

Improving Young Child Feeding in Eastern and Southern Africa

Household-Level Food Technology

Proceedings of a workshop
held in Nairobi, Kenya,
12-16 October 1987

Proceedings



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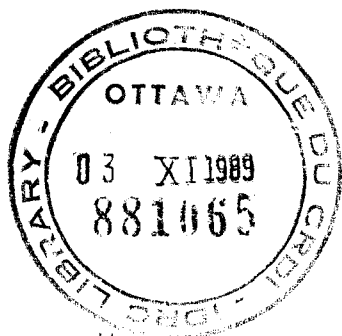
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Editors: D. Alnwick, S. Moses,
and O.G. Schmidt



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Abstract

The weaning period, that is the period in a young child's life when supplementary foods are introduced to complement breast milk, poses great nutritional risk to children in developing countries. By the end of the second year of life, one-third of children in eastern and southern Africa are chronically malnourished. The following factors contribute to the growth faltering commonly observed in weaning-age children: low nutrient intake, high incidence of diarrheal disease (often caused by contaminated weaning foods), and recent declines in duration and intensity of breastfeeding.

Food scientists, nutritionists, and health planners working in Africa and South Asia met in an international workshop to examine household-level food technologies that hold promise for improving nutrition of infants and young children. After reviewing current knowledge of breastfeeding and weaning practices in eastern and southern Africa, participants discussed the use in weaning diets of fermented foods and germinated flour, for both improved nutrient intake by young children and decreased risk of food contamination. Research that should be conducted into the effectiveness of the food technology was identified and its diffusion at the community level discussed.

This publication contains the proceedings, conclusions, and recommendations of the workshop. It is directed at scientists and health planners who are involved in nutrition research and developing programs to improve feeding of infants and young children in developing countries.

Résumé

Le sevrage, c'est-à-dire la période où l'on commence à donner des aliments solides à un jeune enfant en complément du lait maternel, présente de graves risques nutritionnels pour les enfants dans les pays en développement. Dès la fin de leur deuxième année, le tiers des enfants en Afrique orientale et australe souffrent de malnutrition chronique. Les facteurs suivants sont à l'origine du retard de croissance que l'on retrouve couramment chez les enfants en âge d'être sevrés : carence nutritionnelle, forte prévalence des maladies diarrhéiques (qui s'expliquent souvent par la contamination des aliments) et diminution récente de la durée et de l'intensité de l'allaitement maternel.

Des spécialistes des sciences de l'alimentation, des nutritionnistes et des planificateurs de la santé travaillant en Afrique et en Asie du Sud se sont réunis dans le cadre d'un atelier international afin d'examiner des technologies alimentaires applicables au niveau des ménages qui semblent prometteuses pour améliorer la nutrition des nourrissons et des jeunes enfants. Après avoir examiné les connaissances actuelles en matière d'allaitement au sein et les pratiques de sevrage en Afrique orientale et australe, les participants ont discuté de l'utilisation, au cours du sevrage, d'aliments fermentés et de farine germée, tant pour améliorer l'apport nutritionnel chez les jeunes enfants que pour diminuer les risques de contamination des aliments. Ils ont également discuté des recherches qu'il y aurait lieu d'entreprendre sur l'efficacité des technologies alimentaires et sur leur diffusion dans la collectivité.

Cette publication fait un compte rendu des discussions de l'atelier et présente ses conclusions et ses recommandations. Elle s'adresse aux scientifiques et aux planificateurs de la santé qui participent à des recherches en matière de nutrition et à l'élaboration de programmes visant à améliorer l'alimentation des nourrissons et des jeunes enfants dans les pays en développement.

Resumen

El período de destete, es decir, aquel período en la vida de un niño en que se introducen en su dieta alimentos suplementarios para complementar la leche materna, representa un gran riesgo nutricional para los niños de países en vías de desarrollo. Hacia el final de su segundo año de vida, un tercio de los niños en África oriental y del sur muestran señales de malnutrición crónica. Los siguientes factores contribuyen al crecimiento vacilante que se observa comúnmente en los niños que se encuentran en edad de dejar la lactancia materna: baja ingestión de nutrientes, alta incidencia de diarrea (a menudo causada por alimentos para el destete contaminados), y nuevas disminuciones en la duración e intensidad de la alimentación proveniente del pecho de la madre.

Científicos del campo de los alimentos, especialistas en nutrición y planificadores de la salud que trabajan en África y en el Sur de Asia se reunieron en un taller internacional para examinar las tecnologías de alimentos que se utilizan en el hogar y que prometen buenos resultados en el mejoramiento de la nutrición de lactantes y niños pequeños. Después de analizar el conocimiento que existe actualmente sobre la alimentación recibida a través del pecho de la madre y las prácticas que se utilizan para el destete en el oriente y sur de África, los participantes discutieron el uso en dietas para el destete de alimentos fermentados y harina germinada para que los niños puedan ingerir nutrientes mejorados y haya una disminución en el riesgo causado por la contaminación de los alimentos. Se identificó la investigación que se debe realizar sobre la efectividad de las tecnologías de alimentos y se discutió su difusión en el seno de la comunidad.

Esta publicación contiene las actas, conclusiones y recomendaciones del taller. Está dirigida a científicos y planificadores de la salud que participan en la investigación nutricional y en programas de desarrollo para mejorar la alimentación de lactantes y niños en los países en desarrollo.

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WEANING FOODS IN NEPAL

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Abstract *Undernutrition is one of the major problems confronting infants and young children in developing countries such as Nepal. The problem arises from two factors: an inadequacy in the supply of food needed for infants and children; and ineffective utilization of such foods as are available. The weaning period is a critical one in child feeding; appropriate complementation during this period is essential to the nutritional well-being of the child. The paper discusses this aspect of infant feeding, both in terms of the content of complementary food, and of the timing of the initiation of weaning. A description is given of the simplest of the weaning foods - "sarbottam pitho," or "super flour," patterned after "sattu," a traditional Nepalese food. A weaning food development project was undertaken in 1980 by the Central Food Research Laboratory in Nepal. The objective of this project was the development and promotion of malted, ready-to-eat multiminis that would utilize the traditional process of germination, and that would take advantage of cheap, locally available cereals and legumes (pulses). The project involved training, demonstrations, and the use of mass media. Further evaluations are required, however, to determine the degree to which the technology has been adopted by village families.*

The Kingdom of Nepal, bordered by China in the north and by India in the south, east, and west, has a total land area of about 147,181 km², consisting of three well-defined physiogeographical belts running east to west: the terai (75-300 m above sea level), the middle hills (300-3000 m above sea level), and the mountains (3000-8000 m above sea level). The flat plains of the terai, although making up only 17% of the total land area, have 65% of the arable land and 38% of the population. The middle hills, constituting 68% of the land area, have only 30% of the arable land, but 56% of the population. The mountains have about 10% of the population and 15% of the land area. Because of the snow coverage, the mountain areas are of little agricultural importance.

Variations in elevation, cloud cover, and topography result in a wide variation in ecological conditions. The prevalence of numerous

microclimates permits the cultivation of a variety of crops. Maize commands the highest proportion of total harvested cereal area, followed by paddy and wheat in the hills; paddy is predominant in the terai. Although only 16% of the land is considered suitable for cultivation, agriculture is the principal occupation of more than 90% of the population, and contributes up to 60% of the gross domestic product (GDP).

In Nepal, 85% of the cropped area is under cereals - paddy, maize, wheat, millet, and barley. Sugarcane, potatoes, and oil seeds are the principal cash crops. The cereal consumption pattern varies widely between the hills and the terai: in the latter, rice occupies first place; maize is the staple in the hills. Millet and barley constitute about 10% of cereal consumption in the hills, but only 3% in the terai. More than 80% of the diet is cereal-based.

With a per capita income of USD 160 per annum, Nepal is one of the poorest countries in the world. The harsh life in a rugged topography, together with poor social and economic conditions, gives rise to some of the highest existing rates of malnutrition, as well as to widespread infection. What has been called the "agricultural crisis" has manifested itself in the inability of a declining agricultural production to feed an ever-growing population: the current population (predominantly rural, with almost 94% residing in the rural areas) is estimated at more than 15 million, and the growth rate at 2.7%. More than 40% of this population live below the poverty line; more than 80% of the women and approximately 60% of the men are illiterate.

Nutritional Problems and Infant Feeding Practices

Children form a large and increasing proportion of the Nepalese population. According to the 1981 census, there were 2.31 million young children 0-4 years of age, making up 15.41% of the total population. Infant and child mortality is, however, extremely high, ranging from 100-300 and 160-360/1000 live births, respectively. High morbidity and mortality among children is the combined result of malnutrition, infections, and lack of basic health care and other social services. Being one of the poorest countries in the world, Nepal has all the characteristics of a least-developed country.

The prevalence of wasting and stunting among children (under the age of 6 years) is alarmingly high: the 1975 Nepal National Nutritional Status Survey revealed, for example, that 51.9% were stunted, 6.6% wasted, and 3.8% both wasted and stunted. Comparison with a relatively well-off group of children selected from Kathmandu shows clearly the gap in nutritional status between socioeconomic classes: stunting, wasting, and concurrent wasting and stunting in this special group were determined to be 18.8, 1.9, and 0.6%, respectively.

In addition to anthropometric indicators of nutritional status, specific nutritional deficiencies, including anemia, xerophthalmia, and goitre have been identified in various population groups in Nepal. More recent nutritional status surveys of children 0-5 years of age indicated a high prevalence both of moderate and of severe degrees of malnutrition.

In Nepal, the distribution of wasting by age group indicates that infants and children up to 35 months of age are the most seriously affected. This pattern could indicate general maternal inability to provide adequate milk, poor quantity and quality of weaning food, and the young child's inability to compete successfully for the family food. Stunting is found at a very early age in Nepal. It is likely that those children stunted early will remain permanently behind in linear growth.

As with each succeeding year the child fails to obtain nourishment adequate both for growth and for day-to-day nutrition, he or she slips into the "stunted" category. One of the major problems confronting infants and children in developing countries such as Nepal is therefore malnutrition, or undernutrition. This problem stems from two factors: the first is an inadequacy in the supply of food needed for infants and children; the second is an ineffective utilization of such foods as are available.

Weaning Processes

During the early months of life, breast milk is usually the only food given to the child. Because breastfeeding provides all the nutrients an infant needs for the first few months of life, the period between 1 month and 4 and 6 months of age is relatively safe. Even with the best lactation performance, however, breastfeeding becomes inadequate after 4-6 months, and supplementary feeding becomes necessary; the baby then begins a gradual "weaning period."

A major challenge common to all human societies is the securing of a "safe passage" for the infant, from birth to the time when he or she can consume the normal family diet and become physically independent. Between 4 and 6 months (depending on the growth of the individual baby), semisolid and, later, solid foods must be introduced progressively; breastfeeding should be continued for as long as possible. Until the child can eat the regular family diet, specially prepared foods will be needed in increasing quantity and variety.

Weaning is, therefore, an important period of adaptation from breast milk, a food that satisfies all the nutritional needs of the infant for the first few months, to a mixed diet containing solid foods.

The process of transition from infancy and total reliance on breast milk to childhood and the ability to survive on the family diet is not only a matter of physiological maturation. Over the first 24-30 months of growth, anatomical and physiological developments in the gastrointestinal and enzyme systems (permitting the child to consume adult food) are paralleled by other physical and developmental changes: communication skills increase rapidly, such that by the end of this period, many children are able, albeit simplistically, to verbalize many of their needs and feelings; mobility also improves dramatically during this period and, combined with the consumption of new foods, makes the child more vulnerable to illness caused by infection.

Appropriate complementary feeding during the weaning period is a complex aspect of child feeding, and is critical to nutritional

well-being. In infancy, growth is more rapid than at any period of life; nutritive requirements per unit of body weight are also greater. Good food sources of energy, protein, calcium, and iron are particularly important during this time. On the basis of body weight, children require twice as much protein, calcium, and iron as do adults.

Weaning Practices

In Nepal, complementary foods have traditionally been of low caloric density and low protein content, containing little or no fat, and often limited in micronutrients. Such foods are not well suited as supplements to the breastfed infant's diet. Moreover, supplementary feeding is usually initiated too late and in quantities that are inadequate. As a result of all these factors, infants are commonly half-starved from 6-12 months of age. After this point, they begin to partake of the family diet, in which the main foods are usually rice, maize, or tubers. Although their needs are greatest, they receive the smallest share of the protein supplements. At the same time, they are seldom encouraged to eat vegetables, and their diet therefore becomes dangerously overdependent on rice or on some other staple. Appetite then begins to fail, and infection perhaps tips the scale by causing further dietary restrictions and the loss, in loose bowel motions, of valuable nutrients.

During the period of the sixth plan, a study of weaning practices was conducted in 10 districts of Nepal by the Nutrition Section of the Central Food Research Laboratory (CFRL). This study showed that, although breastfeeding is universal, no particular weaning foods are used by the rural population. Foods such as "dal bhat" (rice-pulse) and "dhindo" (traditional corn meal), usually consumed by adults, are given in small amounts and in diluted form to young children (6-36 months). Sour and cold foods are restricted. Roasted and ground soybeans, or corn and flattened rice moistened with water, are also given as snack foods. These adult foods are very difficult for a child to digest, and therefore cause diarrhea. Infants and young children may receive food left over from an earlier meal; because of improper and inadequate storage, these leftovers are often heavily contaminated (CFRL 1987).

In some societies, especially in the Kathmandu valley, "pasne" is observed: this is the rice-feeding ritual that takes place when the child is 5-6 months of age. On this ceremonial day, "kheer," a special rice preparation with milk and sugar, is served to the infant as a first solid food. After this, infants and toddlers are fed with "lito," a traditional bland rice porridge made with clarified butter (ghee) and sugar (if these are available).

Rice "lito" or gruel is deficient in protein and vitamins. The starch granules in rice flour or grains not only swell on cooking, but show a great propensity for holding and binding water. This contributes to the typical dietary bulk of a rice gruel, and therefore to the low caloric density per unit volume consumed. Infants and young children from 6 to 36 months of age cannot ingest sufficient amounts of such preparations to fulfill their energy requirements. When the caloric needs are not met, growth is retarded, and the body begins to break down its own protein to supply energy. Most starchy

staples supply incomplete protein; if breastfeeding is inadequate, the situation is made worse, resulting in protein energy malnutrition (PEM) - one of the major nutritional problems in Nepal.

Whereas protein of animal origin is costly and in short supply, beans (legumes) or seeds can complement cereals to increase the protein available from vegetable sources. Although it is not prepared daily, "jaulo" is a traditional weaning food made from rice, lentils, and green vegetables and intended for convalescing young children and for the elderly. Feeding two or three times a day is, however, insufficient: the volume that a child can consume at each serving is too little to meet his or her nutritional requirements.

Despite the general availability of cereal grains and pulses for the provision of an adequate and balanced diet, most children do not consume enough calories. Customs surrounding food prevent the utilization of that food for weaning children. Such customs may have developed because of the difficulty for a young child of digesting inadequately cooked vegetable protein.

In many traditional societies, the weaning child seldom receives specially formulated foods: rather, he or she is gradually introduced to adult foods. The child, whose stomach is small, cannot consume enough food to supply the nutrients necessary for growth and development. The inappropriate and nutritionally poor diet given to the children results in growth retardation and in infection; diarrhea and other infections are responsible for the high mortality and morbidity of infants and young children.

There is an urgent need to develop satisfactory, cheap, and culturally acceptable weaning foods that can be prepared from locally available resources and that are therefore accessible to the lower-income socioeconomic classes. From the nutritional point of view, and in view of the infant's limited gastric capacity, the concentration of energy and nutrients is an important characteristic of weaning foods. These foods should be soft (so that they are easy on the babies' digestive tracts) and free of contamination.

Low-Cost Weaning Foods

A Nepalese traditional food preparation called "sattu," an instant food, is used especially in the tarai; an age-old method is employed, whereby the roasted ingredients of cereals and legumes are ground into a powder and mixed with water to make a thin gruel or cake.

Patterned after "sattu," "sarbottam pitho" was developed by the Shanta Bhavan Community Health Program in Nepal. This is a "super flour" that provides an excellent supplementary food for infants and young children. It combines local beans and whole, dried cereal grains, roasted and ground into a powder. This powder is cooked as a porridge, with enough water for the desired consistency. Home-prepared "sarbottam pitho" is the simplest weaning food and generally has two ingredients - a cereal and a legume, in a 1:1 ratio. This basic mix becomes, with the addition of fat, oil, sugar, or a vegetable in suitable proportions, a multimix, constituting a complete meal. It cannot, however, be recommended unequivocally for the

continuous feeding of children 6-36 months of age: because it exhibits high viscosity and high protein content, one cannot be sure of its digestibility; it is therefore considered more suitable for older, preschool children (Desikachar 1980).

Malted Multimixes

The search has been ongoing for a low-cost weaning food that would combine at least some of the following characteristics: high-nutrient density; low-bulk properties; utilization of widely used, cheap, and locally available cereals, pulses, and oil seeds; and use of improved traditional processing methods that can be easily adopted at the home or village level. This search led to the development of malted multimixes. The evidence of Desikachar (1980) showed that malted, ready-to-eat mixes have considerable advantages over mixes that are roasted. An enormous amount of work has been carried out and documented, with respect to the science and technology of such processing and its effects on nutritive value, culinary qualities, etc. In-depth studies were conducted by Desikachar (1980), a WHO consultant at the Central Food Technological Research Institute (CFTRI), Mysore, India; Tara Gopaldas (1982) of the Food and Nutrition Department of the Maharaja Sayajirao University, Baroda, India; and our own researchers at the Nutritional Research and Development Division of CFRL, Nepal. These studies clearly indicate the tremendous potential of malted cereal-pulse or oil seed multimixes in weaning-food formulation; this potential is enhanced by the fact that germination of cereal and legume grains is a traditional and universal practice in Nepal. Millet and green gram were used originally as the raw materials; since then, we have been conducting studies with different cereals and legumes.

The studies employ common household methods of processing or pretreatment: these methods include soaking, germination, malting, cooking (roasting), and milling. All these processes modify, both qualitatively and quantitatively, the nutritive value of the food. They have also been reported to impart the following beneficial effects: elimination of complex interfering (toxic) substances; increase in shelf life, acceptability (aroma), and digestibility; and reduction in bulk or viscosity to a level necessary to achieve the appropriate caloric density. The proportion of cereal to pulse (bean) is kept simple: a 2:1 ratio is maintained, based on the rough ratio of staple to legume in the average Nepalese diet ("dal bhat"). (The ultimate purpose of the project, after all, was to transfer the technology to the household and village level.) More than one cereal is recommended; some 10 recipes have been developed, using varieties of cereals and legumes, and taking into account their availability in different ecological regions.

The main steps involved in the process are steeping, germination, roasting, and milling. The final product can be packed in polythene bags or in clean, dry, glass containers. The proximate composition of these formulations of malted mixes reveal that they are within the acceptable limits of 350 kcal and 12-15 g protein/100 g (20 g/100 mL gruel, or 0.7 kcal/mL).

Both the acceptability test and the feeding trial were conducted in Dhading, one of the hill districts in the central region of the

country. Forty-two mothers and their weaning-age children participated. A 3-month feeding trial was conducted with the cooperation of the local health post; growth charts were produced through a bimonthly monitoring of the children.

The food preparations were found palatable and acceptable. After continuous feeding for 3 months, a significant improvement was shown by all those children of the scheduled class and of the low-income group who were suffering from undernutrition. None of these children showed vomiting or diarrhea. Because of our limitations, the animal feeding trial could not be done. The storage test did not give good results. The food was found to have a shelf life of only about 4 weeks (CFRL 1987). A great deal more research needs to be carried out in these areas.

Promotion of Home-Processed Weaning Foods

There are no commercially produced weaning foods in Nepal; they must be imported. The imported products (mostly Indian) are too expensive to be affordable even to the urban, middle-class population. For the rural sector, the majority of whom belong to the low-income groups who are actually the target population, there is no alternative than to develop and promote low-cost, home-processed weaning foods based on locally available ingredients and on traditional methods.

One of the most promising approaches for overcoming weaning-period malnutrition is the development of weaning foods that can be prepared by mothers at the home or village level; this development ideally uses local initiatives and locally available foods and employs traditional processing techniques.

The germination and malting of grains has emerged as a most promising method of weaning-food preparation, both for the reduction of dietary bulk in high-carbohydrate weaning diets, and for the enhancement of the nutrient content of the foods. Because the ultimate purpose of our project was to transfer this simple technology to the households and villages, the following preconditions were taken into consideration:

- The weaning foods should be based on a staple diet ("dal bhat") of cereal and legume;
- Locally available ingredients should be used that are low-cost and therefore affordable to the low-income socioeconomic strata;
- Processing should involve simple, adaptable, and traditional technologies, such as soaking, germinating, malting, drying, roasting, and milling. These methods require only simple household equipment;
- The processing methods should be culturally acceptable;
- The foods should be nutritionally adequate as supplements to breast milk;
- The foods should be soft in texture, low in fibre content, and high in caloric density;

- They should be foods that can be precooked, therefore needing only minimum cooking before being served to the children; and
- They should be acceptable and easily digestible, without producing secondary disorders such as diarrhea, vomiting, and flatus.

Germination (an intermediate step in malting) of cereals or of legumes has been shown to cause increases in thiamin, riboflavin, niacin, folic acid, ascorbic acid, iron, amylase and diastase activity, protease activity, digestibility, protein efficiency ratio, and biological value. Germination also has been shown to increase caloric density and to reduce viscosity, with decreases in phytin and increased phosphorous and trypsin activity of hemagglutinin.

Roasting precooks the ingredients used in cereal-legume mixes and increases the shelf life and acceptability. Most antinutritional or toxic effects of legumes (trypsin inhibitor, hemagglutinin, goitrogenic agents, cyanogenic glucosides, alkaloides, etc.) were partially or wholly eliminated by roasting.

The weaning period is a critical one, during which the infant is extremely vulnerable: inadequate or improper nutrition during this period may lead to severe malnutrition. Despite the rather lengthy and laborious preparation required (steeping, germination, roasting, and milling), the virtues of sprouting and malting of grains, and the superiority of malted multimixes over their roasted counterparts, make it more than worthwhile to incorporate these processes into the development and promotion of home- and village-prepared weaning foods. The processes of sprouting and malting are not new to the Nepalese. The traditional food "quanti," a semiviscous soup, is prepared from germinated mixtures of varieties of legumes; this food is eaten during a festival called "Janai Purnima," in the month of August. This is the month when diarrheal infections are rampant; "quanti" could therefore be used as a therapeutic food.

Roasted cereals and beans have been the traditional snacks of the Nepalese; special mixes of roasted grains are sometimes eaten as festival crackers. "Astamandap," a super flour made from a mixture of cereals and legumes, is a food prepared specifically for old people and convalescents; its preparation involves all the above-mentioned processes. There is therefore no reason why the benefits and use of malted mixes should not be encouraged and popularized through extension services such as demonstrations and the training and education of mothers, rural women, volunteers, and community workers.

Changes do not come easily; the means are therefore critical whereby a weaning intervention is presented to the target population. The development of programs to effect changes in weaning behaviour is a complex task: home- and village-based programs require the sustained efforts of nutritionists, home scientists, and nutrition educators.

His Majesty's Government, Nepal, with the support of UNICEF/WHO, initiated the Joint Nutrition Support Programme (JNSP) in 1983/84, in five selected districts; the program was designed to have a multi-sectoral approach. This is the country's first effort to make manifest the concept of an integrated approach to a single nutrition program. Promotion of home- and village-processed weaning foods through

demonstrations and educational programs for mothers is one of the very important activities undertaken by the Nutritional Research and Development Division of CFRL. This training is also designed for female community workers.

During the last 3 years, demonstrations and training sessions have been organized and conducted in different villages; these sessions have involved mothers in the preparation, under local conditions and using local equipment and materials, of weaning foods based on malted multimixes. In the tarai, the multimixes based on rice, wheat, and bengal gram are being popularized; in the hills, the focus is on rice, corn, and soybean, depending on the general availability and dietary pattern. The demonstrations and training sessions were conducted in local health posts and centres that maintain the growth-monitoring charts. After training, each participant is advised to form a mothers' club and teach others what she has learned; in this way, information can be more effectively disseminated.

This program of demonstration and training has so far been conducted in three hilly districts and in two terai districts in different panchayats. Some 250 women have been trained. The trainers include a nutritionist, a home scientist, an agriculturalist, and a health assistant. Guest lecturers, such as local women development officers and family planning officers, have also participated.

The program has been well attended. Because food preparation was based on traditional methods of processing, the mothers were able to benefit from new practices based on age-old methods. Because the demonstrations involved practical training of the homemakers, they were appealing to the rural women. A simple survey must, however, be undertaken to determine the degree to which these new practices have been adopted by village families. It is also important to realize that without the correct motivation, knowledge alone may not improve the mothers' methods.

The adoption of "sarbottam pitho" (super flour) was evaluated in Tansen, a hill area of western Nepal. It was found that 67.1% claimed to have heard of "sarbottam pitho," and 13.28% said they had made it at home. A survey conducted in five districts indicated that "sarbottam pitho" was given to 34% of the children in the Makwanpur (inner terai) district, but to less than 2% in the other four districts.

There appear to be two major stumbling blocks with regard to the use of this food: many families are too poor to be able to afford it; and those mothers who breastfeed their children for 2 years are often unaware of the importance of weaning foods. With little extra time available to them, the mothers complain of the length and tediousness of the processing. Once these mothers become motivated (once they become aware of the nutritional needs of their children), the translation of the technological knowledge into practice becomes easier and more natural. If, however, the families are too poor, or are not in a position to prepare two meals per day, other interventions, both immediate and long-term, are required.

Although the composition of new weaning foods (with ingredients that are low in cost and available year-round) is extremely important, communication about nutrition is the key to a successful introduction

of these foods. Weaning-food development should be a part of mother-and-child health services or of primary health care.

Conclusions

There are no commercially produced weaning foods in Nepal. The marketed products are all imported and too expensive to be affordable, even to the urban middle class, to say little of the majority of the rural households, who are socioeconomically very backward. The approach that encourages home-preparation and processing of weaning foods has the advantage of allowing for intervention at multiple points in the nutritional system and of being applicable, in some degree, to all segments of society.

There should be promotion and support of local ingredients, prepared in the traditional manner as home-made weaning foods; this is an important part of a nutritional strategy for improved child feeding and nutritional well-being.

The foods chosen for weaning recipes should be easily available from gardens or local markets, low in cost, and used frequently in most households.

Effective demonstrations are required to motivate and involve the mothers and thus to make them aware of the nutritional needs of their children. In this way, the translation of technology into practice will become easier and more natural.

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