

## Nutrition and health care of human population in drought

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### 1. Introduction

Drought is a creeping disaster as enunciated in the United Nations publications. This is in recognition of the fact that a situation of drought develops gradually giving sufficient warning of its coverage, extent and intensity unlike floods, cyclones and earthquakes which offer little time and opportunity for planning and preparedness. Drought is due to grossly inadequate and irregular rainfall in a particular region and is generally associated with scarcities of work, water, food, fodder and energy and, therefore, has adverse effects on crops, human and cattle populations. The majority of the rural population belonging to the weaker socio-economic sections of the society, viz., the small and marginal farmers, landless agricultural labourers, tribal population living in the remote areas and population dwelling in urban slums are normally affected and amongst them, children below 14 years, especially pre-school children below 6 years, expectant and nursing mothers are highly nutritionally vulnerable to scarcity and drought conditions, resulting in varying degrees of protein-energy malnutrition. Apart from the common causal factors of poverty, poor personal hygiene and low standard of environmental sanitation, nutritional deficiency increases the susceptibility to more frequent infections, particularly gastro-intestinal and respiratory infections which tend to run a more severe course, resulting in increased morbidity and especially in infants. Therefore, in order to minimise the deleterious effects on human population due to drought in an extensive area, over an extended period, disaster preparedness and mitigation measures should be pre-planned integrating the nutrition and health (both preventive and curative aspects) components and

undertaken adequately and energetically. Such measures are elaborated in detail in the succeeding paragraphs.

### 2. Drought disaster preparedness

#### (a) *Dietary survey and nutritional surveillance—*

Dietary survey and nutritional surveillance studies of the population at risk in the drought-prone and potentially drought-prone areas should be conducted based upon previous monsoon weather data over long period of statistically valid years. This will give base line data and comparative data from time to time. In practice, it implies the carrying out of systematic nutrition surveys, periodically on statistically valid group of population with a view to monitoring the gross nutritional status of the people under changing environmental conditions. Information on clinical survey, anthropometric survey, biochemical survey, household budget survey and vital statistics — especially morbidity and mortality data in pre-school children should be included in surveillance programme. The following requisites should be fulfilled prior to undertaking the diet survey and nutrition surveillance programme :

- (i) In view of the continuous, extensive and time consuming nature of the tasks, it is highly imperative that the Nutrition Divisions of the States Health Services should be strengthened suitably at all levels.
- (ii) The Medical Officers and paramedical staff at the Primary Health Centres, Community Health Workers, Multipurpose Health Workers, Auxilliary Nurse Midwives, personnel of Voluntary Relief Organisations should suitably be trained and oriented for undertaking Nutrition Programmes in the States.

(iii) If the nutritional surveillance system has to function efficiently, there should be close co-ordinations of the Nutrition Division and Health Components (including MCH Services) of the State Health Services at all administrative levels and in the field.

(b) *Coordination of nutrition programmes in the States* — At present various Nutrition Programmes are in operation under different Ministries/Departments in the Central and State sector and are indicated below :

Ministries/Departments	Nutrition programme
(A) Department of Rural Development	Applied Nutrition Programme
(B) Department of Social Welfare	(i) Special Nutrition Programme
	(ii) Balwadi Nutrition Programme
	(iii) Integrated Child Development service
	(iv) Food for Nutrition Programme
(C) Ministry of Health and Family Planning	(i) Vitamin A Prophylaxis Programme for pre-school children
	(ii) Prevention and control of anaemias among pregnant women and pre-school children
	(iii) Goitre control programme
(D) Department of Education	Mid-day Meals Programme
(E) Department of Food	(i) Production of Nutritious Foods
	(ii) Fortified Projects
	(iii) Nutrition Planning
	(iv) Nutrition Education
(F) Department of Agriculture	(i) Scientific storage of food grains
	(ii) Test kitchens
	(iii) Research and Education

The above mentioned Nutrition Programmes should function with Nutrition Officer of the State Health Services as their Technical Adviser.

(c) The Health and Nutrition officers should actively associate themselves with "Crop-Weather Watch Group" set up at the State and District levels, of experts in Meteorology, Agriculture, Irrigation, Drinking Water and Food Supplies.

(d) Stock-piling at District and Tehsil/Taluk level of the following should be initiated as and when scarcity conditions set in which may be regarded as "Warning" for the impending drought :

(i) Essential medicines, including paediatric formulations for treatment of diarrhoeal diseases, respiratory infections, vitamin deficiencies of A and B complex, nutritional anaemia and worm infestations. Sufficient care should be taken in respect of short life items by way of periodical turn-over for use within their life period in order to prevent loss to the State.

(ii) Bleaching powder and 'Chlorine' tablets for disinfection of drinking water and Orthotolidine Test kits for exercising quality control over potability and safety of drinking water.

(iii) Essential vaccines for active immunisation of vulnerable population, Proper Storages in the Primary Health Centres and cold chain facilities should be ensured prior to stock-piling.

(e) *Building a corps of Trained Personnel* — In view of the frequency of such phenomena as drought, flood, cyclone, it has now become essential that each relief agency should have a corps of workers fully trained in emergency relief work. Relief has now become a technical matter involving certain norms, skills, and techniques. Relief can have desired results only when it is offered according to these skills and techniques. Hence the necessity and importance of training in building a large corps of trained workers, Voluntary Organisations of high standing and experience could undertake the training programme as per a suitably formulated accepted syllabus. So far as drought relief is concerned, training should be imparted in the following :

(i) Diet and Nutrition survey techniques

(ii) Organising, maintaining and supervising supplementary feeding centres

(iii) Delivery of nutrition and health education programmes

(iv) Health measures-supply of safe and potable drinking water, environmental sanitation and personal hygiene.

(v) Follow-up techniques in implementation of nutrition and health programmes.

(f) *Initiation of education programmes in nutrition, environmental sanitation and personal hygiene* — For effective implementation of nutrition and health education programmes, there should be coordination between the Nutrition Division and State Health Education Bureau. There is a need for evolving and propagating a few simple and relevant health and nutrition messages at the State level in local languages on functions of food, types of food (energy yielding, body building and protective foods), and their sources, breast feeding, preparation of weaning foods, nutrition requirements

during childhood, during pregnancy and lactation, promotion and use of locally available, inexpensive and yet nutritious foods, food habits immunisation, importance of safe and potable drinking water, practical methods of purification of drinking water, simple and essential principles of environmental sanitation and personal hygiene, use of oral rehydration for treatment of diarrhoeal diseases and small family norms etc.

The various grass root level resources such as primary schools, mahila mandals, youth clubs, agricultural extension workers, ANMS, community health workers, multipurpose health workers and anganwadi workers, voluntary relief organisation should be suitably trained and mobilised to facilitate and strengthen the delivery of health and nutrition education system. Village Panchayat members, opinion leaders and influential persons should be frequently used in planning and dissemination of vital health and nutrition education to the community. The inference of diet and nutrition surveys must be made available to the field workers for imparting nutrition education effectively.

Health and nutrition education messages should be put across to the target population by making effective use of available media. However, it is emphasised that direct talking down by face-to-face contact rather than indirect communication would yield beneficial results and specially designed educational materials should be utilised for the purpose.

The health hazards of consumption of Kesari dal\* in relatively large quantities and inadequately dried food grains infested by moulds\*\* and abuse of commercially available milk products for infant feeding should be explained.

Health and nutrition education should also be incorporated in the National Adult Education Programme launched by the Government of India. The health hazards of habitual alcoholism and the wasteful expenditure involved which could be otherwise utilized for improving quality of food for the family should be stressed.

(g) Maintaining of close liaison with social welfare board of the State and voluntary relief organisations for undertaking supplementary feeding programmes, nutrition and health education programmes and identifying the vulnerable population and the old, the inferior and the handicapped.

### 3. Drought disaster mitigation

When the entire State or certain Districts of a State have been declared as drought-stricken, the following

\*Kesari dal (*Lathyrus Sativus*) is a pulse containing 28% of fairly good quality protein. It is a drought resistant, hardy crop, cultivated in Madhya Pradesh, Bihar, eastern U.P., Bengal, Maharashtra, Karnataka and Andhra Pradesh. Kesari dal contains toxin and its consumption in relatively larger quantities causes Lathyrism. It is a crippling nervous disease, affecting generally young men between 15 and 45 years. It is characterised by spasm of the muscles of the lower limbs, painful knee and ankle joints followed by deformity resulting in scissoring gait. The toxin of *Lathyrus Sativus* is almost eliminated by steeping or parboiling process.

\*\*Moulds can grow on food grains such as rice, maize, sorghum and oil seeds like ground nuts, if they are not properly dried. Often mould growth can be detected visibly. Light greenish or bluish patches especially on the germ region of the grain is an indication of mould damage. Certain types of moulds (*Aspergillus Flavus*) produce poisonous substance (Aflatoxin B1) as they grow. Continuous consumption of commodities which are contaminated by moulds over a long period may lead to long term ill effects such as liver disease. Mould damage can be prevented by proper drying of the agricultural commodities. These commodities should be stored in moisture-proof storage conditions. If unseasonal weather conditions do not permit prompt drying, 2% acetic acid can be sprayed on moist grains to prevent mould damage.

mitigation measures should be undertaken vigorously. Some of the measures which are already initiated should be intensified.

(a) *Dietary Survey*—Should be carried out with special reference to consumption of food grains like Kesari dal and inadequately dried grains, infested by certain type of moulds (*Aspergillus flavus*) which in turn produce toxins (Aflatoxin B1). These could be visually detected and further use should be suspended.

(b) *Nutritional Status Survey*—Should again be undertaken using the base line data for comparison, with a view to identifying cases of Protein Energy Malnutrition (Marasmus and Kwashiorkor in pre-school children and Famine Oedema in adults), Vitamin A deficiency (Keriosis, Bitot's spots, Keratomalacia and Night Blindness), Vitamin B Complex deficiency (Angular stomatitis, Glossitis etc.) and nutritional anaemia. All available medical and trained paramedical and other personnel should be deployed for the purpose. The results of the survey should be made available at the earliest.

(c) *Issue of pulses in "Special Food For Work Programme"*—It is desirable to issue pulses (Greengram, Blackgram, Redgram, Bengalgram) in the "Special Food For Work Programme" in the drought affected areas. Pulses are about the richest natural sources of protein (22-25%) and they adequately cover protein requirement in the family diet.

(d) *Institution of "Food For Nutrition Programme"* should be undertaken for the vulnerable group, viz., pre-school children, expectant and nursing mothers belonging to the weaker socio-economic sections of the society by establishing "Feeding Centres" for catering supplementary food utilising local foodstuffs, conforming to the community dietary habits and paying special attention to the tribal people, labour camps and urban slums. The old, the infirm and the handicapped who cannot be employed in "Food For Work" or other income generating activity, should also be covered under this programme.

(e) *Provision of "Weaning foods" for the infants (6-36 months)*—As the mothers' milk is weaned off gradually, the infants need more nutritious food, containing proteins and calories for meeting the increasing nutritional demands for balanced growth. If it is not provided during the critical period of 6-36 months, the ill effects of malnutrition which ensues are felt not only immediately but also in later life; not only the physical growth is affected but also proper mental development is interfered. Protein-rich nutritious weaning

foods based on locally available food stuffs of acceptable taste should, therefore, be provided in adequate quantity for the infants at the feeding centres. This special type of foods can be taken home and given to children under 3 years which would have less chances of being shared by the other members of the family.

(f) *Health inputs in Nutritional Programmes* — Supplementary feeding centres, schools and community centres used for nutrition care under various Nutrition Programmes should be used as means of delivery of integrated nutrition and health services by introducing preventive health measures and curative health services to the beneficiaries. These services should be complementary to and synchronise with provisions of supplementary feeding and should consist of :

- (i) Primary medicare care with special attention to diarrhoeal diseases, respiratory infections and worm infestations.
- (ii) Immunisation of children mainly against diphtheria, tetanus, whooping cough, tuberculosis, small pox and typhoid fevers.
- (iii) Immunisation of expectant mothers against tetanus.
- (iv) Administration of iron-folic acid tablets and Vitamin A concentrate to the beneficiaries.
- (v) Education of mothers in child care, nutrition education, personal hygiene, family planning, purification of drinking water in domestic utensils using 'Chlorine' tablets etc.

(g) *Expansion of the on-going Nutrition Programmes* — It is highly desirable that the aforesaid on-going Nutrition Programmes should be expanded wherever possible during the crisis period of drought with a view to cover more areas and higher targets under the technical guidance of the Nutrition Divisions of the States Health Services. It is also desirable that the imported food-stuffs may be substituted by the indigenous ones as far as possible.

(h) *Institution of Therapeutic Feeding Programme* — The purpose of Therapeutic (Sometimes called Treatment or Intensive) Feeding is to improve the chances of recovery for the severely mal-nourished (cases of marasmus with less than 60% of the standard weight for age, Kwashiorkor and children with serum albumin less than 2.5g%) who could not be rehabilitated by Supplementary Feeding and also those with coexisting infective maladies and worm infestation. The Therapeutic Feeding Centres should be run under medical supervision and it is, therefore, best to establish them in the Primary Health Centres. The beneficiaries should be admitted as in-patients along with the mothers. Kitchen facilities are required for the preparation of therapeutic diet and suitable arrangements made for the provisions of meals for the mothers. In Therapeutic Feeding, each beneficiary is handled individually. The nutritional requirements of a malnourished child may be calculated on the basis of 150-200 calories for kilogram of body weight and 3.5-4g% of protein per kilogramme of body weight. A 3-hourly

feeding scheduled is made, allowing 6 or 7 feeds in 24 hours and the accompanying mother is responsible for feeding and caring during the rehabilitation period. The beneficiaries are discharged when they are found active, gaining weight without oedema, free from obvious illness, having good appetite and with 80% of standard weight for height. They are referred to the supplementary Feeding Programme on their discharge and should be followed up by home visits.

(i) *Continuation of Nutrition and Health Education Programme* — Having initiated during the preparedness phase, the Nutrition and Health Education Programme should be continued. It is not enough to improve nutritional status of children but to ensure that this status would be maintained even after discontinuation of any particular Nutrition Programme. The parents, particularly the mothers should be made aware of the over-all development and well-being of children through better nutrition. There should also be better understanding of the importance of environmental sanitation including use of safe drinking water. Avenues like Supplementary Feeding Centres, Therapeutic Feeding Centres, and centres for MCH, ICDS and applied Nutrition Programmes, where mothers congregate are ideally suitable for imparting Nutrition and Health Education by utilising the specially designed educational aides, organising group discussions etc.

(j) *Disinfection of existing drinking water sources* — The malnourished are susceptible to infections, particularly water-borne diseases such as gastroenteritis, infective diarrhoeas, dysenteries, cholera and infectious hepatitis, wells being the main source of drinking water, should be disinfected regularly by manual addition of bleaching powder (with 25% available chlorine) regularly so that 0.2 to 0.5 ppm of free chlorine residual is available at all time. The dosages of bleaching powder should be determined by Horrock's Test and safety and potability of drinking water should be ensured by conducting orthotolidine test for free chlorine residual after contact periods of 30 minutes.

(k) *Use of Chlorine Tablets for disinfection of drinking water* — Whenever disinfection of drinking water cannot be carried out at the source, it should be done by addition of 'Chlorine' tablets and dosage should be determined according to the capacity (volume) of the utensil/container. Contact period of 30 minutes should be allowed prior to consumption of the disinfected water.

(l) *Supply of safe and potable drinking water to the remote villages and tribal areas* — Safe drinking water is a precious commodity, especially in drought affected areas and it should be transported by Railways to the nearest railheads and subsequently by tankers to the surrounding villages. Assistance by Armed Forces should be sought for reaching the drinking water to the remote villages in the tribal areas and inaccessible villages in the desert.

(m) *Provision of new and durable sources of drinking water* — Boring new deep wells by means of rigs should be undertaken for providing a durable sources of drinking water especially in hard rock areas. The

- Health Authorities should ensure the safety and potability by subjecting the samples of water for chemical analysis. Storage of rain water in specially constructed "covered storage wells" at ground level should be explored in hard rock areas.

(n) *Close Coordination between the Health Services and Departments engaged in Nutrition Programmes* — Health Services including Nutrition Division could be more effectively delivered by achieving greater and better coordination between Health and Deptts. of Social Welfare and Tribal Welfare and other Departments engaged in Nutrition Programmes at all levels. While the co-operation and coordination is distinctly evident at the highest level, it needs to percolate to the State, District, Block and Village levels and concerted efforts in this direction are called for coordination committees at the State, District, Block and Village levels should, therefore, be set up for implementation of various Nutrition Programmes. Representatives of UNICEF, WFP and CARE should be invited for participation at the State-level coordination committee also.

(o) *Active Community participation in the nutrition programmes* — Every opportunity should be taken to enlist and promote community involvement through :

- (i) The setting up of village committees in rural areas and group centres in urban areas to oversee the programmes.
- (ii) Identifying needy and potential beneficiaries, specially children under 3 years who generally do not come to the feeding centres.
- (iii) Voluntary provision of buildings, cooking and eating utensils, fuel, vegetables and fruits, etc.
- (iv) Community efforts in related activities such as provision of potable drinking water, improved environmental sanitation, production of food.
- (v) Assistance in the immunisation and health check up campaigns by motivating the community to take benefits from these services.
- (vi) Organising feeding centres and delivery of food to the beneficiaries by the village Panchayats themselves, wherever possible.

(p) *Active involvement of voluntary relief organisations, mahila mandals and youth clubs* — Voluntary relief organisations of good standing and reputation may be involved in the implementation of the nutrition and health delivery programmes in the drought affected areas. A certain percentage of food grains may be earmarked for supplementary feeding through Voluntary Relief Organisations. Voluntary Relief Organisations should also undertake training of the field workers, organisers, supervisors and paramedical staff and others in conducting dietary surveys, nutritional surveillance systems, maintenance of proper records and rendition of returns and reports and delivery of nutrition and health education,

Mahila mandals and youth clubs should involve themselves in the management of the feeding centres, preparation and distribution of food, establishing links with health delivery systems, follow-up of the beneficiaries through home visits, identifying the needy and the potential beneficiaries.

#### 4. Monitoring and evaluation of nutrition programmes in drought affected areas

Monitoring of the Nutrition Programmes would involve the following :

- (i) Identifying items on which feedback is required and the level at which the feedback on different items is to be given. These will serve as the 'barometer' on the implementation of the scheme. Both positive and negative indicators are important. While at the initial stage, feedback on timely provision of physical and financial inputs should receive emphasis and in the subsequent stages, the focus will have to be on attainment of objectives of the programme in terms of beneficiaries, delivery of food (its quality, quantity and regularity etc) arrangements for cooking, potable drinking water etc.
- (ii) Identifying the personnel at different levels and defining their roles in monitoring.
- (iii) Maintaining the basic dietary and nutrition survey records, developing suitable proforma for periodical returns and reports on various inputs, operation, functional performance, nutritional and health status of the beneficiaries, community participation etc vital statistics etc and determining their periodicity.
- (iv) Sending the relevant information as per the proforma, its processing and analysis in terms of projected progress indicating the positive and negative elements, the nature and extent of shortfalls with reasons thereof and suggesting the corrective measures.

Continuous monitoring on the above would lend itself for evaluation of the Nutrition Programmes on the following :

- (i) Nutrition and Health status of the beneficiaries before, during and on termination of Nutrition Programmes.
- (ii) The effects of the provision of the health and nutrition services.
- (iii) Assessment of organisational, managerial and logistic aspects of the programme.

Based on monitoring and evaluation results, change over of beneficiaries should be ensured by weeding out those who do not require supplementary diet any longer and enrolling new deserving cases in place of them.

Evaluation serves as an aid to decision making at appropriate time, provides cues for nutrition and health intervention strategies and helps in identifying teaching material in orientation/training programme.

#### 5. Conclusion

Nutrition and health care in drought is a challenging task. By pre-planning, training, stock-piling the essential requirements, mobilising available health facilities — both preventive and curative, augmenting the Nutrition Division, integrating and expanding the on-going Nutrition Programmes and introducing Food for Nutrition Programme — all monitored under technical guidance of Nutrition Division, providing safe and potable drinking water to the remote villages in the arid and hard rock areas and tribal areas, attending to environmental

sanitation, close coordination with other departments at all levels, not only deaths due to starvation could be averted, but also morbidity and mortality due to drought associated diseases could be minimised. Careful vigilance and prompt action right from the incipient stage by all concerned in well coordinated and concerted manner would yield beneficial results in mitigating human distress and suffering in drought. So far as Nutrition and Health care delivery is concerned, expeditious action is required to be taken by expanding the Nutrition Division — both from personnel and equipment angles so as to enable them to cover the remote and tribal areas.

It is equally important in drought that the Nutrition and Health care of cattle population is organised and delivered in a similar manner as for human population.