

SUPPLEMENTARY FEEDING PROGRAMS: A CRITICAL ANALYSIS*

Patricia Rondó Schilling**

RONDÓ SCHILLING, P. Supplementary feeding programs: a critical analysis. Rev. Saúde públ., S. Paulo, 24:412-9, 1990.

ABSTRACT: A critical analysis of the Supplementary Feeding Programs which have been undertaken around the world is presented. Although only a few programs have been rigorously evaluated it seems that in relation to their main objectives, most of them have not proved to be successful. Some suggestions for improvement are put forward and the particular case of the Brazilian programs is assessed in detail.

KEYWORDS: Supplementary feeding. Program evaluation.

INTRODUCTION

National feeding programs for children in Brazil involve approximately 30 million beneficiaries and costs of half a million dollars per year¹⁰ although there is no evaluation as to how effectively the children are being reached by the programs or how regularly and how much food is reaching them.

Brazil ranks 6th among the most malnourished countries, despite the fact that it is the 7th largest economy in the western world and the 4th biggest food exporter^{14***}.

Malnutrition may have been aggravated over the last few years by the widening gap between the highest and lowest social classes, the declining purchasing power of the legal "minimum wage", the increasing costs of food stuffs and housing and the high rates of unemployment.

The increase in the prevalence of anemia and protein-energy malnutrition in S. Paulo is alarming³⁰ considering that this city has the most advanced degree of scientific and economic development in Brazil.

Supplementary feeding programs are possibly the oldest and the most common form of intervention for correcting malnutrition^{39,40}. Therefore there are some lessons to be learnt from countries where these programs have been implemented.

The present paper analyses feeding programs in America, Asia and Africa, and seeks to give

suggestions for the improvement of those being implemented in Brazil.

EXPERIENCES WITH SUPPLEMENTARY FEEDING PROGRAMS

"Take-Home" or "On-the-Spot" Feeding Systems of Food Distribution

The food supplements can be distributed to vulnerable groups free of charge, through "take-home" or "on-the-spot" systems of delivery or sold at low cost through retail stores, supermarkets etc. using a system of subsidies.

According to Austin² and Austin and Zeitlin³ analysis, the "take-home" system requires less frequent attendance, fewer dispensaries and health centres and involves fewer personnel in the distribution.

It is cheaper than the "on-the-spot" feeding system and increases the purchasing power of the family. However it provides less opportunity for nutrition education, and achieves only slow growth and recuperation.

In the "take-home" food distribution programs only 40 to 60% of the food received appeared actually to reach the target child²⁵ in view of the probability of the food's being showed with other family members, in the home.

The Chilean programme of milk distribution through the "take-home" system of delivery showed that the sharing of this food product at

* Part of the MPH (Master of Public Health) thesis submitted by the author to the Community Medicine Dept., Leeds University, 1988.

** Human Nutrition Dept., London School of Hygiene and Tropical Medicine, London University, Keppel Street WC1 7HT — London U. K.

*** And also by personal communication from the Brazilian Embassy in Italy.

home was not significant in view of the fact that it was considered to be children's food. It seems that when the food distributed is of a type suitable for consumption by all the members of a family, the likelihood or sharing can increase greatly.

A study involving Colombian pregnant women^{31,32} showed that sharing of donated food (non-consumption by the pregnant women of the food distributed was of 42%, even when food was distributed at the same time to all the members of the family. The mothers consumed 58% of the supplement but food displacement accounted for the equivalent of 42% of the supplement.

Although the "on-the-spot" feeding programs have shown a high percentage of substitution* they seem to ensure the intake of food by the beneficiaries⁵. The "on-the-spot" programs can be very unpopular and impracticable if factors like mother's occupational status, site of food distribution and size of family are not taken into account.

The "take-home" and "on-the-spot" feeding programs, are utilised all over the world, but on the basis of the analysis of the results of many studies^{5, 28, 40} it seems that the second method is more effective especially for pre-school and school children, depending on the area selected.

Objectives of the programs

The main objectives of the supplementary feeding programs** 2, 5, 7, 8, 10, 12, 15, 17, 22, 23, 26, 28, 36 were to improve the nutritional status and health of the beneficiaries, to stimulate regular attendance at health centres, and also to introduce nutrition education.

In view of the fact that health is linked to educational, environmental and demographic variables, it is important to integrate supplementary feeding programs with other activities.

Some interesting intervention studies have been undertaken in Guatemala by INCAP***. One of them²² investigated the influence of nutrition supplements on child development, and the impact of medical services provided by health auxiliaries on health conditions, over an 8 year period (1979-1987).

Another study analysing the interaction between nutrition and infection was made in India (the "Narangwal Project")²⁵ providing nutrition supplements and education in one area, health care in another and both nutrition and health services in yet another.

Some other programs² also concentrated on the utilisation of different food-stuffs, as in the Philippines (nutripack); Sri Lanka (Thripoha), and in Thailand (IPRPD products).

Target Group

The range of population size involved in such programs has been broad.

The ages of the children have varied from 6 months to school age, although a few programs have also assisted children below 6 months of age.

In most of the programs, the larger participation has been above 14 to 18 months of age. According to Beaton and Ghassemi⁵, the mothers have tended to delay the introduction of complementary food for their children during the period from 6 to 14 months of age.

The programs have not seemed to affect breast-feeding practices.

Before implementing a program it is important to evaluate the nutritional status of the population in order better to select the target group (taking into account that those who are malnourished have a greater risk of dying in the absence of any intervention).

Austin and Zeitlin³ considered that the target group for supplementary feeding programs must be of children from 6 to 36 months of age, in view of the high morbidity and mortality in this period of life.

Food-stuffs utilised in the programs

In most of the countries involved, the main deficiencies registered were of energy and micronutrients rather than of protein. Nevertheless, all the food supplements were rich in proteins.

In all the programs analysed^{2, 5, 18, 20, 22, 36}, the food supplements covered from 40% to 70% of the energy requirements. The exceptions were a program in Costa Rica⁵ and the Brazilian nutrition programs (PCA, PNAE, PSA, PNL)^{1, 10, 13, 23, 24, 26} that covered 170% and less than 30%, respectively, of these requirements.

Raw foods are, in general, very cheap as compared with processed foods, although their preparation involves time, utilization of gas

* Substitution occurs when food consumed at a feeding centre is substituted for meals normally taken at home.

** It is very important to emphasise that some of them were projects and some on-going programs. The projects are almost always more successful than the on-going programs.

*** Nutrition Institute of Central America and Panama.

cookers, etc. It also involves losses resulting from transport and storage.

In the case of Brazil and many other countries, a high percentage of the food-stuffs are lost every year due to an inadequate storage and transport network.

A study¹² comparing some raw and processed food products shows that the utilization of processed foods is useful especially in isolated areas and for groups of children with protein-energy or micronutrients deficiency.

More than half of the programs undertaken all over the world have utilized processed and fortified food.

It is well known that the acceptability of new foods needs time and is strongly dependent on mothers, as it is they who select the food-stuffs used by the whole family.

According to Ronchi et al.³⁶ the distribution of food has proved to be a good incentive for mothers to attend clinics and Mother and Child Health (MCH) Center. Participation declined when the food was not available.

There have been no studies to find out whether this incentive was more question of economics or nutrition.

Acceptability, availability, nutritional adequacy and costs are all important parameters when we are trying to choose the food supplements to be used in a particular program. Especially nowadays, people are concerned about the relative potential impact of utilising imported or local food stuffs. Some advantages of choosing imported food are the high standards of quality control, easy accessibility to fortified food, assurance of continuity of supply, etc.

The disadvantages can be a lack of stimulus to local agriculture and employment, poor acceptability of the food, etc.

Priority should be given to local food when it is available; the prices are low and management is efficient.

It is very interesting to note that when the Government of Chile decided to maintain the "Milk distribution program"³⁴ supported by its own production they stimulated the development of the dairy industry in the country.

Costs of the Programs

It is important to remember that targeting, coverage and cost-benefit of a program are intimately linked.

Most of the supplementary feeding programs^{2,5,25,43} have not provided data about costs.

The "research projects" have been two or three times more expensive than the "on-going" programs.

There has also been an economic advantage in the "take-home" system of delivery over the "on-the-spot" system.

The administrative costs of the programs have represented 28-84% of the food costs. These costs varied according to the level of supplementation, the coverage of the programs and the source of the food (whether local or imported).

The costs of ten projects analysed by Gwatkin²² varied from 0.5-2.0% of the annual per capita gross national product of their countries.

In fact, supplementary feeding programs are a very costly nutrition intervention although, when linked to other activities like nutrition education and medical care, their cost effectiveness increases.

It is important to know which activities are the most successful in regard to the prevention of infant and child deaths, bearing in mind that the estimate of the costs of supplementary feeding programs measured per death averted, instead of per child fed or child showing improvement in growth, is considered the highest.

The Narangwal Project²⁵ utilized food distribution, nutrition education and medical care. The conclusion reached this research project was that the cost of preventing an infant or child death was lower in the medical care than in the nutrition care area.

Evaluation

Anthropometry

Children participating in most of the programs^{2,4,5,19,34,36,40} have showed an increase in height and weight although this was not significant in all cases. These anthropometric changes probably mean very little considering that only a few programs have had a control groups and that some control groups were probably dissimilar from those studied.

When the control groups have come from more privileged populations the programs have seemed to fail, as in the case of the Costa Rica program.

A review of various types of feeding programs³³ supported by PL 480 Title II* operating in India

* North American Food for Peace Program.

shows that the nutritional status of children and mothers does not seem to have improved. Low coverage, low level of supplementation and high levels of sharing and substitution may be responsible for this.

Another study from India⁵ shows that it was those who were most severely malnourished who benefited the most from nutritional supplementation programs. The height and weight gains of normal children on supplementation programs were almost the same as in normal children in the control groups. These results many explain why the programs were less successful in some countries than in others.

It is very important to screen the child population very carefully before admitting them into a food distribution program.

Gupta and Mittal²¹ concluded that one of the factors that have diminished the impact of supplementary feeding programs is the presence of associated parasitic infections.

In fact there are many factors influencing the growth response. The severity of malnutrition, presence of infections, acceptability of food-stuffs, physical activity of the child, etc.

Regular growth monitoring was utilised in the Hanover and Narangwal projects²². There is no doubt that it is an extremely important indicator for the identification of young children who are not gaining weight and is thus useful in alerting both mothers and health personnel.

Morbidity and mortality

In almost all of the programs analysed^{2, 4, 5, 16, 19, 22, 33, 36} the mortality rates have declined. In countries where these data were available, the infant and child mortality has been lower in the project areas than in the control areas. Despite these results only very few programs have provided data about the impact of food distribution, *per se*, on the decrease in mortality.

In the Narangwal Project²⁵ antenatal food supplementation for pregnant women produced a marked reduction in perinatal mortality. Food supplementation for children produced its maximum measurable effect on growth but only a moderate effect on infant and child mortality. Medical care primarily directed toward infection control produced its maximum effect on mortality and morbidity, and only a moderate effect on growth.

A project in Guatemala (1972-77)²² evaluated the impact of two different interventions: food supplementation and medical care. Medical care

alone was responsible for a 70% decline in mortality and food supplementation for 30%.

According to the results of these two studies, food supplementation has an impact on the nutritional status of the population and medical care has its major impact on mortality.

A research project in Northern Peru provided only food supplements to low income families². There was a significant decrease in infant mortality, no decrease in child mortality, and no difference in physical growth. These results contradicted, to some extent, those from India and Guatemala.

According to some authors⁵ food supplementation has an impact on mortality and morbidity in severe cases of malnutrition. In less severe malnutrition this impact is not so clear.

Birthweight

Supplementary feeding programs for pregnant women seem to increase birthweight and indirectly to decrease early infant deaths.^{22, 25, 29} A research project from Guatemala³³ concluded that calorie supplementation increases birthweight.

Coverage

The coverage of most of the programs was around 10 to 20% (except in some research projects)²². It was 10% in the age group from 6 to 24 months of age. It seems that the segments of the population who really need additional food are those which are not, in fact, being reached.

Other ways to evaluate a program

More research is needed to evaluate the impact of supplementary feeding programs on school attendance, pupils' school performance and the activity level of young children.

Discussion and conclusions

Only a few programs have been evaluated anywhere in the world. Most of the records available are incomplete and difficult to interpret, as a result of the different methodologies that have been utilized.

Besides the nutritional objective of the supplementary feeding program, there are also social, economic and educational objectives.

In the evaluation, different indicators have to be utilized.

The "take-home" system of delivery has been the one most utilized in the majority of the programs although "on-the-spot" feeding was preferred for school children's programs.

Feeding programs are a very expensive nutrition intervention. Despite this, they have low coverage and a disappointing by small impact on the nutritional status of the population. When supplementary feeding programs are integrated with primary health care, their coverage and cost effectiveness tend to increase.

However, in most developing countries nutrition interventions are almost non-existent among those many individuals who have no access to a health centre or school and are usually the most malnourished.

It is important to emphasise that the coverage of the nutrition programs may be lower than the data usually provided suggest, in view of the fact, that length of participation is not taken into account.

Supplementary feeding programs are emergency interventions that must be continued until a better redistribution of family income and resources can be devised. In many countries of the world these programs have almost always been a palliative and demagogic intervention. However, in situations of food shortage, feeding programs have their value.

In Brazil the basic problem is the accessibility of food in terms of cost^{6, 9, 11, 12, 14, 26, 38}. The nutritional problem in Brazil is basically one of distribution, and will be so as long as the distribution of calorie consumption is similar to the distribution of family income. The calorie deficit is not a problem of lack of food production as in the case of countries in Africa and Asia. Food production is linked to demand and to purchasing power. Therefore it is clear that the food-stuffs required to maintain the internal market are decreasing^{12, 27}.

A positive aspect of the Brazilian feeding programs is that they do not depend on food supplies from international aid agencies, even though food products like wheat and milk have to be imported to meet the demand. According to Berg⁸ "there may be no country with so much poverty and so strong a scientific community that knows as little as Brazil about its nutrition problems and the effects of its costly programs". In fact the links between scientific community, government and political policy makers have been weak.

The supplementary feeding programs not only in Brazil but in most developing countries have not proved to be successful in improving the nutritional status of the target population although, of course, social, economic and educational effects must also be taken into consideration.

The target populations of the Brazilian feeding programs have an evident tendency to increase in size.

The main purpose of the government is to assist children, pregnant and lactating women from low income families. However, this is a utopian ideal considering that almost 70% of the Brazilian population qualify for benefit.

Despite the problems, no one can deny that if the Brazilian programs had not been implemented, the nutritional status of the population would have been even worse.

Some measures for the improvement of supplementary feeding programs in Brazil are here suggested:

1- The objectives of the programs must be well defined. If the objective is mainly social, educational or economic there may be other less expensive measures that can be applied more effectively.

2- A better target group in terms of the degree of malnutrition should be selected. Those who are the most malnourished have a greater risk of dying in the absence of any intervention.

3- The target population of the School Lunch Program should be limited to the four first grades in order to give greatest benefit pre-school children.

4- Community participation in all of the programme's planning phases should be encouraged.

5- Brazilian mass media and other nutrition education methods should be fully utilized with a view to stimulating the use of the food-stuffs already available in the country.

6- Processed or raw food will have to be utilized in the different regions of the country according to the storage and transport facilities available, cost effectiveness and the nutrition deficiencies of the local population.

7- Food surveillance systems should be implemented under the aegis of the State Health Secretariats. The food and nutrition situation of the population should be verified periodically according to age, income group, rural/urban areas, social and cultural differences, parents' occupation, presence or absence of a major development program in the area, etc.

8- A more adequate COBAL (Brazilian Supply Company) structure with more intensive activity for the purchase and storage of the basic food supplements, should be established.

9- Interventions in food production and marketing should be in accordance with the proposal of PRONAN (National Programme on Food and Nutrition).

10- Scientific support should be sought for the implementation and evaluation of the programs. Training of paramedical personnel for the provision of simple services to facilitate broader population coverage should be undertaken.

11- An efficient infrastructure should be developed especially in the north and northeast of the country for the purpose of achieving a broad coverage and adequate penetration of the lowest income strata of society.

12- Strong links with primary health care through associational with other programs such as Immunization, Oral Rehydration Therapy, Family Planning, Mother-Child Care, Health Education etc., should be created.

13- There is urgent need for an evaluation of the nutritional status of Brazilian children.

Growth charts should be used routinely in health and educational services (even though they are no longer considered to be the best evaluation indicator).

14. Beneficiaries should be questioned as to the quantity and quality of the food distributed, use to which the food is put, food distribution systems, etc.

15. The quality of the programs should be improved through greater decentralization in all phases.

These are just a few of the many suggestions which could be made to improve supplementary feeding programs.

The political decision is, in fact, the most im-

portant factor for the implementation and maintenance of programs, the availability of the necessary resources, and the development of the scientific and technical criteria.

Supplementary feeding programs can not be a permanent answer to the problem of malnutrition, mainly because no government can afford to maintain such programs on such a large scale on a permanent basis.

The whole country suffers as a result of political decisions which continue to be made in a centralized, generalistic and discriminative way, without taking the real, specific, regional necessities and aspects into consideration regions.

The Supplementary Feeding Programs should be seen as transitory and their progressive deactivation sought to the extent in which effective improvement in the living conditions of the population with better redistribution of income and real access to food supplies are achieved.

Malnutrition has its roots in poverty, which is in turn dependent upon national and international politics.

For how long should we maintain the Supplementary Feeding Programs and wait for changes to happen?

ACKNOWLEDGEMENTS

To Dr. Peter Cox, the MPH Course Co-ordinator at Leeds University, for helping in the final review of this manuscript.

RONDÓ SCHILLING, P. Programas de suplementação alimentar: análise crítica. Rev. Saúde públ., S. Paulo, 24:412-9, 1990.

RESUMO: Foi feita análise crítica dos Programas de Suplementação Alimentar no Brasil e em vários outros países do mundo. Embora poucos programas tenham sido rigorosamente avaliados, observa-se que em relação aos seus principais objetivos a maioria deles não tem se mostrado satisfatória. Algumas medidas são sugeridas para melhorá-los, dando-se ênfase especial aos programas no Brasil.

DESCRIPTORIOS: Suplementação alimentar. Avaliação de programas.

REFERENCES

- ARRUDA, B. K. G. A política alimentar e nutricional brasileira. In: VII Congresso Latino Americano de Nutrição, 1984.
- AUSTIN, J. E. *Nutrition programmes in the Third World: cases and readings*. Cambridge, Mass., Oelgeschlager, Gunn and Hain, Publ., 1981.
- AUSTIN, & ZEITLIN, eds. *Nutrition in developing countries: an overview*. Cambridge, Mass., Oelgeschlager, Gunn and Hain, Publ., 1981.
- BAERTL, J. M. et al. Diet supplementation for entire communities: growth and mortality of infants and children. *Amer. J. clin. Nutr.*, 23: 707-14, 1970.

5. BEATON, G. H. & GHASSEMI, H. Supplementary feeding programs for young children in developing countries. *Amer. J. clin. Nutr.*, 35: 864-916, 1982.
6. BENGGA, J. M & BEATON, G. H. *Nutrition in preventive medicine*. Geneva, World Health Organization, 1976. (WHO — Monograph Series, 62).
7. BERG, A. *Malnutrition: what can be done? Lessons from the World Bank experience*. Baltimore, The Johns Hopkins University Press, 1987.
8. BERG, A. Observations on Brazil's New Nutrition Programme, 1985. [unpublished]*
9. CAMPINO, A. C. *Economia da alimentação e nutrição: noções básicas*. São Paulo, Instituto de Pesquisas Econômicas-USP, 1985.
10. CARVALHO SILVA, A. Malnutrition and nutrition policies in Brazil; report prepared for the Kellogg International Fellow-Ships Programs in Food System-Recife Meeting. São Paulo, 1987.
11. CASTRO, J. *The geopolitics of hunger*. New York, Monthly Review Press, 1977.
12. CASTRO, C. de M. & COIMBRA, M., org. *O problema alimentar no Brasil*. São Paulo, Almed Ed., 1985
13. COMPANHIA BRASILEIRA DE ALIMENTAÇÃO (COBAL). *Diretrizes para uma política institucional de abastecimento alimentar*; documento base para análise e discussão no Seminário Nacional. Brasília, 1986.
14. DARCY, O. M. et al. *A dívida e a pobreza*. São Paulo, Ed. Brasiliense, 1986.
15. EZZAT, K. Amine. Existing infrastructure and development of strategies for nutritional improvement at the community level. In: Workshop on Identification and Priorization on Nutritional Problems in Egypt. Cairo, Ministry of Health/UNICEF, 1984.
16. FEACHEM, R. G. Interventions for the control of diarrhoeal diseases among children: supplementary feeding programmes. *Bull. Wld Hlth Org.*, 61: 967-79, 1983.
17. FIELD, J. O. et al. Supplementary feeding in rural Egypt: the health system in action. *Food Pol.*, 6 (3), 1981.
18. FREITAS FILHO, A. *Limite de pobreza e satisfação das necessidades alimentares*. Brasília, EMBRAPA, 1980.
19. GODFREY, N. Supplementary feeding programmes in refugee populations, 1986 (EPC Publications 11).
20. GONGORA, J. & SHAW, D. J. World food program assistance for supplementary feeding programs: review and recommendations. *Food Nutr.*, 3(2): 15-20, 1987.
21. GUPTA, M. C. et al. Effect of periodic deworming on nutritional status of ascaris: infested pre-school children receiving supplementary food. *Lancet*, 2: 108-11, 1977.
22. GWATKIN, D. R. et al. *Can intervention make a difference? The policy implications of field experiment experience*. Washington, D.C., Overseas Development Council, 1979.
23. INSTITUTO NACIONAL DE ALIMENTAÇÃO E NUTRIÇÃO. *Programa Nacional de Alimentação e Nutrição - PRONAN; documento técnico*. Brasília, 1976.
24. IPEA/IPLAN. Avaliação do desempenho do II PRONAN 1976-79. Brasília, Ministério da Saúde/INAN, 1980.
25. KIELMANN, A. A. et al. The Narangwal Nutrition Study: a summary review. *Amer. J. clin. Nutr.*, 31: 2040-52, 1978.
26. L'ABBATE, S. Fome e desnutrição: os descaminhos da política social. São Paulo, 1986. [Dissertação de Mestrado - Departamento de Ciências Sociais da Faculdade de Filosofia, Letras e Ciências Humanas da USP].
27. MELO, F. H. *O problema alimentar no Brasil*. São Paulo, Ed. Paz e Terra, 1983.
28. MITTAL, S. & GUPTA, M. C. Evaluation of a supplementary feeding programme through take home system. *J. trop. Pediatr.*, 26(2): 50-3, 1980.
29. MONTEIRO, C. A. et al. An assessment of the impact of supplementary feeding to pregnant women on low birth weight rates in S. Paulo city (Brazil). *Rev. Saúde públ.*, S. Paulo, 19: 458-74, 1985.
30. MONTEIRO, C. A. *Saúde e nutrição das crianças de São Paulo*. São Paulo, Ed. Hucitec, 1988.
31. MORA, J. O. et al. Evaluation of a food supplementation program in pregnant women of Bogota, Colombia. [Apresentado a Conferência of Maternal Nutrition on Infant Health: implications for action, Panajachel, Guatemala, 1979].
32. MORA, J. O. et al. The effect of nutritional supplementation on calorie and protein intake of pregnant women. *Nutr. Rep. int.*, 17: 217-28, 1978.
33. NELSON, D. P. et al. *An evaluation report of the PL 480 Title II Programme in India*. Ann Arbor, Mich., Community Systems Foundation, 1979.
34. RAO, D. H. et al. Nutritional supplementation: whom does it benefit most? *Amer. J. clin. Nutr.*, 30: 1612-6, 1977.
35. RIOS, I. M. E. Nutrition intervention: an anthropometric evaluation of changes in nutritional status, with reference to the National Nutrition Programme in Bahia, Brazil. London, 1981. [PhD Thesis - London School of Hygiene and Tropical Medicine, London University].
36. RONCHI, F. P. et al. Evaluation of supplementary feeding programmes assisted by the World Food Programme. *Food Nutr.*, 2(4): 19-25, 1976.

37. SILVA, L. M. V. Contribuição ao estudo da produção social da fome. Salvador, 1982. [Dissertação de Mestrado - Universidade Federal da Bahia].
38. SOLIMANO, G. & TAYLOR, L., ed. Food price policies and nutrition in Latin America; proceedings of Workshop. *Food Nutr. Bull.*, (Suppl. 3) 1980.
39. UNDERWOOD, B.A. Nutrition intervention strategies in national nutrition development. New York, Academic Press, 1983. (The Nutrition Foundation Monograph Series).
40. WORLD HEALTH ORGANIZATION. Nutrition Unit. *Supplementary feeding programme need for a fresh look*. Based on a Discussion paper submitted to Inter-Organization meetings on Expanded supplementary feeding programmes for vulnerable groups. [unpublished]*

Received in 22/8/1989
Reviewed in 21/5/1990
Accepted in 24/5/1990

* Copy of the document will be supplied by the author.