

Diet and Nutrition During Drought in Western Rajasthan, India

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INTRODUCTION

The State of Rajasthan experienced drought in the beginning of the new millennium resulting in fall in agricultural production, scarcity of drinking water and short fall in fodder for cattle. In addition, there was extensive loss of cattle and sheep in the State. Drought is generally viewed as a transient phenomenon and consequently it is usually not taken seriously, once the rains have returned. In spite of high rainfall in certain areas, they too suffer from drought quite often because of erratic rainfall. Since droughts are quite unpredictable, the uncertainties pose particular hardships for the poor who are the most vulnerable in terms of their access to resources. In fact, the lives of poor have been characterized by the total absence of food security (Dreze and Sen, 1989). Rajasthan is frequently affected by drought. The present study was undertaken to assess the diet and nutrition situation during drought conditions and to find out the kind of coping mechanisms the people of this region adapt to cope with scarcity situations.

MATERIAL AND METHODS

In consultation with the local officials involved in drought relief, two severely drought affected districts, Barmer and Jaisalmer, were selected for the present survey. From each of these districts, two blocks, viz. Shiv and Choutan from Barmer and Sam and Pokran from Jaisalmer, were selected. At the block level, from a list of severely affected villages, 5 villages were randomly selected.

In each selected village, 40 households were randomly selected for nutritional anthropometry and clinical examination. Household information including food security status was also ascertained from every alternate household (HH) i.e. 20 households. Household diet survey was conducted in every alternate household (10 HHs) selected for household information.

INVESTIGATIONS

Body weight and height were taken on children (1-5 years) and adults to assess the nutritional status. The preschool children were classified according to Gomez classification as well as standard deviation classification (WHO, 1983) for height for age, weight for age and weight for height to assess the prevalence of undernutrition, stunting and wasting. In the case of adults, chronic energy deficiency was assessed using Body Mass Index (BMI) (James et al., 1988).

Clinical examination of all the available individuals was conducted to assess the prevalence of nutritional deficiency signs. Information on drought relief works was also collected from the selected HHs. In addition, household food security status was assessed based on the perception of the head of the household regarding sufficiency/insufficiency of major foods such as cereals, pulses, vegetables, milk and oils & fats. The coping strategies adopted during food scarcity were also ascertained.

RESULTS

Household information including socioeconomic and demographic particulars, participation in drought relief and other developmental Programmes and household food security was collected from 393 households from 21 villages, while dietary assessment was carried out on a sub-sample of 200 households. A total of 3,174 individuals of different age and sex groups were covered for anthropometry and clinical examination.

PROFILE OF THE AREA

Cultivation of millets like bajra, jowar, oil seeds like sesame on one hand and wheat and gram on the other represent two different types of prevailing sustainable cropping patterns in the areas surveyed. The farmers, in view of their

drought resistant qualities preferred traditional crops, like pear millet and sorghum during the kharif season (June - October). These multipurpose crops are meant for grain, fodder, fencing and thatching material etc. Despite ecological limitations, agriculture and animal husbandry constitute the primary occupation. A large number of small and marginal farmers, agricultural labourers and other local poor depend upon live stock for gainful employment.

Both the districts surveyed have been experiencing drought for the last two years. The rainfall was either nil or scanty in Jaisalmer, and scanty and erratic in Barmer district. Low yield of dry crops, high prevalence of underemployment and migration of labour to neighbouring States was reported. The cumulative effect of drought in these areas resulted in dried up water sources such as dug wells and tanks, resulting in acute shortage of drinking water. Deaths of large number of live stock, especially sheep were reported. Scarcity of fodder was very acute, resulting in mass shifting of cattle to the nearby cattle camps. It was observed that relief works were in operation at the time of survey, like provision of employment opportunities like deepening of tanks, supply of 20 kg of wheat at a subsidized rate of Rs.5/- through public distribution system (PDS) and supply drinking water through tankers and camel carts. Fodder was transported by road from neighbouring states of Punjab and Haryana.

SOCIO-ECONOMIC PROFILE

About 37% of the households belonged to backward class followed by scheduled castes (34.6%) and scheduled tribes (5.8%).

About 61% of the households (HHs) surveyed possessed agricultural land. Nearly one-third of the households were large farmers, followed by marginal farmers (28.6%). In a majority of the households (60.7%) the major occupation was labour. However, about 4% of the households were forced to seek labour work during drought as compared to normal situation. In about 18% of households, it was reported that higher number of persons undertook labour during drought to enhance their household income. About three-fourths (76.5%) households reported complete crop failure.

More than 90% of households possessed live stock. Of these, 64% of the households reported cattle deaths, mainly attributed to prevailing drought conditions. There was an acute shortage of drinking water. About 63% of HHs informed that they benefited by special rations supplied through PDS, 44% of the HHs availed drinking water supply through tankers, while 23% of the HHs participated in relief works.

ASSESSMENT OF HOUSEHOLD FOOD SECURITY STATUS

Food security was assessed based on perception of head of the household with regard to insufficiency of current consumption of different foodstuffs (Table 1). A higher proportion of

Table 1: Distribution (%) of households by current sufficiency of different food groups as perceived by the head of household - districts pooled

| Food group | Perception of head of household | |
|------------------------|---------------------------------|--------------|
| | Sufficient | Insufficient |
| Cereals & Millets | 84.8 | 15.2 |
| Pulses | 63.1 | 36.9 |
| Vegetables | 52.7 | 47.3 |
| Milk and Milk products | 77.4 | 22.6 |
| Fats & Oils | 67.9 | 32.1 |

Number of households=393

respondents expressed insufficiency with regard to vegetable consumption (47.3%) followed by pulses (36.9%), fats & oils (32.1%), milk (22.6%) and cereals (15.2%). It is evident from the data that insufficiency was felt mostly for income elastic foods. Since cereal calories contribute to about 75% or more of the total energy, and pulse contribute to a major portion of proteins of the daily diet (Ramnath et al., 1983), the households having sufficiency and insufficiency of cereals and pulses together were categorized as Food Secure (C+P+). It was observed that about 62% of the HHs were food secure (sufficient cereals and pulses), while only in about 14% HHs had food insecurity (insufficient cereals and pulses) (Table 2).

COPING STRATEGIES ADOPTED DURING FOOD SCARCITY

The major coping strategies adopted by the

Table 2: Distribution of households by sufficiency in cereals and pulses as perceived by head of the household – districts pooled

| Cereals | Pulses | Households (%) |
|--------------|--------------|----------------|
| Sufficient | Sufficient | 61.6 |
| Sufficient | Insufficient | 23.2 |
| Insufficient | Sufficient | 1.5 |
| Insufficient | Insufficient | 13.7 |

Number of households =393

community were borrowing of cash/kind from neighbour (51.4%), managing with the available food stocks or money (39.4%), reducing food consumption (35.6%), opting low cost food items (31%), seeking additional employment (12.2%), disposing of household articles (9.4%) and seeking government assistance (5.1%) (Table 3).

DIETARY SITUATION

The average consumption of different foods during drought was compared with that reported for the State of Rajasthan in India Nutrition Profile (DWCD, 1998) to represent the 'Normal' (non-drought) period and Recommended Dietary Intake levels (ICMR, 1981) (Fig. 1). In general, bajra formed the main staple, while consumption of wheat and maize was also considerable. The intakes of all the foods except for cereals & millets,

Table 3: Distribution of households according to different coping strategies adopted during drought-districts pooled

| Coping Strategies* | Per cent |
|--|----------|
| Use food stocks/money/savings | 39.4 |
| Purchase low cost food items | 31.0 |
| Borrow cash/food from neighbors | 51.4 |
| Gather food from surrounding areas | 2.8 |
| Seek additional employment | 12.2 |
| Seek or obtain government assistance | 5.1 |
| Reduce food consumption | 35.6 |
| Migration | 8.1 |
| Sell household or business assets to obtain income or food | 9.4 |
| Others | 0.8 |

Number of households=393 * Multiple responses

roots & tubers and milk & milk products were lower than the recommended levels. Similarly, the intake of all the foods except green leafy vegetables, other vegetables and fats & oils was comparable with those reported during non-drought period. No large-scale consumption of wild leaves and tubers (famine foods), reported during distress conditions was noticed.

The diets were deficient in energy, vitamins A and C when compared to RDA (ICMR, 1990) (Fig. 2). The intake of nutrients was also marginally lower than those observed during

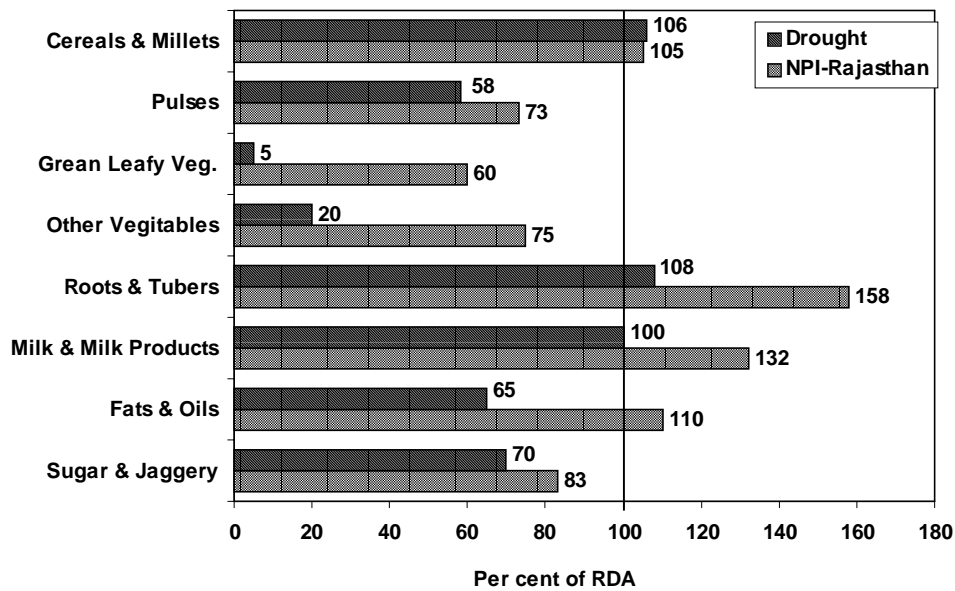


Fig. 1. Mean in take of food stuffs (g/CU/day) as per cent of RDA

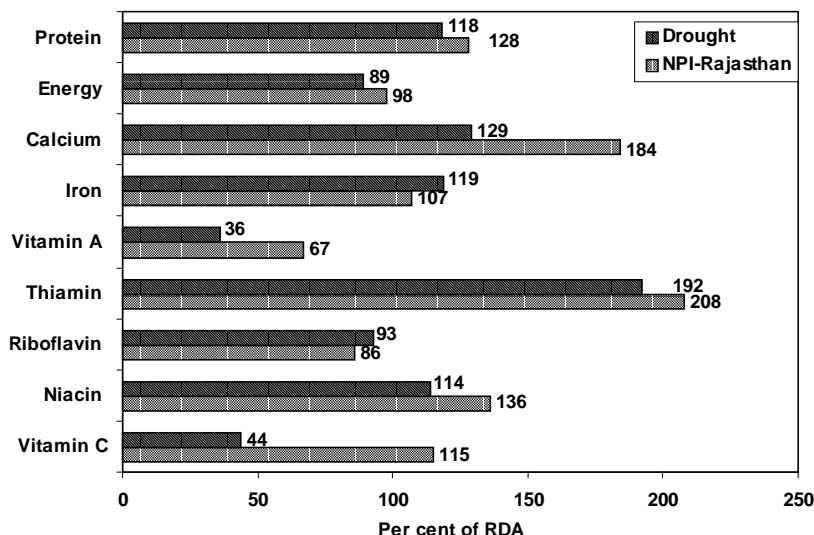


Fig. 2. Mean intake of Nutrients (CU/day) as per cent of RDA

non-drought conditions. Not a single household was subsisting on starvation diet (less than 500 kcal per consumption unit per day).

NUTRITIONAL STATUS

Nutritional Deficiency Signs

The only nutritional deficiency signs encountered were protein energy malnutrition (1.3%) and vitamin A deficiency (2.5%) among preschool children. Prevalence rates of these signs were not much different from those observed during non-drought periods (DWCD, 1998).

Anthropometry

The prevalence of at risk children (<75% of weight for age of NCHS standard) was higher during drought period (50.7%) as compared to non-drought period (43%) (Fig. 3).

The prevalence of undernourished children (<Median -2SD) was significantly higher with 64.8%, as compared to 46.8% during non-drought periods ($\chi^2=89.8$). The extent of severe undernutrition (<Median -3SD) was 23.3%, which is more than during normal season (Table 4). Similarly, according to height for age, an index of chronic undernutrition, 56% of the children had stunting (<Median -2SD) ($\chi^2=47.1$). The magnitude of

Table 4: Distribution (%) of preschool children according to SD classification – districts pooled

| Indicator | N | Below median -3SD | Median -3SD to median -2SD | Median -2SD to median -1SD | Median -1SD to median | ³ Median | χ^2 |
|-------------------|------|-------------------|----------------------------|----------------------------|-----------------------|---------------------|-------------------|
| Weight for age | 596 | 23.3 | 41.5 | 26.8 | 7.6 | 0.8 | 89.3 (p<0.01) |
| NPI* | 7733 | 15.5 | 31.2 | 32.0 | 17.7 | 3.6 | |
| Height for age | 596 | 26.5 | 29.4 | 24.5 | 12.4 | 7.2 | 47.1 (P<0.01) |
| NPI* | 7733 | 35.7 | 22.3 | 18.2 | 12.1 | 11.7 | |
| Weight for height | 596 | 4.9 | 21.3 | 42.7 | 24.7 | 6.4 | 139.0 (P<0.01) |
| NPI* | 7733 | 3.8 | 11.0 | 32.2 | 32.0 | 20.9 | |

* Nutrition Profile of Indians (DWCD)

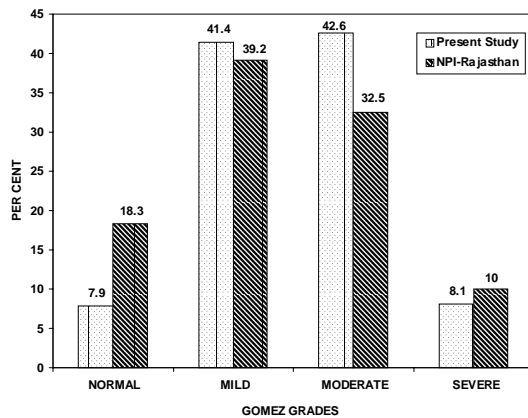


Fig. 3. Per cent distribution of 1-5 years children by nutritional status (weight for age)-Gomez classification

'wasting' as judged by weight for height revealed that higher percentage of children 26% had wasting (<Median -2SD) during drought period than (15%) reported during non-drought period ($\chi^2=139.0$).

About 49% of adult males and 40% of females had various degrees of chronic energy deficiency (BMI <18.5) (Table 5). The prevalence of CED among adult males in the present survey was marginally higher (48.9%) compared to normal period (46.6%), while it was comparable in the case of females.

Table 5: Distribution of adults according to BMI classification – districts pooled

| BMI | Males | | Females | |
|--------------------------|------------|--------------|------------|--------------|
| | Drought | Non-drought* | Drought | Non-drought* |
| N | 603 | - | 1019 | - |
| <16.0 | 10.1 | 12.0 | 8.4 | 12.2 |
| 16.0-17.0 | 13.3 | 11.9 | 9.4 | 10.9 |
| 17.0-18.5 | 25.5 | 22.7 | 22.0 | 21.4 |
| 18.5-20.0 | 20.2 | 19.7 | 22.6 | 21.0 |
| 20.0-25.0 | 26.2 | 31.1 | 32.0 | 32.3 |
| 25.0-30.0 | 3.6 | 2.5 | 5.1 | 2.2 |
| ³ 30.0 | 1.0 | 0.1 | 0.5 | 0.0 |

* Nutrition Profile of Indians (DWCD)

DISCUSSION

In India, agriculture production is mainly dependent on regular monsoon. Delayed and scanty rainfall leads to crop failure and disrupt the economy of rural poor, mostly landless agri-

cultural labourers, marginal and small farmers. In Rajasthan, during the previous 2-3 years, there had been monsoon failure leading to severe drought. The present survey revealed that the extent of undernutrition has increased as a result of the current drought. In addition, there exists a problem of drinking water and shortage of fodder or cattle resulted in cattle movement and deaths.

Diet surveys indicated that, even in normal situation, the diets were deficient in important nutrients like energy, vitamins and minerals. The present drought conditions imposed stress on the already deficient food intakes. In the study areas, the energy and protein content of diet tended to be remain same as in normal conditions, which may be explained by food availability through public distribution system and other management strategies adopted by the administration.

It is also important to consider coping strategies adopted by the household during food scarcity. The strategies adopted were mainly borrowing of food or cash from neighbours, use of food stocks and reduced food consumption. In a majority of the households, the adult male members migrated to the nearest town or city for employment. While the other members of the family, either adults or adolescents are engaged in the drought relief works.

Starvation deaths and epidemics such as gastro-enteritis generally encountered during the drought (Krishnamachari, 1975), were not observed in the present study. Initiation of several relief measures through separate "drought relief cell" established by the State Government as well as participation of non-governmental organizations has largely contributed in the prevention of devastation caused by drought.

Since the area is vulnerable to recurrent drought conditions, the factors which deserve the immediate attention are strengthen the ongoing rehabilitation measures ensure the supply of food, fodder and drinking water and health and veterinary care to minimize the untoward effects of consequences of drought in future.

KEY WORDS Drought. Western Rajasthan. Diet. Nutritional Status.

ABSTRACT Rajasthan had experienced drought conditions in the beginning of the millennium resulting

drop in agricultural production, acute shortage of drinking water and fodder for cattle. Large number of cattle deaths was also reported. About 63% of the households stated that they were benefited by special ration supplied through PDS, 45% of the households had drinking water supply through tankers, while about 23% of the households participated in drought relief works. Coping strategies adopted during food scarcity were, borrowing cash/kind from neighbours (51.4%) managing with available food stocks (39.4%), reduced food consumption (35.6%), opting low cost foods (31%). The intake of all the foods except cereals & millets, roots & tubers and milk & milk products were lower than the recommended level. The intake of nutrients revealed that the diet was deficient in energy, vitamin A, and vitamin C and was also marginally lower than those observed during non-drought period. The prevalence of undernutrition (<75% of weight for age) among preschool children was higher (50.7%) during drought compared to non-drought period (43%). Similarly about 49% of adult males and 40% of adult females had chronic energy deficiency (BMI<18.5). The factors, which deserve immediate attention, are strengthen the ongoing rehabilitation measures, ensure the supply of food, fodder and drinking water. Health and veterinary care have to be improved to minimize the untoward effects of consequences of severe drought.

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