droughts due to lack of adequate clean water and changes in diet, causing health problems such as fever and weakness, which are exacerbated by reproductive health issues. It may be noted that a relatively lower decline in food expenditure in tribal areas such as Bolangir does not necessarily imply that the food security situation was better. Many households in tribal areas do not have specific food budgets and during droughts, they manage shortfalls by exploring other means to access food. Local food sourced from forests, rivers, waterbodies and other sources—depending on seasonality, availability and access to these sources—are explored. However, in most cases, women of the household are responsible for collecting these foods.

Table 3: Impact of Drought on Agriculture and Food Production Study Areas
(% of sample households)

		Failure of Major Food Crops	Crop Damage at Different Stages	Inadequate Rainfall	Continuous Dry Spell	Loss Crop of Yield	Others	All
Bolangir (tribal area)	Village-1: Dry	97.1	2.9	0.0	0.0	0.0	0.0	100
	Village-2: Partially irrigated	63.4	17.1	17.1	0.0	0.0	0.0	100
Kendrapada (non-tribal area)	Village-1: Dry	26.7	22.2	2.2	22.2	8.9	37.8	100
	Village-2: Partially irrigated	14.3	32.4	7.1	31.0	0.0	45.2	100

Source: Field survey.

Table 4: Drought-induced Loss of Crop, Employment and Income Losses in Study Areas

	Drought Year (% of Households)		Deviation from Normal Year	
Range/Extent of Loss	Bolangir	Kendrapada	Bolangir	Kendrapada
Crop loss	100	75	60–75	25–50
Average < 25%	15	35		
Medium 25%–50%	32	35		
Severe > 50%	53	05		
Employment loss	65	52	35–60	45–70
Average < 25%	05	25		
Medium 25%–50%	10	15		
Severe > 50%	50	12		
Income loss	85	56	50–75	30–5
Average < 25%	10	45		
Medium 25%–50%	10	11		
Severe > 50%	65	0		

Source: Field survey.

Table 5: Rate and Intensity of Drought-induced Impact in Study Areas (%)

	Households Reported		Intensity and Priority*	
	Bolangir	Kendrapada	Bolangir	Kendrapada
Loss of farm income	60	45	12	20
Labour migration	65	33	28	15
Shortfall of food	39	28	16	8
Water scarcity	48	16	10	16
Decline in non-farm activity	23	21	3	11
Spike in food prices	43	25	10	12
Rise in borrowing	50	25	20	15
Health problem	45	45	1	3

* Intensity here refers to the proportion of households that are affected by drought-induced adversity from an average to high extent in different regions. Priority here refers to households that lack preparedness to reduce and cope with such adversity, mainly on account of being resource poor. Together, the figures indicate the proportion of households that are vulnerable and lack the ability to reduce/cope with drought-induced adversity.
Source: Field survey.

Drought-induced loss of crop output, employment, and income, was found to be very high in the study areas, with variations across the two sites. Table 4 shows that the deviations in drought-induced losses of crop and income from a normal year are very high in Bolangir, which is a dry area with few kharif crops. Despite poor irrigation, farming practices and inadequate productive avenues, the drought-induced employment loss was found to be relatively lower than in Kendrapada, which is a multi-cropped irrigated area, with other non-farm avenues. The poor households in Bolangir, and particularly women, undertake multiple low-productive, low-return activities such as subsistence farming, collecting forest products, undertaking seasonal works, participating in public employment programmes, etc, irrespective of the returns/wages from these activities. This could be one of their ways of coping with drought or scarcity.

As a part of coping with drought, a sizeable portion of rural workers migrate out as an important strategy against income and consumption shortfalls, shifting the burden of immediate household maintenance to the non-migrating women. The nature and trend of drought-induced labour migration is different in the two study areas and across land size groups. In Bolangir (a tribal area), it was mostly distress-driven labour migration from the rural area during drought periods, due to poor farming and inadequate non-farm avenues. In Kendrapada (a coastal area), on the other hand, outmigration of labour was also reported, but to some extent it was demand driven, with households having some occupational choice between local farming and wage employment, or migrating out for "better" opportunities. Increasing multiple informal borrowings during droughts was common among rural households in both the sites, mainly for expenditure on food and critical non-food items. Money was even borrowed to meet the initial costs of migration. However, local moneylenders prefer to lend to regular migrant workers rather than non-migrant locals, depending on their level of remittances, social capital and past record of repayment. To meet the drought-induced shortfalls, particularly on food expenditures at the household level, incidence of liquidation of assets, and distress sale of livestock and other assets were also reported. Rise in food prices—varying between

20% and 35%—during droughts is common, and affects the poorer households the most.

Food Consumption Coping Strategies

At the household level, it is often assumed that the responsibility of its members towards each other's well-being, particularly during periods of stress, is a part of the household coping strategy, but this is subject to the available resources and capabilities to fulfil such a responsibility. Agarwal (1990) found that, within poor households, the burden of coping falls disproportionately on women and, during a calamity, the women's bargaining position within the family is weakened. The focus of this paper is on the nature and pattern of household food consumption, coping with drought and its impact on members across regional contexts. A list of context-specific coping behaviours was established through focus group discussions (FGDs) in the study areas. To make it more gender representative, adequate numbers of women were included in all FGDs on the assumption that women usually know more about household food procurement, distribution, and consumption patterns than men. Sample households employed multiple consumption coping strategies to manage their food consumption during droughts, due to both supply- and demand-side factors, such as crop production conditions, food storage and exchange, food price spike, ability to buy food from the market and other factors.

I have attempted to measure different household food consumption coping strategies and their impact on gender relations in different drought-affected areas, in terms of the frequency and severity of coping strategies used by sample households, and their food security status. A set of simple questions to capture people's basic consumption-related coping responses to inadequate access to food in a given condition and location, was designed. Since location and group-specific coping behaviours vary widely, care has been taken not to overlook household strategies that are used locally and their impact on gender. Depending upon the types of consumption coping strategies employed by food-insecure households, I grouped them into four major types (Annexure 1, p 78).

Dietary change: Poor households change their diet frequently during droughts, by switching food consumption from preferred foods to cheaper, less-preferred substitutes. In tribal areas in Odisha, many poor households consume coarse cereals and other cheap local food called *gurudi*, bamboo sprouts, leaves, etc. Such food is collected mainly by women members. They also changed their staple food from maize to rice or wheat.

Augmenting short-term food availability: Food deficient households try to increase their food supplies using short-term strategies that are not sustainable over a long period. Typical examples include borrowing or purchasing on credit from local shopkeepers or traders, or from nearby urban areas. More extreme examples are begging, consuming wild foods, immature crops, or even seed stocks, in both of the study areas.

Decreasing the number of family members: If the available food is still inadequate to meet the family needs, households try to reduce the number of people that they have to feed on a temporary basis. This is done by sending some of the family members elsewhere: for example, temporary migration, sending children to neighbours' houses when those neighbours are eating, and abandoning family members like non-working women or the elderly.

Rationing food consumption: This is one of the hardest coping strategies that households use in an attempt to manage their shortfall of food. Some of the common practices are cutting quantity of meals, reducing the number of meals per day, favouring certain household members over others, and skipping meals in a day.

The data presented in Table 6 and Annexure 2 (p 78) show that households follow multiple food consumption strategies to cope with drought. Among food-insecure households in both areas, strategies include reliance on less-expensive, less-preferred foods, purchase on credit, and reducing the size and number of meals per day. Sharp differences in the household food consumption coping behaviours between tribal and non-tribal areas are evident. However, the situation was better in Kendrapada, mainly due to multiple land-based activities, alternate source of water and irrigation (crop life-saving irrigation), and productive non-farm employment. Relatively higher average household income and better connectivity with urban centres might have had a positive impact on household drought coping, but this did not necessarily benefit all equally, especially women, because of their low mobility, and poor access to these opportunities. Therefore, region-specific agriculture

Table 6: Household Consumption Coping in Drought-affected Areas
(% of sample households)

Household Coping Strategy	Indicators	Bolangir (Tribal)		Kendrapada (Non-tribal)	
		Village-1	Village-2	Village-1	Village-2
1 Dietary change	Consuming less preferred and less expensive foods	97.1	91.1	85.4	88.1
2 Augmenting short-term food availability	Borrowing grains	45.7	37.8	43.9	38.1
	Purchase food on credit	82.9	86.7	82.9	66.7
	Gather wild food, hunt, harvest immature crops	34.3	31.1	14.6	11.9
	Consume seed stock for next season	60	77.8	58.5	9.5
3 Reduce numbers of family member sharing food	Migration	68.6	41.5	31.1	38.1
	Abandon or separation of family member	14.3	0	6.7	7.1
4 Rationing food consumption	Reducing quantity/ size of daily meals	94.3	75.6	77.8	64.3
	Reducing consumption of adults for small children	94.3	80.5	84.4	52.4
	Feed working members at the expense of non-working members	54.3	53.7	66.7	52.4
	Stop buying prepare/ cooked food	40	63.4	53.3	47.6
	Reducing number of meals time daily	88.6	61	84.4	71.4
	Stay few days without eating	57.1	14.6	35.6	23.8

Source: Field survey.

and rural development shape the impact of drought on employment, consumption and labour use at the household level.

Household food consumption coping behaviour, under short-term food availability, delineates the extent of burden that tribal households undertake to manage their food requirement. About one-third of tribal households (31%–34%) had to depend on wild foods, mostly collected from the forest, or consumed premature crops to meet their short-term food requirement. In non-tribal areas this was as low as 12%–15%, mainly due to better conditions of farming, food production, and food procurement. Though wild foods, leaves and other such foods consumed are often detrimental to human life, such practices reflect household food consumption vulnerability. The involvement of women in the collection and consumption of these food items tends to rise amongst those with lower size of landholdings and a lower level of regional and agricultural development (Annexure 2).

It may be seen in Table 6 that a sizeable portion of sample households followed augmenting short-term food arrangements, particularly food on credit—more than 80% of households, except village 2 in Kendrapada—to manage food consumption shortfalls. Since many poor households could not buy food on credit due to their small landholding and poor socio-economic conditions, they are often forced to liquidate their assets in order to buy food during the drought period. This trend was high in both the study areas, with a few exceptions in non-tribal regions, at least in the short term. Distress selling of livestock, largely managed by women, is common during droughts, partly because of the scarcity of fodder and rising costs of livestock maintenance, but mainly in order to meet short-term food consumption expenditures.

Land-size Classes and Consumption Coping

As regards land-size classes, most of the land-poor households were worse affected by food shortage, and consumed low-quality food. This is the conventional consumption coping strategy they follow in order to manage seasonal food deficiency. During the field survey, it was observed that some households had to abandon or separate their family members—usually by sending them to other places—in order to manage the shortage of food during drought years. This is one of the worst social impacts of droughts on households. However, the nature and extent of destitution prevalent in drought-prone areas seems to affect women, elderly and widows more than others. It may be noted that about 41%–69% of households in tribal areas had tried to reduce the number of family members during droughts (most of them migrated out with family), as a coping strategy for consumption purposes (Table 6). Scarcity of food, inadequate food procurement and a high incidence of outmigration of labour in tribal areas, are the major impacts of droughts on household food security, which are not adequately managed by the poorer households, despite following multiple coping strategies and participating in different public drought programmes like food provisioning, assured employment, livestock camps and other short-term interventions. Households in irrigated and non-tribal areas experience lesser hardships of food consumption during droughts, but outmigration of labour remains a major household drought-coping strategy.

Household efforts to ration food consumption in terms of reducing the quantity and number of meals, or skipping meals for the day were also reported in both the study areas. The practice of consuming lesser food than normal was widespread among landless and marginal farming households. Overall, it ranges from a high of 80%–94% in tribal areas to 52%–84% in non-tribal areas. The trend was also more or less similar among women, as well as in high land-size classes. It is shocking to know that about 57% and 35% of households reported staying without major meals/food for an entire day, at least for one day, in tribal and non-tribal areas, respectively. It implies that the intensity of food insecurity remains high, even in relatively high income and irrigated areas like Kendrapada. However, the explanation may not be economic, as socio-cultural and other non-economic practices matter in rural areas.

From the above discussion and analysis of data presented in Table 6, it appears that there are some links between food consumption, diverse food arrangements and crop adjustments in the study areas. It is likely that in tribal areas, insufficient food production might push many land-poor households to depend on market and non-dependable food sources. In some tribal areas, there was a growing trend to cultivate commercial non-food crops like cotton and oilseeds, instead of food crops. In this situation, many poor households have to depend on markets for food. As a result, food price spikes, especially during droughts, adversely affect their food security. However, current public food programmes, including PDS, mid-day meal (MDM) scheme, etc, could play a crucial role if they are regular and accessible, but these are not useful for those who migrate out, unless they are provided at the destination as well. Hence, droughts have adverse impacts on household food security, and the proportion of food-insecure households will tend to rise with the recurrence of drought, because such recurrences makes food production, particularly rice production, highly risky and volatile.

Intra-household Drought Coping and Gender Relations

Households coping with income and consumption shortfalls during drought periods were different across the study regions. Our field data provides evidence that the consumption shortfall was a direct fallout of crop failure, loss of farm income and an increasing dependence on markets for food. In response to drought-induced adverse impacts, households adjust both the quantity and frequency of their food intake as a part of their food consumption coping strategy. About two-thirds of the respondents experienced a decline in quality of food, imbalance in diet, and a drop in consumption of vital items like milk and milk products, vegetables, etc, with particularly serious implications on women and children. Similarly, loss of income and crop production induced adjustment in household consumption, range from a decline in the sale of crop output, reduced consumption, and consumption of seeds, to an increase in

food purchase, substitution of staple foods, consumption of low value food, etc. In tribal areas, there was a shift reported in staple consumption, predominantly from maize and bajra, to wheat and rice, mainly attributed to the relief work payments, which had a wheat/rice component.

As discussed above, intra-household food consumption adjustment with visible gender inequality is evident in the study areas, but with variations at the regional and group levels. In response to the question "who faced a bigger drop in food consumption within the household"—although almost all people were affected to some extent, it was more in tribal pockets and among women and elders. All female members of the family were the first to adjust to food consumption and other shortfalls, followed by elders in the family. Many adult women and men experienced an overall decline in food consumption, and about two-thirds of them reported a higher degree of decline. The percentage of households that reported a shortfall of food due to droughts was as high as 39% and 28% in tribal and non-tribal areas, respectively (Table 5). However, the priority and intensity of such shortfalls in food consumption was found to be lower in non-tribal areas (8%) than in tribal areas (16%).

It is evident that women absorbed a disproportionate amount of the shortfall in food consumption. Children were perhaps protected to whatever extent possible. This pattern implies a discrimination against the women of the family, who appear to be "sacrificed" in favour of the "working men" and children. The strong presence of gender discrimination was unmistakably reiterated if one looked at the decline in food consumption by sex, region and land-size groups. A very high proportion of women (71% in tribal area and 59% in non-tribal areas), reported reduced food intakes. However, the same was true of men in tribal areas only.

Drought Coping and Intra-household Well-being

Since most household risks link to employment and income, we pose some basic questions in the context of drought. First, does decline in employment and income induce a reallocation of labour within the family? Second, is this reallocation distress driven? Third, are the impacts of drought gender neutral? The thrust was to highlight the impacts of drought within the given household decision-making framework, during a scarcity period.

Intra-household cooperation and adjustment among family members in resource allocation, expenditure and risk sharing are important to cope with droughts and scarcity. Diversification of family labour was found to be one of the households' drought-coping mechanisms in the study areas, but a greater share of the burden was absorbed by women, with extended working hours, undertaking more tasks, and engaging children in economic activities (both usual and new activities). Despite regional- and group-level differences, in general, women were overburdened during the scarcity period, spending more time arranging food, water, fodder, and fuel, in addition to their usual household chores. Their participation in multiple activities increased during the scarcity period. Gender bias in food consumption, expenditure on health and education and unequal distribution of workload during droughts was evident (Table 7).

In this situation, the participation of women in all possible income-earning activities can either be higher, to seek any additional income, or lower due to their preoccupation in arranging for water, fodder, fuel and other activities. Besides, decline in childcare due to an increase in the number of activities and working hours of women, school dropouts (mostly among girls), and outmigration (of male working members) also tend to rise during droughts. I tried to capture some intra-household coping mechanisms in terms of changes in the level of food consumption, allocation of labour, and reduction in critical household expenditures (on health and education), in buffering the effects of droughts. The data presented in Table 7 shows intra-household drought coping and its impact on gender in terms of level of changes in food consumption, working period and crucial expenditures. It appears that the trends in food consumption shortfalls are not only higher among women and in tribal areas but vary across regions and social groups (Table 7).

In relatively irrigated and multicropped areas, where food production, storage and market access are better, the level of reduction in food consumption during droughts is lower both overall, and between men and women.

We found that intra-household scarcity risk management was followed mainly in terms of reallocation of labour and essential spending, both biased against women. The increase in working hours as a risk-induced coping strategy was pronounced for women, though it may vary in intensity, which is not easy to capture. Similarly, a sharp gender inequality, in terms of reduction in health and education expenditure for girls and women reiterates the adverse impacts of droughts on women, despite the availability of assured wage employment during the off-farm season. In fact, girls are the first to withdraw from schools in the cases of droughts and household contingency.

Irrespective of regions and land-size classes, women are the hardest hit during droughts in terms of food production, arrangement and consumption, sharing a disproportionate work burden as compared to men in the family (Table 7). It may be noted that provision of some public programmes like PDS and

Table 7: Intra-household Effects of Drought by Gender

Level of Changes	Reduction in Food Consumption				Increase in Working Period				Reduction in Health Expenditure				Reduction in Education Expenditure	
	F	M	F Child	M Child	F	M	F Child	M Child	F	M	F Child	M Child	F Child	M Child
All	67	34	25	17	85	73	42	43	83	81	56	48	61	50
Marginal* < 10%	11	25	18	12	19	16	27	31	45	48	40	36	36	33
Average* 10%–25%	10	9	5	5	18	21	6	1	16	19	7	6	7	6
High* 26%–50%	25	0	2	0	16	12	1	3	7	4	0	0	0	1
Very high* > 50%	21	0	0	0	36	24	7	7	15	10	9	6	18	10
No change	33	66	75	83	15	22	58	57	16	18	43	52	39	49
Tribal	71	47	35	15	88	65	–	–	–	–	–	–	–	–
Non-tribal	59	27	12	5	81	76	–	–	–	–	–	–	–	–

M = Male, F = Female.

* These ranges vary across drought years and regions, and have been normalised following discussions with respondents and other stakeholders.

Source: Field survey.

the Mahatma Gandhi National Rural Employment Guarantee Scheme are not adequate to improve the status and well-being of women in drought-affected areas.

Conclusions

Household food consumption shortfalls are direct fallouts of drought-induced crop failure, loss of farm income and rising food prices, where many poor rural households use women members for "diversification of labour" and "consumption smoothing,"[2] in order to cope with scarcity. But, such shortfalls are not gender-neutral and are often not addressed adequately. Reduction in both quantity and frequency of food intake was common across the study areas with evidence of a sharp fall in quality of food, imbalance in diet, and a drop in consumption of vital items like milk and vegetables, with particularly adverse implications for women and children. Food consumption is also linked with diverse food adjustments, crop adjustments and different food arrangements in both tribal and non-tribal areas, indicating visible regional diversities. Consuming seeds, substitution of staple food, shifting to low value food, liquidation of assets, and dependence on declining common property resources, show a sizeable stress of food insecurity, particularly on the poor and women.

About 71% of women in the tribal areas and 59% in the non-tribal areas reported reduced food intakes during droughts. Intra-household food consumption inequality was found in both study areas, but varied across social groups. Factors like local customs and practices, nature of food storage, local arrangements and food price hikes also play a crucial role in food arrangement and consumption. Increase in the number of working hours and activities undertaken, as well as unequal access to resources, inadequate drought relief and other public measures, under-representation in decision-making, and poor human development, widen gender inequities. With frequent droughts and uncertain farm production conditions, high participation of women in land-based activities appears to reflect conditions of distress, posing threats to food security and gender equity. Drought-induced scarcity can negatively affect food consumption, income and employment capability, as well as asset ownership and entitlements of both of men and women, but unequally, with implications for gendered divisions of labour, intra-household coping capability and relative bargaining strength.

Provision of assured food and water availability, local food production and changes therein are thus important for rural households, particularly for women whose participation in food production and other land-based activities have been progressively increasing. In this context, local food production continues to be crucial for household food security and gender equality. Therefore, region-specific and gender-sensitive development plans, focusing on long-term drought proofing, improving irrigation and farm practices, and expanding access to and use of water, land, credit and other resources are important. Long-term drought measures, improving public food provisioning, and conservation and management of resources, with women's participation and decision-making, are re-emphasised for improving gender equality and food security in drought-affected areas.

NOTES

1 Gender inequality here mainly refers to inequalities in access to and control over resources, health, education, economic and political participation between men and women.

2 Consumption smoothing is households' desire to have stable path of food consumption and to translate consumption from period of normal income to period of low income.

REFERENCES

ADB (2010): "Community-managed Irrigated Agriculture Sector Project Case Study of Nepal," Asian Development Bank, Manila.

Agarwal, Bina (1990): "Social Security and the Family: Coping with Seasonality and Calamity in Rural India," *Journal of Peasant Studies*, Vol 17, No 3, pp 341–412.

De Schutter, Olivier (2013): "The Agrarian Transition and the 'Feminization' of Agriculture," Conference Paper No 37, International Conference on Food Sovereignty: A Critical Dialogue, Yale University, New Haven, 14–15 September.

Doss, Cheryl (2011): "If Women Hold Up Half the Sky, How Much of the World's Food Do They Produce?" Working Paper No 11-04, Agricultural Development Economics Division, Food and Agriculture Organization.

FAO (2011): "The State of Food and Agriculture 2010–11: Women in Agriculture: Closing the Gender Gap for Development," Food and Agriculture Organization, Rome.

GGCA (2016): "Gender and Climate Change: A Closer Look at Existing Evidence," Global Gender and Climate Alliance.

IFAD (2007): "Gender and Water—Securing Water for Improved Rural Livelihoods: The Multiple-Uses System Approach," International Fund for Agricultural Development, Rome.

Iyer, Ramaswamy (2010): "Approach to a New National Water Policy," *Hindu*, 29 October.

Kapsos, Steven, Andrea Silberman and Evangelia Bourmpoula (2014): "Why Is Female Labour Force Participation Declining So Sharply in India?" Research Paper No 10, International Labour Organization, International Labour Office, Geneva, http://www.ilo.org/global/research/papers/WCMS_250977/lang--en/iindex .htm.

Maxwell Daniel and Richard Cladwell (2008): "The Coping Strategies Index: Field Methods Manual—Second Edition," Cooperative for Assistance and Relief Everywhere (CARE), United States.

Pandey, Sushil, Humnath Bhandari and Bill Hardy (2007): *Economic Costs of Drought and Rice Farmers' Coping Mechanisms*, Los Baños, Laguna, International Rice Research Institute, Philippines.

Sahu, Basanta Kumar (2008): "*Pani Panchayat* in Orissa, India: The Practice of Participatory Water Management," *Development*, Vol 51, No 1, pp 121–25.

Sen, Amartya (1981): *Poverty and Famines: An Essay on Entitlement and Deprivation*, Delhi: Oxford University Press.

— (1983): "Economics and the Family," *Asian Development Review*, Vol 1, No 2, pp 14–26.

Sircar, Ashok (2016): "Women's Wright to Agricultural Land: Removing Legal Barriers for Achieving Gender Equity," Policy Brief No 19, New Delhi: Oxfam India.

Slavchevska, Vanya (2016): "Feminization of Agriculture in the Context of Rural Transformations: What Is the Evidence?" Report No ACS20815, World Bank, Washington, DC.

Annexure 1: List of Household Food Consumption Coping Strategies

A	Dietary Change	
	1	Consuming less preferred and less expensive foods (low quality cereals and coarse cereals in the place of normal cereals)
B	Augmenting Short-term Food Availability	
	2	Borrowing grains from landlords/large farmers/relatives/others
	3	Purchasing food on credit
	4	Participating in food for work activities (engaging children and women in such work)
	5	Distress sale of assets to buy food (utensil, livestock, jewellery)
	6	Reducing/postponing major social expenditure (health, education, social function) to buy food
	7	Skipping payment of earlier credit (mainly informal credit)
	8	Collection of wild food, hunting
	9	Harvesting immature crops
	10	Consuming seed stocks held for next season
C	Reducing Numbers of Family Member Sharing Food	
	1	Sending family members to have food from outside (children for mid-day meal in school, females for food at anganwadis, others to eat with neighbours/temple/other places)
	2	Sending household members to beg for food from neighbours (specially in Gujarat)
	3	Migration (outmigration of working members alone or with familiy)
	4	Abandonment or separation of family member (non-working elders/handicapped/ women)
D	Rationing Food Consumption	
	1	Reducing quantity/size of daily meals
	2	Reducing number of full meals time daily
	3	Reducing consumption of adults for small children to eat
	4	Feeding working members at the expense of non-working members (mainly female)
	5	Stopping purchase of prepared/cooked food (food at hotel/restaurant, papad rice or other cooked food)
	6	Skipping entire days without eating

Source: Field survey (focus group discussion).

Annexure 2: Household Food Consumption Coping Strategy Index (CSI) and Coping Behaviour in Study Areas

(%)

			1 Dietary Change	2 Augmenting Short-term Food Availability				3 Reducing Numbers of Family Members Sharing Food		4 Rationing Food Consumption					
		No Household	Consuming Less Preferred and Less Expensive Foods	Borrowing Grains	Purchasing Food on Credit	Gathering Wild Food, Hunting, or Harvesting Immature Crops	Distress Sale of Assets to Buy Food or Consuming Seed Stock for Next Season	Sending Family Members to Have Food from Outside or Migration	Abandonment or Separation of Family Member	Reducing Quantity/ Size of Daily Meals	Reducing Consumption of Adults for Small Children	Feeding Working Members at the Expense of Non-working Members	Stopping Purchase of Prepare/ Cooked Food	Reducing Number of Full Meals Time Daily	Staying Entire Days without Eating
Bolangir	Landless	7	100.0	57.1	100.0	71.4	14.3	100.0	28.6	100.0	100.0	71.4	14.3	100.0	100.0
	Marginal	12	100.0	50.0	83.3	33.3	83.3	100.0	25.0	100.0	100.0	50.0	16.7	100.0	83.3
	Small	9	100.0	44.4	77.8	22.2	66.7	44.4	0.0	100.0	100.0	66.7	55.6	66.7	33.3
	Medium	6	83.3	33.3	66.7	16.7	50.0	16.7	0.0	83.3	83.3	33.3	83.3	83.3	0.0
	Large	1	100.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0
	Total	35	97.1	45.7	82.9	34.3	60.0	68.6	14.3	94.3	94.3	54.3	40.0	88.6	57.1
Kendrapada	Landless	7	100.0	57.1	100.0	28.6	28.6	71.4	0.0	100.0	100.0	71.4	57.1	100.0	57.1
	Marginal	13	92.3	53.8	92.3	15.4	69.2	53.8	0.0	100.0	92.3	53.8	46.2	76.9	15.4
	Small	14	85.7	42.9	85.7	14.3	85.7	35.7	0.0	71.4	85.7	57.1	85.7	57.1	0.0
	Medium	4	50.0	25.0	50.0	0.0	25.0	0.0	0.0	25.0	50.0	50.0	100.0	0.0	0.0
	Large	3	66.7	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	41	85.4	43.9	82.9	14.6	58.5	41.5	0.0	75.6	80.5	53.7	63.4	61.0	14.6

Source: Field survey.