SOCIOECONOMIC CONDITIONS, FOOD HABITS AND FORMULATED FOOD PROGRAMS IN THE PUEBLOS JOVENES OF LIMA, PERU

Marisela Benavides[1] *and Robert E. Rhoades*[2]

International Potato Center (CIP)
Lima, Peru

SUMMARY

The present article examines attempts to develop and introduce formulated foods, or mixes, to low-income populations in Lima, Peru's *Pueblos Jóvenes* (squatter settlements).

It discusses how socioeconomic conditions, dietary patterns, and economic pressures often mitigate against consumer acceptance. An alternative approach which stresses a prediagnostic study of clients' needs and careful monitoring of product development with consumer input is suggested.

INTRODUCTION

Formulated or blended foods, sometimes called "mixes", have been widely investigated and debated as to their merit over the past two decades (1,2). While a number of nutrition studies and guidelines for development of the composition of formulated foods have been published, little research has been conducted on the social and economic conditions which encompass acceptability or rejection by beneficiaries of formulated food programs. This article, which presents the findings of a study done in 1983, examines formulated food programs in Lima, Peru, both historically and at present. Acceptability of formulated foods is examined in light of various factors: household economics, cultural preferences, dietary patterns, and food assistance programs. A major objective of the paper is to broaden our understanding of non-biological factors that play a major role in the successful transfer of formulated foods designed for Third World populations.

Data collection procedures involved a literature review of socioeco-

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1 Sociologist, International Potato Center, (CIP), Lima, Peru.

2 Leader, Food Systems, International Potato Center (CIP), P.O. Box 5969, Lima, Peru.

nomic conditions and present dietary habits in Lima's *Pueblos Jóvenes* or "young towns," interviews with specialists working on food-related problems among the urban poor, in-depth interviewing of mothers as well as women working in the *comedores populares* (common kitchens), and the administration of a questionnaire to a sample of mothers. The potato *(Solanum tuberosum)* was selected as a focal point due to the importance this tuber has in the Andean diet, and attempts in other world areas to use potato as a base for formulated mixes (3-6).

SOCIOECONOMIC CHARACTERISTICS OF LIMA'S *PUEBLOS JOVENES*

1. *Development of Pueblos Jóvenes*

Modern Lima is surrounded by a belt of marginal settlements called *pueblos jóvenes* or *barriadas* containing a population of 1.2 million (4).

The first *barriadas* appeared in Lima in the 1940's. They were established in the areas surrounding the *Mercado Mayorista*, Lima's main produce market. New *barriadas* or *pueblos jóvenes* appeared on the margins of the Rimac River during the 1940 and 1950 decades. From 1955 onward, however, an acceleration in the expansion process of these settlements occurred, and new barriadas emerged around the contour of the urban center and along the main access roads leading to the capital (See Figure 1).

The constant growth and yearly expansion of *barriadas* (Table 1), is currently evidenced in the settlements occupying the sandy, desert areas surrounding the city.

The formation of a *pueblos jovenes* begins with the "invasion" of state or private land by an organized group and, in fewer cases, the relocation of populations. Once installed, the inhabitants formally organize themselves to obtain official government recognition, legal title to property, and installation of electricity, water, and sewage services. The age of the *pueblo joven* and its organization power explains the differences between *pueblos jóvenes:* older settlements tend to have better facilities (e.g. San Martín de Porres located in the margins of the Rimac) than new ones. Nevertheless, even in the best *pueblos jóvenes*, severe problems are found in regard to sanitation, water, and most basic amenities.

2. *Population Characteristics*

Reliable statistical information on the populations of *pueblos jóvenes* is difficult to obtain and available data often correspond to different years. In this paper, a few general conclusions are drawn, which are important for understanding the target populations of formulated food projects.

Origin of slum population is important in determining food customs and dietary practices. The original inhabitants of *pueblos jóvenes* are primarily rural migrants to the city where a tremendous amalgamation of races and ethnic groups is found. While the greatest proportion of migrants are of highland origin, many originate as well from the coast and

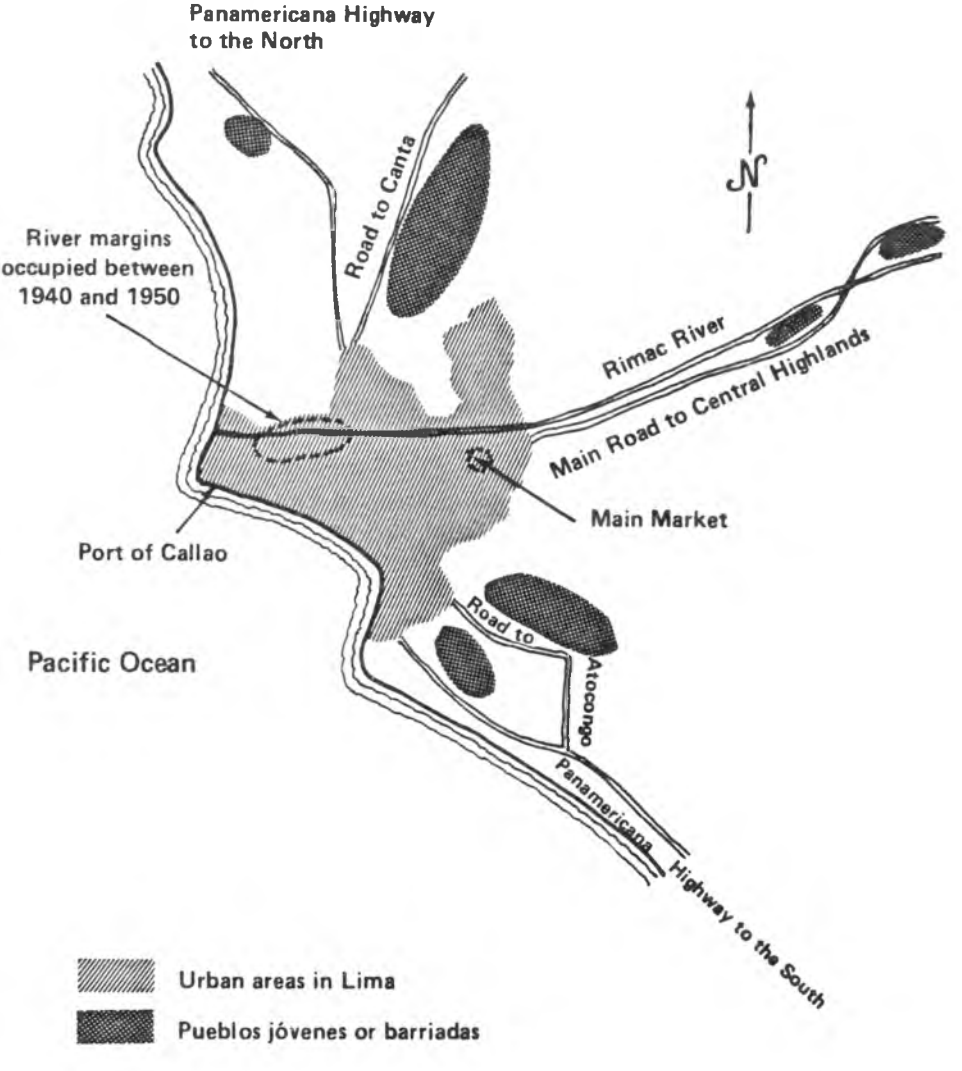

FIGURE 1

Map indicating the location of barriadas in Lima, Peru

TABLE 1

TOTAL POPULATION, AND POPULATION GROWTH IN *PUEBLOS JOVENES*, METROPOLITAN LIMA

Year	Lima's total population	Population in *Pueblos Jóvenes*	Percentage
1953		13,599[a]	
1955	1,200,000	119,140[a]	10
1959	1,641,900	236,716[a]	14
1967	2,628,700	491,340[a]	19
1970	2,990,000	761,755[a]	25
1972	3,418,500	783,039[b]	23
1981	4,608,010	1,171,839[b]	25

Sources:
a Rodríguez, Alfredo *et al.* (8).
b Henríquez, Narda *et al.* (9).

jungle. For example, a study of a *pueblo joven* in Callao revealed that one-third of its inhabitants originated from the coast (10). Not all people living in *pueblos jóvenes* have taste preferences of the highlands (also a highly variable cultural zone) as is sometimes assumed in food programs.

The population of *pueblos jóvenes* is demographically young, and families tend to be large by Lima standards. According to a *pueblo joven* census conducted in 1972, 45% of the total population of Lima and Callao *pueblos jóvenes* are less than 15 years of age (11). The average family size of the low-income groups in Metropolitan Lima is 6.7 persons.

3. Employment Patterns

According to a 1982 survey carried out in 18 Lima *pueblos jóvenes* by INADUR (National Institute of Urban Development), 57% of the active economic population have stable employment, 36% have temporary employment, and no information was available on the remainder (12). Concerning occupations revealed in this survey, 37% declared themselves laborers, 31 claim to be self-employed, 26% classified themselves as employees, while the remainder (6%) fell into miscellaneous categories (12). Self-employed workers include street venders, artisans, and semi-skilled workers (carpenters, plumbers, etc.) all of which are common activities for men. The most typical economic activity among women is hourly domestic employment, small businesses, street vendors, and in a few cases, sewing.

In the implementation of any formulated food program special attention should be given to the activities of mothers. In one *pueblo joven* study, 62% of women gave up work at marriage (85% worked before marriage), 15% remained unemployed and approximately 23% remained permanently in the labor force (13). This pattern of leaving work is explained in part by the necessity of the mother to remain at home to

take care of children and the house, especially in the cases of "invasions". As the family matures, women will return to the labor force due to economic pressures. When the children are older, or one child can watch the younger children, the mother will again frequently engage in an outside economic activity. They devote themselves primarily to commercial ventures which are compatible with maternity and which permit the greatest liberty in establishing their own hours and allowing, if possible, the mother to take her children with her. They frequently become street vendors or, if capital can be accumulated, they open a small local shop, often in their own house.

4. Income

According to the 1982 INADUR survey, and other data from 1983 the average family income in the *pueblos jóvenes* fluctuated, between 1.5 and 1.6 MLS (minimum labor salary) which was equivalent to US$110-118.[3]

Two other surveys –the first, in San Juan de Lurigancho (north-east part of the city) and the other, in the Fundo Marquez (port of Callao)– provided the data on income levels shown in Table 2. In both studies, 50%/o of the analyzed population had incomes fluctuating between 80 and 160 US dollars.

THE FAMILY BUDGET AND FOOD EXPENDITURE

According to information in the National Survey of Food Consumption (15), conducted between August 1971 and August 1972, the expenditures among the lower income groups for food and drink in the Lima Metropolitan area required almost half of the total family budget. This was corroborated by another survey undertaken in 1977 and 1978 (16) which showed that 55%/o of expenses of the two lowest income strata are oriented toward food.

Hilary Creed de Kanashiro (17) in reference to food expenses of the lower income groups based on data obtained between 1972 and 1979 from various *pueblos jóvenes* (Ciudad de Dios y Pamplona), argues that food expenses are even higher than government data suggest:

> "In 1972 these groups spent 78%/o of their total income to eat. It was not possible to obtain this information for all families but the impression is that some families have maintained more or less this percentage between 1972 and 1979 while for others it has risen. One of the families spent 85%/o of their total income for food in the 3 weeks prior to the interview."

Inflationary trends have continued to drive food costs higher.

2. Nutritional Situation

The close correlation between consumption patterns and income

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3 On April 20, 1983, the average exchange rate was 1,306 Soles per US dollar. The exchange rate in 1987 is 14,000 Soles or 14 Intis.

TABLE 2

INCOME LEVELS IN TWO *PUEBLOS JOVENES*

Population (Percentage)	Income levels US$
Fundo Marquez	
27	< 79
35	82-117
21	119-163
15	> 163
2	n.d.
Survey applied to 209 persons Zolezzi, M. and G. Romero (14)	
San Juan de Lurigancho	
34	< 82
44	82-156
17	> 156
5	n.d.
Survey applied to 246 persons. Zolezzi, M. and G. Romero (14)	

makes it clear that in *pueblos jóvenes* the low nutritional level has important consequences for health. According to the ENCA 1972 survey (15), 19°/o of the Lima population less than six years of age face malnutrition problems: 17°/o suffer from first degree malnutrition, while 2°/o are of second degree (18). The ENCA survey indicated also that 47°/o of Lima families do not satisfy 90°/o of their caloric requirements, and 22°/o their protein requirements (12), a situation which has worsened since 1972 to the present. In addition, severe water and sanitation problems in *pueblos jóvenes* compound health and nutritional problems.

FOOD HABITS IN THE *PUEBLOS JOVENES*

1. Nursing

a. Breast-feeding

Breast-feeding is the main feeding method for babies in the *pueblos jóvenes*, and as Table 3 shows, mothers try to extend this practice for as long as possible, generally up to one year of age. Most mothers considered their own milk more adequate than artificial feeding. Breast-feeding is primarily used because of custom, its natural character, and savings to the family. In the *pueblo joven* Matazango a survey of 94 mothers re-

vealed that mother's milk is considered by 90°/o of the mothers as better than any other kind of milk (19). Mothers declare they stop breast-feeding when they no longer have milk or the child is old enough to eat other foods.

TABLE 3

BREAST-FEEDING PERIOD: COMBINED RESULTS OF TWO *PUEBLO JOVEN* STUDIES
(N = 163)

Time	No. of mothers
Less than 6 months	22
6 - 12 months	73
More than 12 months	68

Source: González, Elías, 1979-1980. *Pueblo joven* Villa María del Porvenir (N = 103) (20).
Source: Leon Angeles Lauritz, Nov. 1977-1978. *Pueblo joven* San José, and Virgen del Rosario near Ancon (N = 60) (21).

b. Breast-feeding, supplementary feeding and non-maternal milk

In cases of insufficient mother's milk or if the mother works, supplementary feeding on non-maternal (canned or powered) milk is made. In San Jose and Virgen del Rosario, for example, evaporated milk[4] is used by 71°/o of the mothers, pasteurized or homogenized by 8°/o and powered milk by 2°/o (21). In addition to mother's or other milk, babies are given substances such as tea and anise to eliminate gases and colic.

2. Transition to Solid and Non-Milk Food

This period begins when the child starts to eat solid foods at three to six months of age. The first foods given to the child are soups or broth containing noodles or potatoes prepared by the mother. Other foods given to the child are: potato purée prepared from the family soup bowl, squash purée, banana, boiled egg, pudding-dessert *(mazamorra),* and juice (mainly papaya and granadilla). These are traditional convenient methods of feeding babies from readily available table foods which are part of the regular adult meals and do not have to be specially prepared. The concept of a prepared child's meal as something separate from the adult's meal is not found, only in the sense that food may be separated out of the family pot (e.g., potatoes) and then mashed or made palatable for the child.

4 Gloria was the brand best known until 1985. This situation has probably changed. Although these are not recent studies, ENCI, a highly subsidized powdered milk may well have replaced it as the most commonly used.

Ninety-four mothers in *pueblo joven* Matazango responded to the question: which are the most common foods used to begin weaning? The most frequently mentioned items were mashed potato and vegetable broth (36 responses each) followed by fruit juice and boiled egg (20 and 8 responses, respectively) (19).

Results of a survey (N = 21) conducted specifically for the present article (Table 4) revealed the following first foods:

TABLE 4

FIRST FOODS FOR BABIES

Food	Frequency of response
Soups (vegetable, noodle, semola)	14
Potato (purée or mashed)	9
Banana	6
Eggs	5
Chicken broth	5
Fruit juice (granadilla, papaya)	3
Carrot	3
Purée squash	3
Corn pudding	2
Spinach	1

Source: Author's survey 1983.

3. *Incorporation of the Child into the Adult Diet*

The age of incorporation of the baby into the adult diet varies according to family resources. In the lowest income families, the child is incorporated as rapidly as possible into the family diet (although individual components may be prepared especially). This occurs generally after six months of age (Table 5).

a. *Child diet: 1-6 years*

The daily diet of small children like that of adults, is divided into the three usual meals: breakfast, lunch, and supper. Often, the evening meal is in reality the noon meal warmed over or, on other occasions, it is a *lonche* (snack) consisting of tea, bread, or pudding *(mazamorra)* with a bit of milk. There is limited consumption of fruit, eggs, and meat. Milk is used in some preparations, but this is diluted, canned evaporated milk. When the child is weaned, he does not always receive the proper substitute for mother's milk, a state which is compounded by the attention a mother must give to the newly arrived baby (22).

TABLE 5

INCORPORATION OF CHILD INTO THE ADULT DIET
(N = 21)

Age	Frequency of mention	Percentage
4 months	1	6
6 months	4	25
8 months	3	19
9 months	1	6
1 year	4	25
1 year +	3	19
	16	100%

Source: Authors' survey 1983.

Mothers often fear that the use of fish and dried legumes *(menestras)*[5] produces infection, allergy, and diarrhea. Legumes *(menestras)* are ranked highest by mothers as harmful to children, describing their effect as *caen pesados, aflojan el estómago, empachan,* Spanish expressions which refer to gastrointestinal problems (23). Beans, fish, and bananas are also thought to cause stomach problems. These are considered too "heavy" for the young child. At this age, preferred foods are noodles, puddings, fruits, and gelatines. Processed foods that children receive at this age are oats, sémolas, including preparations previously mentioned. For the preparation of puddings it is common to use corn starch *(Maicena).*

b. Diets of children: 6-14 years

The diet of children comprised in this age bracket is virtually the same as the family diet, although the proportion is greater than in the 1-5 year-age group. Despite their limited diets, by this age children have formed certain food habits and tastes which are important in determining acceptability of donated or formulated foods.

4. The Adult Diet

a. Foods consumed most frequently

Soups are important elements in the *pueblos jóvenes* diet since they are consumed daily, as is rice and bread. The soup ingredients include basic items such as onions, tomatoes, garlic, supplemented by vegetables such as carrots, potatoes, often mixed with a chicken broth or piece of inexpensive meat. In other cases, they prepare soups with wheat, beans and pea flours, or with noodles, sémola and rice. The mother prepares the soup using many different forms which depend on their availability and

5 In Peru the *menestras* include beans, broad-beans, peas and Lima bean.

market prices. Flavoring adding cubes are often added to soups.

Consumption of legumes and rice is common, due to the volume that can be bought with family budgets and generally their more secure supply in the market. Eggs are important in the diet, particularly if the mother has her own backyard chickens, a pattern common in *pueblos jovenes.* Fruit consumption is variable due to price fluctuations and supply. The most commonly consumed fruits are oranges (cheap in winter) and bananas (cheap in summer). Consumption of milk is also variable.

Legumes are generally consumed every other day. The diversity of legume types (e.g. green beans, broad-beans, chick pea) in the market permit a variation in consumption. Legumes are eaten with rice and in some cases with a piece of fish, egg and other high-density protein food if the family income permits.

Stews are prepared with greens and pieces of inexpensive meat, generally viscera. Stews are also quite diverse according to the green vegetable or grain with which it is prepared: e.g., squash, maize, olluco, potato or cabbage. Choice of vegetable depends on whichever ingredient is lowest in price at the market. Noodles, prepared in soups or separately, are consumed at least once a week. Fish and shellfish are frequently consumed since they are cheaper than chicken.

Frequency of chicken consumption also varies according to prevailing market prices. Generally, mothers purchase small pieces (wings, backs, feet, liver, etc.) for soups and for broths. Other meats, such as beef or pork, are rarely consumed due to their high cost. If meat is consumed, it is the less expensive pieces (e.g., viscera, head pieces, feet) which are selected.

According to the 1980 national household survey (ENHI) (24), Table 6 includes a list of the foods frequently consumed among low-income groups in the Lima Metropolitan area.

The adult diets of the *pueblos jovenes* are primarily made up of high carbohydrate foods such as rice, bread, noodles and dried legumes. Potatoes are also commonly consumed, reflecting a highland cultural preference. The former are consumed because of lower price in relation to volume. Concern with price does not necessarily mean, however, that people do not perceive differences in the nutritive value of foods. For example, in a study of mothers' opinions on the health value of foods, by Bardales de Hoyos (25), milk, meat, eggs, fish, fresh vegetables, fruits, and legumes were ranked highest, in the order presented.

Susan Lobo (10) in her excellent study of squatter settlements in Lima, reports that strong feelings of trust must pervade a situation in which food is given and received. Although men often eat *en la calle* (in the street) from vendors, this is considered disagreeable and often unhealthful. They prefer food prepared in the home, by one's own relatives. Culinary arts of the *pueblos jovenes* can be quite elaborate, especially on festive occasions. Foods which they can afford to eat are always well prepared.

5. Shopping Patterns, Food Storage, and Kitchen Activities

Mothers generally acquire food daily. Very few go to the market

TABLE 6

FOODS MOST FREQUENTLY CONSUMED AMONG THE LOW-INCOME GROUPS IN THE LIMA METROPOLITAN AREA

Food	Grams per family per day	Percentage of the daily total consumption
Potato	.899	16.3
Rice	.738	13.4
Bread	.459	8.3
Fish	.328	5.9
Sugar	.275	5.0
Chicken meat	.242	4.4
Sweet potato	.242	4.4
Onion	.234	4.2
Noodles	.184	3.3
Evaporated milk	.162	2.9
Banana	.158	2.8
Tomato	.140	2.5
Beans	.139	2.5
		76 (rounded)

Source: Encuesta Nacional de Hogares Individuales (ENHI) (24).

only once a week, as is common among the middle and upper classes. They purchase food in small open-air markets called *paraditas*, but in small amounts, a pattern reflecting in part limited cash availability.

In Lobo's study (10), the shopping patterns in Callao are described as follows:

> "In Ciudadela, Chalaca and Dulanto each household purchases food daily. Generally, the women do the shopping since it is they who prepare the meals. Purchase of foodstuffs and preparation of food represent a large portion of the female head of the households' concerns. The morning trip to the market, in which food is selected for the entire household's consumption, generally lasts about an hour and is carried out efficiently. The market represents a focal setting for communication, for sizing up the available products, for commiserating on rising prices, and for exchanging quick bits of information with intimates."

"Food is generally stored in boxes or left in sacks in places protected from humidity and light" (cf. study by Bardales Hoyos) (25). Daily shopping minimizes household storage.

a. *Types of kitchens and availability of water and fuel.* Primarily, kerosene stoves are used and kerosene is an important expense. Water in the newer *pueblos jóvenes* is brought in by truck, sold in containers at a relatively high price and is often of dubious quality.

b. *Time spent preparing food.* As illustrated in Table 7, time dedicated

to food preparation is approximately four hours daily, and 4.45 hours in families with small children (22). Preparation of food is the mother's task, or in her absence, the grandmother, an older sister, or other adult family member.

TABLE 7

PREPARATION TIME OF FOODS CONSUMED IN *PUEBLOS JOVENES*

Oats with milk	30 minutes
Sémola and green vegetable soup	1.5 hours
Quinua soup with egg	1 hour
Broad-bean flour soup	1 hour
Noodles (tallarines)	20 minutes
Rice	45 minutes
Sweet potato (boiled)	35 minutes
Cau-cau	2 hours
Purée of squash (zapallo)	40 minutes

Source: Cabieses, C. (22).

FOOD ASSISTANCE PROGRAMS

Diverse private and public institutions have organized distribution systems for donated foods in Peru. These organizations place great emphasis on the *pueblos jóvenes.* The population that receives donated foods often participates in food programs to receive oil and animal protein foods. Some other foods in the donated packages are said not to be to their liking. From this it might be inferred that the "poor" will not accept any food (especially those labelled "for the poor") and that foods being promoted among low-income people should be attractive in color, taste, smell and culturally acceptable in terms of preparation and presentation.

1. *Food for Work*

This program requires participation of recipients in community works, such as construction of local buildings, roads, street cleaning, road levelling and caring of parks. They require that recipients work at least 10 days a month to receive 24 kg of food (26). The workers should be family heads of either sex who do not have regular employment. The maximum permitted work time is 25 days, for which they receive 48 kg of food. The program allows up to five rations per family. The participants receive six products: wheat, maize flour, wheat flour, rice, oats and vegetable oil.

2. *Program for Mother-Infant Food Support*

This program distributes packages (powdered milk and corn-soy-milk mix or CSM) to pregnant or nursing mothers. Evidence shows, however, that the ration is consumed by all family members.

3. Popular Kitchens

Another mechanism through which donating agencies operate is that known as *comedor popular* (popular kitchen) which is an important form of women's organization in the *pueblos jóvenes.* Through this organization, women use a common fund to buy the food and jointly prepare the meals, taking turns in the different tasks involved in the process. This type of organization was started in 1979, and has quickly extended in recent years due to the population's urgent foods needs. At present, around 200 popular kitchens are found in different *pueblos jóvenes.*

4. The Glass of Milk Program

In recent years, and taking advantage of the existence of women's organizations in the *pueblos jóvenes,* the *Glass of Milk Program (Programa del Vaso de Leche)* was implemented. This program, which receives donated milk for distribution among children, is supported by 7,000 organized committees in different *pueblos jóvenes.*

PREVIOUS EXPERIENCES WITH PROCESSED FOOD ORIENTED TOWARD LOW-INCOME GROUPS

The experience of promoting formulated processed foods for low-income groups is not new in Peru. The most notable cases occurred in the 1960's when two products were developed and introduced to the market: 1) concentrated fish protein, and 2) cotton-seed flour.

1. The Concentrated Fish Protein Case[6]

This project received wide newspaper coverage and was strongly supported by the political sector and international organizations. In the early 1960s Peru was the world's top supplier of fish flour. Given the alarming rate of malnutrition and infant mortality in the country, it was believed that fish flour for human consuption could be an effective way to fight these problems. As shown in Table 8, at that time the cost of fish protein was six times less than milk protein, prices reflected in soles, then the currency of Peru.

At the Nutritional Investigation Institute located in Lima, nutritionists began tests on tolerance and nutritive value of fish flour in baby foods. Fish flour (produced by the company VIO-BIN in the USA) was mixed with bread and noodles to be consumed in soups and nursing bottles for children suffering from malnutrition. As a result of these studies, it was found that concentrated fish protein could, for example, fortify wheat flour to levels from 3 to 10%.

Five-year introduction trials were conducted in entire communities using noodles enriched with 10% fish flour. One acceptability test

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6 This section is based in part on the analysis given in the Junta del Acuerdo de Cartagena, n.d. (27,28).

TABLE 8

COMPARATIVE PRICES OF FISH FLOUR AND OTHER PRODUCTS

Product	Soles/kg
Fish (corvina)	35
Meat	25
Eggs	18
Evaporated milk	10
Fresh milk	4
Fish flour	3
Cotton-seed flour	1

Source: La prensa, Feb. 6, 1965.

was carried out for more than one year in Pucalá, a village of 4,000 near Chiclayo. For this specific purpose, the population was divided into three groups: 1) control group with regular diet; 2) a group that received a supplemented diet with fish flour in wheat mix in noodle form (0.5 kg weekly, *per capita*); 3) the group received a diet supplemented with a wheat and fish flour base (0.5 kg weekly *per capita*, of noodles, enriched with 10% concentrated fish protein). Results revealed a lowering of infant and preschool mortality in the two diet-supplemented groups, with a more marked effect among the preschool and the adolescent categories, respectively.

In 1964, after four years of research and publicity, fish protein concentrate was finally produced in Peru. To stimulate interest among private industry, in that same year the Government approved a Supreme Decree exonerating industries from paying import and other taxes for material, machinery, and parts required in the study. This also included investigation, production, utilization, and marketing of products that might have the quality of "compensatory nutritive supplements" for human consumption. Furthermore, industrial processors were not required to pay any taxes on profits.

The first concentrated fish-protein product, called CPP *(Concentrado de Proteína de Pescado Verrando)* was first introduced into a soup or *chupe* mix that could be utilized for making soups, or in less quantity, for the enrichment of noodles, bread and other foods. The product had less than 2% oil and grease, with very little fish odor. *CPP Verrando* (the developer of the product was named Verrando) was sold combined with vegetable protein and condiments, having between 72 and 75% pure protein, 98% digestible, and was sold in packages meant to serve six persons. The product received favorable backing from FAO and UNICEF.

A second project developed another type of fish-protein concentrate product with 0.02% of oil and grease, with no smell, capable of being included in all kinds of foods and which might be given different tastes: vanilla, chocolate, chicken, ham, or other ingredients. Selling fish-protein concentrate in pure form to be utilized for people in combination with their foods, including baby foods, was also considered.

To test acceptability of the product *Caritas of Peru* carried out a 6-month pilot program of food distribution for preschool children, especially during the weaning period, in various parishes of Lima. Twenty children from 6 to 30 months of age were selected in each parish and their regular diets were supplemented two times daily, with a soup prepared with noodles "*cabello de angel,*" a nursing baby bottle with a base of skim milk, and special crackers. The companies Arturo Field and Nicolini Brothers collaborated with *Caritas of Peru* in preparing the crackers and noodles for this program.

According to available information on these projects, the markets of fish protein concentrate products had access to were fundamentally institutional (Military Hospital and National Eating Halls). The demands with which CPP met made its production possible only 2-3 times per year. Promotional campaigns were not undertaken, nor a systematic distribution developed (27,28).

Despite the careful, exhaustive, and highly technical study on the nutrition and digestibility of the fish concentrate products, attempts to gain acceptability by the public failed. The technological development phase of the project was first-rate, the work almost exclusively of a dedicated Peruvian scientist who defined the technical processes necessary to obtain fish-protein concentrate, assigned his own team, and carried out an important investigation on marine species. Furthermore, the primary product was of extremely low cost and was widely available in the country. The project received support of private and government groups. Dislike of the fish taste and odor by consumers might have been one aspect in the rejection and limited diffusion of concentrated fish protein. Likewise, introduction of CPP for massive consumption was not accompanied by educational and promotional campaigns on a national level.

The Andean Pact, however, explains its failure, not in relation to taste or palatability problems alone, but in terms of socioeconomic problems which were never considered:

> "The major omissions were found in the pre-development stage of the product. There was no clear knowledge of the market, no knowledge of food habits in the consumption of foods with fish taste nor of preparation in the kitchen, nor of soups prepared from powder, and no understanding of the population segments in Peru nor of their food habits. It was not possible to identify adequate promotion. No studies of feasibility were conducted. The basic aspects of investment, costs, profitability were unknown. The operative phase involved a limited introduction of the product, the sole promotion of essentially its creator. There were no systematic studies of operation, supply, etc. Practical mechanism of evaluation and control were not implemented". (27,28). (The author's translation).

2. *Cotton-Seed Flour*

Another effort of the supplementary food projects was made by the UNA (Universidad Nacional Agraria) and IIN (Instituto de Investigación Nutricional) to produce a food based on cotton-seed flour. The UNA worked on the problem of preparing cotton-seed flour for human con-

sumption, while INN carried out studies in the field of nutrition and digestibility of cotton-seed flour as a principal source of proteins. The Nestle Company prepared two rice flour and cotton-seed meal mixes. They also experimented with a mix based on cotton-seed flour, *quinua*, and beans. The purpose was to define the method of incorporating these flours into prepared products for human consumption. This project received the support of the Ministry of Health, which requested bids from private enterprises for the production of a new commercial product.

Perulac, a subsidiary of Nestlé, won the bid and in 1966 initiated the production of a cotton-seed product called "PeruVita." After a campaign of support and promotion, "PeruVita" appeared on the market in two forms: sweet and salty. Easy to rehydrate, it was characterized by fine creamy-brown color powder. Its basic components were cotton-seed flour, quinua flour, calcium carbonate, and vitamins B_1, B_2, and A_2. The salty version also contained sodium glutanate, onion powder, and dehydrated *orégano*. The sweet version contained: vanilla extract, powdered cinnamon, and finely ground nuts. Ten months after introducing PeruVita, however, Perulac withdrew the product from the market. A total of 197 metric tons had been sold during this period. Seventy-three per cent of the purchases came from the Government for institutional programs. The main reasons given for stopping this project were the bitter taste of PeruVita and the palatability of the product (Junta del Acuerdo de Cartagena, n.d., p. 196).

NEW APPROACH TO BLENDED FOODS: A CASE STUDY

Although we have discussed the best known cases in Peru over the past 25 years, other numerous less known attempts have been made to develop supplementary foods for low-income groups. Government organizations and private and international companies have been involved. There has been limited success due not only to taste and palatability problems but also because of educational, promotional, socioeconomic and marketing problems. These cases and similar ones around the world should be carefully considered to avoid repeating history (1).

In 1983, the International Potato Center (CIP) embarked on a food processing project using potato as a base for a mix, aimed at low-income groups in Lima. In Peru, the homeland of the potato, the tuber is highly valued and a much-sought-after item by urban migrants. In an effort to avoid past mistakes, an investigation, in which the authors participated, was undertaken to understand how the urban poor would evaluate a potato-based mix. The first step was to go to the clients of the proposed project and obtain their input early in product development stage. The philosophy applied was similar to the "Farmer-back-to-Farmer" approach of CIP which posits that successful adaptive research must *begin* and *end* with the presumed beneficiaries of the project (29). It was felt that a strong diagnostic stage –prior to committing resources to the mix development– would assist in preventing failure or at least in re-orienting the project design.

Initial questions the research team anwered were:

- What processed products were presently consumed in *pueblos jóvenes*?
- How might a potato-based mix fit into the local diet and was there interest?

– What might the cost of an acceptable mix be for the low-income groups?

1. Processed Products Consumed in Pueblos Jóvenes

A survey of the markets revealed the following processed products were presently in use:

a) Flavor - adding items, e.g., Sibarita and Maggi cubes (brand names).
b) *Sémola*, a wheat-based product used in soups and different types of noodles for soups.
c) Broad-beans, peas, wheat and maize flours are used primarily by people from the highlands for the preparation of soups.
d) Papa seca and chuño. *Papa seca*, a dried potato product made in the highlands, is consumed on a limited scale in a festive dish called *carapulcra. Chuño*, the Andean freeze-dried potato, is rarely consumed on the coast due to its cost.
e) Products for children. *Maicena* (maize starch), sémola, and oats are used in puddings. Oats are used for breakfast and evening meals.

2. Feasibility of a Mix Acceptance

A "ready mix" mentality or need for the *pueblos jóvenes* of Lima was not identified in the survey, especially if a mix had to be cooked for some time. Adding a formulated processed product to their diet might shorten the amount of time it takes a mother to mix the processed ingredients into a soup or a pudding. The overall preparation time remains roughly the same, unless a potato-based product is meant to replace fresh potatoes which need peeling. Considering the high culinary standing fresh potatoes hold, this proved to be difficult.

A formulated mix which still requires home cooking (as opposed to a complete ready-mix) and is aimed at children above six months of age, should be adapted to the same forms of preparation of foods now consumed by adults. Children are incorporated into the general family diets as rapidly as possible, although mothers may especially mash or prepare some foods for babies.

An acceptable mix would probably be similar to *sémola* which is presently used in soups and puddings *(mazamorras).* Mothers would most likely try to utilize a creal-based mix in the preparation of stews, purées, and other typical preparations. For children, it might be possible to prepare the mix in the form of *mazamorra*, with sugar or other ingredients. Based on experiences with mixes in other countries, mothers would have to be taught forms of preparing the mix, by supplying recipes that take into consideration seasonal fluctuations in prices and supply.

3. Possible Expenditures for the Potato-Cereal Legume-Based Formulated Mix for Low-Income Groups

The diets of people in the *pueblos jóvenes* are constrained by their limited disposable incomes. They attempt to stretch their budgets as carefully as possible, often through purchasing relatively low-cost foods which are "filling" (noodles, rice, bread, beans). Mothers frequently

express that their diets lack the more expensive, non-bulky, highly nutritive foods: e.g., eggs, milk, fish and meat. It is therefore important –early in the development of a mix– to make sure cost is acceptable to project clients.

Analysis of household budgets can be a helpful exercise for programs aimed toward improving the nutritional status of low-income groups. The following calculations illustrate how the CIP team estimated how much a family might afford for a formulated mix replacing other foods. The following two calculations illustrate an economically attractive cost level to which a potato-based mix must be brought for low-income groups in Lima.[7]

Calculation 1: Estimation of possible expenditures for the mix, based on family expenses for its components in the proportions presently consumed, using as a base the average income of *pueblos jóvenes.*

According to data on food consumption among lower income groups of Metropolitan Lima in the National Survey of Individual Households (24), consumption of potato, rice, beans, broad-beans, maize and oats (Quaker) represent 25.17% of the food family expenditures per day (Table 9).

According to data on family income previously presented, the average family monthly income for *pueblos jóvenes* was US$118.00. The percentage for food was 60% or US$71.00, of which 25.17% went for the components of the prototype mix or US$18.00 per month, per family. In daily terms, this amounted to US$0.59.

The daily family consumption of the mix components was equivalent to 1.822 kg (see Table 9); thus, the expenditures per kg consumed were US$0.32.

Calculation 2: Estimation of possible expenditures for the mix, using the prices of April 1983 of the products assumed to be in it, in the proportions presently consumed.

Through this calculation we see that expenditures per kg of the mix components in the proportions regularly consumed, amount to US$0.45.

These calculations show that in 1983, the cost per kg should not have risen above US$0.50 per kilo, the approximate cost of *sémola* at that time. Unfortunately, given the high cost of dehydrated potatoes, it was difficult to keep cost of the mix within this range.

Given the high consumption of fresh potatoes by the Lima population (0.899 kg daily, per family, an amount which obviously varies according to the price of potatoes) and given fluctuations in prices for fresh potatoes, a potato-based mix might serve as an interesting alternative when the potato is out of the economic reach of the low-income groups. When the price of potato rises beyond their ability, we know that this group substitutes potatoes with other foods such as sweet potato, cassava, and rice. A potato-based product within an affordable price range and with an agreeable flavor might be acceptable. Nevertheless, this implies that the mix processors should buy potatoes cheaply, process, and store them.

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7 The prototype mix would involve potato, broad-beans, rice, oats, maize and barley.

TABLE 9

PERCENTAGE OF FAMILY EXPENDITURES IN FOODS POSSIBLY INCLUDED IN A FORMULATED MIX

Products	Family's daily consumption (kg)	°/o of family expense per day
Rice	738	9.25
Potato	899	10.49
Beans	139	4.25
Broad-beans (habas)	019	0.32
Maize	005	0.10
Oats (Quaker)	022	0.76
	1.822	25.17°/o

Source: ENHI, 1980. (24).

TABLE 10

PRICE OF PROTOTYPE MIX AND DAILY FAMILY CONSUMPTION OF INGREDIENTS

Food	Price/kg 4/83 "Minorista" Market of Jesús María US$	Family daily consumption (kg)	Cost of the amount consumed/day US$
Rice	0.38	0.738	0.28
Potato	0.46	0.899	0.41
Beans	0.61	0.139	0.08
Broad-beans	0.65	0.019	
Maize	0.46	0.005	0.03
Oats (Quaker)	0.92	0.022	
		1.822	0.80

Source: Authors' survey and ENHI 1980. (24).

As a result of these types of early diagnostic exercises, the idea of a potato-based mix to be developed within, and for the *pueblos jóvenes* of Lima, was dropped. Research shifted to highland communities and government institutions where, in terms of cost and preparation, the processed product could have a better chance of success. Research continues, but bearing in mind the cost and acceptability factors. Our position is that if more pre-diagnostic exercises like the ones we have presented are executed, fewer failures in formulated food projects would take place.

CONCLUSION

Many of the attempts to develop supplemental and formulated foods have encountered acceptability as the principal problem to address. After reviewal of the literature on formulated foods and our study of socioeconomic characteristics and food habits in the *pueblos jóvenes* of Lima, it becomes clear that the technology development stage cannot be considered as a process isolated from the socioeconomic context. The characteristics of these products should be designed from the viewpoint of nutritional needs of consumers, taking into account their preferences and habits, their economic possibilities, and alternatives. It is crucial that formulated food projects begin and end with their ultimate clients: the consumers who are to benefit from their efforts.

RESUMEN

CONDICIONES SOCIOECONOMICAS, HABITOS ALIMENTARIOS Y PROGRAMAS DE ALIMENTOS FORMULADOS EN LOS PUEBLOS JOVENES DE LIMA, PERU

Este artículo examina algunos intentos por desarrollar e introducir alimentos formulados, o mezclas de éstos, a las poblaciones de bajos ingresos de los *Pueblos Jóvenes* de Lima, Perú.

Se pone en evidencia el hecho de que las condiciones socioeconómicas, los hábitos alimentarios y las presiones económicas actúan muchas veces en perjuicio de su consumo. Se sugiere, en consecuencia, un enfoque alternativo que haga énfasis en un estudio previo de diagnóstico de las necesidades de los consumidores, y un cuidadoso seguimiento en el desarrollo del producto, con participación de los consumidores.

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