NEAR EAST PRIVATE SECTOR REGIONAL NUTRITION PROJECT

Yemen Arab Republic

Contract # PDC-1406-I-13-4095-00

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Submitted to:
U.S. Agency for International Development

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EXECUTIVE SUMMARY

The purpose of this study is twofold: first to assess the nutritional situation in the Yemen Arab Republic and second, to identify food processing opp ortunities in the private sector that would positively impact on the nutritional status of the target population of women, infants, and children.

Information for the preparation of this report was obtained from a variety of sources, including the following: Reports, books, articles, and various government and United Nations publications (see Bibliography). The data on agricultural production, food consumption, and so forth, were used for illustrative purposes only as their validity is questionable. A qualitative study of food consumption patterns and of the market was conducted in October-November 1986 along with a survey of food processing companies, including visits to factories and flour mills, and interviews with members of the Yemeni private sector and government officials.

An analysis of the nutritional situation reveals a prevalence of stunting early in life and wasting during the weaning period. This may be due to inadequate duration and extent of breastfeeding, frequent incidence of diarrhea with resultant malabsorption and infectious disease due to improper sanitation, child neglect, and traditional food-related and other practices that put children at a nutritional disadvantage.

The per capita energy consumption has increased over the years as more food is available. Total cereal intake has decreased, while the consumption of vegetables, fruits, pulses, meats, dairy products, fish, oils, eggs, and sugar has increased and is expected to increase further (see Annex A for a description of Yemeni foods). Some new foods have been added to the diet, such as breakfast cereals. The private sector is largely responsible for this abundance as there are no government agricultural price supports or food subsidies to consumers. There have been large increases in the industrial output of many foods, such as dairy and wheat products.

A casual survey of markets indicates that the demand for food exceeds local production; the difference is met by imports.

Demand for a variety of food is also greater than available supply and this is presently not being fully met by imports.

Weaning foods and dairy products were not considered viable areas for US food processing industry involvement as there is already a surfeit of brands of these on the market. Education in the proper use of these foods appropriate to an illiterate population is needed if these foods are to enhance rather than to interfere with the growth and development of children.

On the basis of assessment of the overall nutritional situation it is concluded that such symptoms as diarrhea, dehydration, and failure to thrive reflect general cultural behavior and unsanitary food and water supplies rather than lack of specific nutrients. These are best addressed by a massive education program.

Promoting nutritional information and education programs and the establishment of certain industrial sanitary practices will improve the nutritional status and thus general health of the target population. The food processing industry has the financial resources to operate state-of-the-art plants. The main shortage is in technical and managerial expertise, which could be improved through collaboration with US firms. Presently there are no in-country opportunities for training and education of factory managers and workers. The private sector in Yemen has demonstrated its openness to modern food processing technology and its willingness to work with foreign firms. In view of the situation the following recommendations are offered:

(1) A nutrition education program be established aimed at health professionals, retailers, and consumer. Health professionals need to provide appropriate information and improve their communication skills with patients. As retailers control much of what is purchased by consumers, the positive benefits of products should be promoted to them. Some of the nutrition problems, such as vitamin D deficiency, infections due to hygienic practices, and improper formula dilution could be addressed with education aimed at consumers (males as well as females).

(2) A plant sanitation information and education program be established for manufacturers. Workshops for food processors on plant and worker sanitation and on potential nutrient gains and losses during processing need to be established.

(3) Consideration be given to the implementation of one or more of the following projects: Iron-fortification of wheat flour, vegetable and fruit drying, establishment of an oil-seed crushing plant, and production of industrial cleaning chemicals (see Annex B for an explanation of these potential collaborative projects).

INTRODUCTION

The Yemen Arab Republic is located in the southwestern part of the Arabian Peninsula between 13 and 17 degrees latitude and 43 and 46 degrees longitude. The total land area is estimated to be around 200,000 square kilometers. The country is bordered by the Kingdom of Saudi Arabia to the north and northeast; by the People's Democratic Republic of Yemen to the south and southeast; and by the Red Sea along its western border. The physical features of the country are characterized by a stretch of semi-arid and desert lowlands along the coastal region. The central part is covered by mountain chains from south to north with pleteaus interspersed at various altitudes, such as those in the Dhamar-Yarim area and Sana'a-Amran area. On the eastern edge, the mountains slope into a semi-arid region which extends into the desert area of the Rub El Khaly (The Empty Quarter).

Its extremely rugged topography has resulted in a scattered population distribution. This means that the best use of scarce land is terraced cultivation and of scarce water, irrigation. Two seasonal rainfalls in spring and in mid to late summer provide the main source of water for irrigation.

Table I depicts demographic data based on the 1975 and the 1986 censuses. In accordance with the 1986 census, the country's total population is 9,274,173, including migrants of around 1,168,199 working outside Yemen. The annual population growth rate is estimated to be 3.29 percent. From 1975 to 1986 the urban population grew from 345,379 to 905,688--almost a three-fold increase. The population distribution between the urban and rural regions is estimated at 14 percent urban and 86 percent rural residents by 1986. During the same period the number of households in the rural areas increased from 906,185 to 1,366,460. The average number of persons per household increased from 5.1 in 1975 to 5.7 in 1986 and as of 1986, the male to female sex ratio is 100:97.

Yemen has a tradition of migration as a result of the country's economic stagnation. This process continued in the 1970's, mainly to the neighboring oil exporting countries, as a result of the 1970's oil boom. About 70 percent of the labor force work in the agricultural sector. The national illiteracy rate is estimated at about 74.9 percent--for males at 57.9 percent and for the females at 92.5 percent. The crude birth rate, according to a pilot demographic survey done in 1981 is 51.9 per thousand while the crude death rate is 26.4 per thousand. There is a high fertility rate of 6.85, and a high infant mortality rate of173.5.

Over the last decade, the Yemen Arab Republic has experienced far-reaching changes in its socio-economic structure as well as in the material welfare of its citizens. At its inception as a Republic through the revolution of September 26, 1962, the feudal rule of the Imam ended. After a protracted

civil war that ensued from the revolution, the new Republican regime succeeded in establishing, within a relatively short period of time, several foundations of a modern state. This can be seen, for instance, in the relatively large network of roads and electricity, which constitute some of the foundations for economic development.

From a closed and isolated nation prior to 1962, Yemen was suddenly opened to the world to face all aspects of the international economic scenarios, including the introduction of modern consumer goods and services. In spite of global economic changes, such as the world-wide recession of the 197Ø's which was compounded by the rampant inflation internationally, Yemen managed under a free economic system to achieve economic growth and affluence, especially in comparison with other nations within the same level of gross domestic product. Consequently, it has managed to attain substantial progress in the development of various sectors of its economy.

For the first time in its history, the Yemen Arab Republic instituted programmed national economic plans starting in 1973 for the purpose of identifying its constraints, and, accordingly, planning the best possible approach to mobilize its resources through the choice and coordination of investment projects that would lead to economic growth. With this aim, the Three-Year Development Plan' of 1973/74 - 1975/76, followed by the First Five-Year Plan of 1975/76 - 198Ø/81 and the Second Five-Year Plan of 1981 to 1986, were undertaken. Through these plans, Yemen has achieved a remarkable economic base of physical and social infrastructures, which had been undertaken to be the founding steps towards the development of the various structural sectors of its economy. It is commendable that these development plans were achieved by the combined efforts and capital investments from both the private and the public sectors of the country.

Of all the Yemeni economic sectoral structures, the agricultural sector is the single most important as it has the best potential. The agricultural sector's share of the Gross Domestic Product has declined to 23 percent from around 45 percent at the beginning of the 197Ø's. The agricultural sector employs approximately 7Ø percent of the resident active labor force. In comparison to other nations within the Arabian Peninsula, Yemen has been fairly well endowed with approximately 3.5 million hectares of cultivable land under a suitable climate.

Besides agriculture, the country has been active in investigating the potential of any existing natural resources. These efforts have led to the recent discovery of oil in commercial quantities. Further explorations for oil and other natural resources are continuing throughout most of the country. The industrial sector hardly existed in the country in the true economic sense prior to the 197Ø's. What prevailed then were some traditional local production and artisan works supplying the basic needs of the communities.

Overall, the Yemen Arab Republic may be considered a fairly late starter in economic development. Thus, within the international economic arena, it had no real goods and services to offer upon which it could achieve continuous growth from wealth arising within the nation. It depended very much on external sources of income to finance its economic development and in turn the economic growth. These exogenous factors included basically the following:

- As a result of the large increase in demand for labor in the neighboring oil-exporting countries in the 1970's, migration of labor from Yemen to these countries accelerated. Workers' remittances increased income which accounted for around a half of the Gross Domestic Product over the period 1975 to 1981.

- Yemen, categorized as one of the least developed nations of the world, benefitted from substantial aid from various donor nations and international development institutions.

The economic development plans combined with the favorable exogenous factors of income, enabled the Yemeni economy to realize economic growth averaging 8.1 percent between 1975/76 and 1980/81. Gross Domestic Product increased from YR 9,123 million in 1975/76 to YR 15,387 million in 1985, achieving an average annual growth of over five percent between 1975/76 and 1985. The growth in GDP substantially declined in 1981 to just below one percent indicating a strain on the economy. Between 1981 and 1985 the GDP growth rate ranged between 0.9 percent and 4.2 percent except for 1982 when the GDP growth rate was 8.3 percent. This faster growth rate in 1982 resulted mainly from the increased government expenditure which created a deficit reaching almost one-third of the GDP.

While the agricultural sector has been the dominant sector of the economy, agriculture stagnated over the period, declining in its share of the GDP from 37.4 percent in 1975/76 to 23.1 percent in 1984, with slight improvement to 24.1 percent in 1985. This decline may be partially attributed to the fact that the economic development of the country induced growth in the other sectors of the economy. The real reason for the slowdown in agriculture, however, may be attributed to the increase in labor cost as a result of the following: (1) labor migration to the neighboring oil-exporting nations; and (2) the over-valuation of the Yemeni currency that considerably cheapened food imports. Hence, the overall high cost of agricultural production attracted minimal capital investments on the commercial level, especially by the private sector.

Most of the other sectors of the economy grew during this period except construction which peaked to YR 1,473 million in 1978/79 after which it continued to decline. In reference to other indicators of the economy, consumption by both the government and the private sector continued to grow. The gross fixed capital formation, directly related to investments, peaked

in 1980/81 but declined from 1981 to 1985. The income per capita at the 1981 constant price ranged from YR 1,721 in 1975/76 to YR 2,167 in 1985. Income per capita, however, averaged a growth rate of 2.4 percent against the average growth rate of the GDP of 5.4 percent over the same period between 1975/76 and 1985. This may be attributed to the high population growth rate--resulting in a distribution of per capita income among a larger population.

The distribution of the capital investment volume among the various economic sectors indicates a pattern of investment directed heavily towards construction and both physical and social infrastructures. The total public sector investments were mainly in the basic physical and social infrastructures, the benefits of which will only be realized over the long run. Although the private sector invested (annual average YR 2,000.2 million), a substantial volume of this investment went into real estate. This implies a lack of diversified investment opportunities as perceived by the private sector and high returns accruing from land speculation. Between 1975/76 and 1985, the private sector invested in real estate a cumulative total of YR 10,154 million, or 46.2 percent, compared to the total cumulative private sector investments over the same period at 1981 constant prices of YR 22,002 million. In contrast, the private sector's cumulative investments between 1975/76 and 1985 in the productive sectors of the economy fared as follows (at 1981 constant prices): Agriculture - YR 1,792 million and Manufacturing - YR 2,745 million.

By 1983 the Yemeni economy slowed down considerably as a result of government actions to reduce the budget deficit on the one hand and the adverse development in the exogenous factors of income on the other hand, which, until now, had been the key factor encouraging economic development. The workers' remittances leveled off and even showed signs of decline by 1980/81. Also, by 1983, foreign grants declined substantially, in particular from the neighbouring oil-exporting nations who had been experiencing a slowdown in their economies, partly from the declining oil prices and partly from the Gulf War between Iran and Iraq. In 1983 and 1984 drought conditions throughout the country worsened the situation further with a decline in the total output in the agricultural sector.

Table II presents the overall Balance of Payment position for the period 1975/76 to 1985. Throughout this period Yemen has been experiencing continuous trade deficits which peaked to YR 8,764 million in 1982, resulting from the fast growth in imports relative to negligible exports. At the current account level the balance of payments enjoyed a surplus until 1978/79 when a deficit of YR 621.3 million was experienced, and this deficit continues to date as a result of deterioration in the exogenous factors of income. Since 1979/80 the country has been experiencing a deficit in its overall balance which instigated the decline in the country's net foreign reserves from a peak of YR 6,890.1 million in 1979/80 to a meager YR 587.6 million by 1985.

The deterioration in the Balance of Payments position reflects several economic factors which have contributed to the adverse developments in the economy, and these include the following:

The Exogenous Factors of Income

The country had embarked on economic development under a free and liberal import policy with total dependence on exogenous factors of income to finance its economic growth--these being mainly workers' remittances and foreign grants and concessional loans, which cannot be depended upon over the long run.

Workers' Remittances. These started to level off by 1978 while imports continued to grow at a high rate due to increased demand for imported goods. The economic slowdown in the neighbouring oil-exporting countries, where most of the workers earned their livelihood, stagnated worker's remittances as a result of salary and wage reduction and layoff of several thousand of the Yemeni workers who were replaced by cheaper labor from Asia.

Foreign Aid. Yemen enjoyed substantial aid through direct grants and concessional loans which peaked to YR 2,109 million by 1982. The volume of such aid and concessional loans dropped by nearly 60 percent in 1983 from the record high of 1982. This drop resulted largely from the slowdown in the economies of the neighbouring oil-exporting nations whose share in the grants to Yemen were substantial. In the foreseeable future, especially with the newly discovered oil in commercial quantities in Yemen, it is doubtful that foreign aid to Yemen will grow significantly.

Liberal Import Policy and Local Currency Value

Throughout the years, Yemen has entertained liberal import policies which instigated a surge in imports that peaked to YR 8,785.7 million in 1982. This, combined with the overvalued Yemeni Rial which was pegged to the U.S. Dollar and maintained at a stable rate from 1973 until well into the last quarter of 1983, induced a large increase of imported goods which became cheaper than the local products, especially agriculture products. The failure to perceive the deterioration in the nation's external position at the early stage by the later part of the 1970's has now further complicated the foreign exchange position of the country due to the decline of external reserves to a critical level, amounting to just around one month of imports by the end of 1985.

As a consequence of these economic developments, and in particular the Balance of Payment deterioration coupled with the increasing scarcity of foreign exchange, the local currency, under market pressures, was forced to devalue by the last quarter of 1983. Since then, the Yemeni currency has been continuously undergoing devaluation from the stable rate of YR 4.56 prior in the last quarter of 1983 to around YR 14 to the U.S. Dollar at the prevailing market rate.

Overall, recent adverse economic developments have led the Government to institute several economic corrective measures.

Restrictions on Imports. There are restrictions on imports, requiring import licenses mainly for priority goods covering:

- Basic food commodities;
- Pharmaceutical and medical supplies:
- Raw materials for local industries;
- Essential spare parts;
- Fuel and oil development requirements;
- Goods for approved manufacturing and agricultural projects.

Restrictions on Foreign Exchange. Restrictions have been placed on foreign exchange transactions placing full control in the hands of the Central Bank of Yemen which has undertaken, on several occasions, the adjustment of the exchange rate. Further actions by the Central Bank include the attempt to reduce the growth of the money supply.

Import Bans. The government instituted import bans on most consumer goods and durables as well as fruits and vegetables.

Reductions in Government Budget. There are massive reductions in the government budget with concurrent attempts to improve government revenues through more efficient tax collections.

Priority to Agriculture. Priority has been given to investments which will develop and improve agriculture projects.

Oil. Over the long run, it is anticipated that the recent discovery of oil in commercial quantities will partially alleviate the prevailing economic strains, particularly in the foreign exchange arena. An oil refinery has been in operation since April 1986 with a production capacity of 10,000 barrels a day. This refinery currently supplies around one quarter of the demand, hence, saving foreign exchange now required for import of fuel. The construction of a pipeline to the seaport of Salif was started in the last quarter of 1986 to be completed by November 1987. Accordingly, it is anticipated that export of oil will commence early in 1988. The forecasted exportable crude oil is in the range of 150,000 to 400,000 barrels per day, depending on the size of the exploitable reserves.

The current economic conditions have resulted in a sluggish economy with no immediate signs for quick recovery accompanied by escalating prices, high dependency on imports with scarcity of foreign exchange, and declining purchasing power.

NUTRITION AND CONSUMPTION

Nutritional Situation

There is little data available on nutritional status in Yemen; outside of the 1979 Nutrition Survey (see Bibliography), no country-wide assessment of any kind relating to nutrition has taken place. No data exist on how growth may have improved as food became more plentiful, on the prevalence of disease, maternal health, or birthweight.

General. The 1979 Nutrition Survey found a high prevalence of stunting (low height or weight for age) for children under two years of age. The prevalence of wasting (low weight for height) and stunting which is an acute problem, was high during the weaning period (second year of life) but dropped to five percent after age two. High infant and child mortality for under two year olds and catch-up growth are possible reasons for the decrease.

Many Yemenis may appear short and slight of build, however, upper-income Yemenis in Sana'a are of similar size to upper-income Western populations. While Yemenis may be a mixture of a number of genetic groups, it is unlikely that they are genetically of small stature.

The high prevalence of stunting early in life maybe due to a variety of factors, such as: inadequate duration and extent of breastfeeding; large numbers of pregnancies and poor maternal health; improper weaning practices; frequency of diarrheal disease incidence and malabsorption due to improper sanitation; frequency of infectious diseases such as measles, polio, dermatitis (e.g. infantile eczema, scabies, impetigo, and others); neglect; economics; statistical artifact; and traditional food and other practices that may put small children at a nutritional disadvantage. This last factor will be elaborated below.

Women complain that they do not produce a sufficient quantity of breast milk and use powdered infant formula of which many different brands are available. It has been found that in addition to the question of potability of water for preparing the formula, women both over and underdilute it, depending on the size of the scoop provided with the powder.

One major problem is the infrequent feeding of infants and young children. Supplemental foods are often intitiated by one month of age since breast feeding is often not done for long periods. For example, in 1979 in Rada' 30 percent of the children under one month of age were not breastfed, and 44 percent started weaning on cereal and biscuits* between three and six months of age. Young children may receive food three times a

* Biscuits are mainly cookies.

day only. Some of the older children in low-income households may get morning and afternoon meals, but not an evening meal. Cultural beliefs prevent feeding certain foods to children; foods believed to have a cooling effect such as fruits and fruit juices for example, are considered inappropriate in cold weather.

While no special foods are prepared for children, there is a belief that children should consume easily-digestible, light, bland, soft foods. This eliminates many potential foods from the diet; fruits, vegetables, legumes, fish, and meat, for example, are rarely fed to young children. Traditional weaning foods included asid, madid, harish, malalabia, and shabisa (see Annex A). Today biscuits (over sixty varieties are available) and imported processed baby foods are used by most. Some of the infant cereals are diluted, according to directions on the container, to be fed through a nipple from a bottle.

Another factor that affects children who are old enough to eat by themselves is that Yemeni meals are quickly consumed from a common pot by all. Speed and palm-size are thus important determinants of quantity of food obtained. The very young whose caretakers claim that they consume table foods are given little bits of mainly liquid-type foods between the adults' bites as opposed to solid foods.

Diarrhea and Dehydration. Diarrhea is rampant among children leading to malabsorption and nutrient wastage. UNICEF's estimate is that 50 percent of the deaths are caused by it. The causes of diarrhea are mainly hygienic circumstances in the home environment, lack of sanitation in food manufacturing, and improperly-used breast milk substitutes. Unless diarrhea is controlled, it is not possible to provide proper nutrition for infants and children because both energy and nutrients will be lost through malabsorption.

The lack of potable water plays an important role in diarrhea incidence. A World Bank report states that in 1980 only 27 percent of the population had access to safe water, and according to the National Health Laboratory in Sana'a, 80 percent of the population uses contaminated surface water today. The prevalence of infection by parasites such as bilharzia is as high as 90 percent in some areas. Other frequent water-transmitted parasites are giardia, schistosomiasis, trichuris, and ascaris.

Another salient factor in the cause of diarrhea is the use of improper weaning foods, e.g. underdiluted formula or formula prepared with water that is still contaminated with hepatitis virus even after boiling (there were 40,000 cases of hepatitis in 1985). It may also result from the consumption of microbiologically-tainted imported foods that are stored at the port for as long as six months, or from locally-processed foods; some of the biscuit and confectionary manufacturing is highly labor intensive with several persons' hands touching the finished product prior to packing. Equipment for processing such products is not always properly cleaned. More on this below.

Inadequate water intake is also a nutritional problem in Yemen. Water is traditionally withheld from a lactating mother because it is believed to change the taste of the milk; she is allowed, however, to drink coffee, qishr, tea, milk, and soup. In low-income households, water may be the major source of fluid and when withheld breast-milk supply may diminish. Chewing qat* makes women thirsty (it may be a diuretic) and this practice is not discouraged during the lactation period.

Much of the climate in Yemen is dry, a contributing factor to dehydration. Young children's water intake may also be restricted due to the belief that too much water may cause their stomach to burst. Dehydration is a serious problem; presently only about 15 percent of the children are immunized, thus diarrhea, fevers, and infections are frequent occurrences among them. Oral rehydration salts are planned to be sold in packets to be mixed with 1000 milliliter water. Unfortunately, potable water in Yemen is sold in 750 and 1500 ml bottles only. There is danger, therefore, of the oral rehydration salts being over or underdiluted, just as infant formula is.

Iron. Iron-deficiency anemia may be a serious problem. This is at least partially the result of multiple pregnancies. A woman is born with inadequate iron stores due to her mother's lack of them. Then, with each pregnancy she depletes her stores even further. Birth control and child spacing leading to fewer pregnancies farther apart would remedy this situation. The number of pregnancies is quite high because infant mortality and pregnancy wastage are high; approximately 150 per 1000 live birth and 35 percent, respectively. To put it into perspective, a "Save the Children" survey in six villages documented a ratio of live children under 12 years of age to those stillborn, miscarried, or dead to be 2:1. In 1983 in the town of Abs between 28 and 40 percent of the children died by the age of two.

Iron stores are also depleted by malaria, thalassemia, sickle cell disease, and the preponderance of intestinal parasites spread by contaminated water. Geophagy, practiced by women, and residence at high-altitude may also contribute to iron-depletion.

Iron needs during pregnancy cannot be met by normal food intake. It has to be supplemented by pharmaceutical means. As the use of wheat flour is increasing and since most of the cereal or flour is imported (80-90 percent), it may be possible to remedy some of the iron-deficiency anemia by requiring iron-fortification of all wheat flours (see Annex B for elaboration). This will obviously have a geater impact in the urban than in rural areas where more of the traditional grains (sorghum, barley, millet, and corn) are available through subsistence production.

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* qat is non-narcotic stimulant chewed regularly by persons of both sexes.

Neglect. General neglect of children is not uncommon. Many of the mothers are in their mid-teens and they lock their children in their residence without food or water while they socialize. Propping of feeding bottles is quite common. Mothers may add butter to the baby's milk to satiate it so that it will sleep for long periods while they are busy. The differential rates for malnutrition and mortality at certain ages between male and female infants also points to neglect which leads to failure to thrive or general undernutrition.

No food is provided by the school for children. They either carry food from home or purchase it from small shops around the school. Most of the foods available in such shops are sweets, sweetened drinks, fried snack foods, and unhygienically-kept cooked food (see list in Annex A).

Vitamin D. Rickets due to vitamin D deficiency has been documented. This most likely results from the fact that young children's bodies are covered from head (with a hat) to toe in and out of the house due to the belief that they may catch a cold if not dressed warmly enough. Women are frequently covered and veiled when outside of the house, especially in urban areas. Physicians report difficulties during deliveries due to improper pelvic bone formation.

Consumption Patterns

Yemeni food habits have been influenced by other cultures, especially by those of Ethiopia, India, and more recently by the Western world. Bread, in a variety of forms (see Annex A), is the staple of the Yemeni dietary; it is consumed at all meals. A number of ways exist for using up leftover or dry bread, such as soaking it in soured milk or soup.

There are two major meals per day in Yemen: a morning and a midday one. The main meal is the midday one which may consist of bread, porridge, soup, stew(s), condiments, and maybe fruit. The morning meal consists of bread, beans, dairy products, gruel, sometimes egg, or liver or fish in the south. An additional meal in the evening may or may not be served; when it is it contains bread, leftovers from midday, or beans, or dairy products. Qat chewing, a practice indulged in during the afternoon, causes anorexia, thus many do not feel the need for an evening meal.

Yemenis eat their food from common containers rather than receiving individually-served portions. This is not necessarily hygienically advantageous to young children who thus get exposed to organisms carried by everyone. Containers are only rinsed with water between meals remaining good media for bacteria and virus.

Due to the sharing of food by all from the same containers, people tend to eat fast. Within a family, especially a nuclear one, males and females usually eat together. In larger

households or when guests are present, males are served separately from women and children. High-status foods, such as meats, when in short supply are dispensed by the male head of household to others. Very large households within which each son may have his own quarters (couple of rooms) still share one common kitchen. Interestingly, kitchens in multi-story Yemeni houses are close to the top floor, or on a separate landing close to the top where there is light and ventilation. In one-story dwellings both the ventilation and the lighting is poor.

The major sources of protein are cereals and legumes. Animal foods include chicken, beef, mutton, lamb, fish, eggs, and dairy products. Many interviewees used the phrase "you have to have meat" at the midday meal. Meat is used for soup or stew or delicacies such as stuffed vegetables. While some form of meat or fish may be prepared daily, the quantity is often only adequate for flavoring. Meat is usually consumed on Fridays. Chicken has become popular because of its low price and many households prepare it almost on a daily basis. Fish is used in certain areas only; eggs appear to be well liked when they are available.

Dairy consumption is plentiful, as milk (mainly imported powdered whole milk), soured milk, and cheese are used as ingredients in numerous Yemeni dishes and milk in some form is used by almost all households. Imported milk products are abundant. A 1981 survey found 30 different brands of powdered whole milk, 10 of evaporated milk, and 20 brands of infant formula. Adults consume dairy products mainly as an ingredient in prepared dishes but children also drink milk either plain or with sugar added. More dairy products are consumed during Ramadan then at other times of the year.

Legumes, mainly beans, are consumed in the morning; they can be purchased dried, canned, or cooked (from little roadside shops). Sources of fats include the traditional clarified butter (rendered with millet, spices and flavorings), canned ghee (vegetable oil version of the clarified butter), vegetable oils, canned butter, margarine, and shortenings - all imported or processed from imported oils, mainly palm.

Fresh vegetables and fruits are seasonal; there is a ban on importing them. The most commonly used vegetables are tomato and onion as ingredients, and potato fried or in soups or stews. Okra, eggplant, carrot, chinese chives, radish and its green leaves, and squash are popular, while leeks, cabbage, cauliflower, bell peppers, green beans, leafy greens, and grape leaves are also available. One-third of vegetable consumption is potato, and another large portion is onion. Vegetables are often prepared with ground meat and spices.

Fresh fruit, except grapes in season, are not plentiful or of good quality. Other seasonally available fruits are watermelon, other melons, cantaloupe, quince, banana, orange, papaya, and mango. Consumption of vegetables and fruits is lower than in other Middle Eastern countries (Kuwait, Saudi Arabia, and

the United Arab Emirates have per capita consumption of fruit 1.8-2.5 and of vegetable 2.8-5.8 times as high as Yemen). Young children consume virtually no vegetables or fruits other than potatoes and bananas and what little may be present in fruit-flavored drinks.

Spices and herbs are liberally used, though the food does not necessarily appear very spicy. Commonly used ones are the following: black cumin seed, black pepper, cardamom, cinnamon, cloves, coriander leaves, garlic, ginger, ground cumin seed, mint, parsley, thyme, and vanilla.

Between meals children are given sweets, cookies, bread and cheese, sweetened drinks, or money to buy food from the little stalls seen everywhere. Certain foods such as dates, nuts, and raisins were mentioned as consumed only for special occasions such as in the diet of women during the first forty days after delivery.

While food preparation is the domain of women, food purchasing is done by males. Some women complained that their husbands did not have time to do the shopping adequately. Only a few women were seen at grocery stores and markets.

Many changes have taken place in the Yemeni diet in the last few years. The traditional grains are yielding to wheat, much of which is imported. Rice is gaining in popularity yet none of it is grown locally. Pasta is also popular and some of it is processed locally from imported flours. Snack foods are consumed in increasing quantities, most of them imported, but many locally produced from imported ingredients. Traditional preparations are giving way to commercial ones; the home-made porridges, for example, consumed at the midday meal are being replaced by wheat bread. Some of the changes are economic; the consumer price index indicates that meat, fish, eggs, and dairy products have not increased in price as much as cereals, legumes, and fruits.

The per capita energy consumption has increased over the years as more food is available. Total cereals have decreased, while the consumption of vegetables, fruits, pulses, meats, dairy products, fish, oils, eggs, and sugar increased and are expected to increase further. Some new foods are added to the diet, such as breakfast cereals (e.g. cornflakes and oats, the latter prepared as a soup with tomatoes, onions, and spices). In the poorer sections of Yemen, such as the Tihama, it is possible that energy needs are not being fully met. Agricultural labor is energy demanding, especially on women who carry water and fuel to the home as well as produce to market, possibly several miles up and down the mountainside. These women may not have adequate energy intakes during pregnancy. Rural Yemenis appear short, muscular, and thin.

The private sector is largely responsible for the abundance of the Yemeni diet. There are no government agricultural price supports or food subsidies to consumers. Import restrictions are

designed to promote local production which is taking place in vegetable and fruit production. There are large increases in the industrial output of many foods, for example, according to the Central Planning Organization, milk output increased from 4,562,000 to 27,138,000 liters between 1981 and 1983.

Will the change in diet lead to new nutritional problems ? Very likely. The increased consumption of sugar (all of it imported) and other sweet substances leads to dental caries. As qat contains ascorbic acid and is kept in the mouth for very long periods, it may weaken tooth enamel. Many already are sporting a number of gold teeth. Fat intake has already increased and is still increasing as much of the oil is of the highly-saturated palm variety the incidence of heart disease may increase. Most of the imported wheat or wheat flour is refined but unenriched, exacerbating iron-deficiency as well as the possibility of B vitamin deficiencies. The improvement in food availability results in earlier menarche (In 1979 in Rada' no one under 16 had a child, while today 14 and 15 year olds are having them) and possibly more pregnancies. With improved health care, more women may carry pregnancies to term, resulting in increased depletion of maternal nutrient stores.

Nutritional Fortification

Information on nutritional content, enrichment, fortification, and so forth is not available. Processed foods have such comments on their lables as "contains vitamins A and D" but without specifying quantities and it is not possible to discern whether the comment refers to what is in the food naturally, or to the fact that it may have been fortified. Even manufacturers are unable to provide information on nutrient content. When asked about fortification manufacturers will often state that the product is fortified, but are unable to provide specific information regarding types or quantities of nutrients added, or losses of nutrients resulting from processing (e.g. Vitamin A losses from palm oil). Thus, the nutrient content of processed food products is almost impossible to ascertain.

As the objective of this study is to improve the nutritional status of vulnerable groups, which implies certain expectations such as increased usage of weaning foods and dairy products, it is necessary to elaborate the reasons for omitting them from the recommendations. Weaning foods and dairy products are ubiquitous in Yemen and can be found all over the country including rural areas. There is virtually no local dairy industry and its development is not feasible, however, the number of different brands of dairy foods on the market, either imported or processed from imported whole milk, is large.. It would not be productive, therefore, to recommend an increase in milk imports.

Regarding infant formula, the problem is not its availability but its improper use. Presently there is no code for the marketing or promotion of breast milk substitutes. The

instructions on imported cans of infant formula are meaningless to an illiterate population and quantities such as 60 milliliters of water would stress the capabilities of even literate ones. Furthermore, there is no standardization of proportion of powdered formula to water.

For example, the following instructions are provided for the three leading brands of formulae: Guigoz 1 - 90 milliliter boiled water to 3 scoops formula, Isomil - 60 ml water to 1 scoop, Bebelac - 60 ml water to 2 scoops. As all formulae are imported their supply is not constant, thus it is not possible to purchase the same brand at all times. Improper dilution of formula has been documented to be related to scoop size.

There is a need for instructions to be standardized and to be country-specific. Powder to water ratio should be the same for all breast milk substitutes and be specific to the country; in the Yemeni context, water quantity should be related to commercial bottled water as this is the only standard volumetric measure that the total population has access to (i.e. one small water bottle = 750 ml, one large one 1,500 ml). Infant formula instructions call for boiled water which may not be adequate to destroy all potential organisms such as hepatitis virus. One of the factories in Hodeida (NaNa) is planning to market reconstituted liquid formula from powdered formula imported in bulk. This is likely to be too expensive for the average-income household.

Some of the imported weaning foods do not appear to conform to the spirit of the WHO code. Many products are aimed at one month old infants and are recommended to be fed through a nipple on a bottle. There are a sufficient number of products on the market already to discourage women from breastfeeding; it would be more productive to provide educational programs about them than to create new ones. It is not within the scope of work for this project to make recommendations regarding government policy on breast milk substitutes and weaning foods.

The only explicit nutrient deficiency identified is anemia. This is found in women in almost every country and could be addressed (although not completely alleviated) by iron fortification of processed flour. Commercially-prepared wheat products (bread, pasta, biscuits) are consumed by all but their consumption is higher in urban areas and among landless rural residents than among farmers. As the urban poor and rural landless are the most economically disadvantaged, they are likely to have higher rates of anemia than others. Fortification of wheat flour would have a greater impact on them than on subsistence farmers.

Bread is a main staple in the Yemeni diet, from the Ruti manufactured in the central bakeries to the traditional breads baked in the home. Consumption figures indicate that per capita consumption may be at least 50% greater than in the U.S. The flour used is purchased either from the Red Sea Flour Mills, as

white flour (72% extraction) or "integral flour" (94% extraction), or else as whole wheat flour from the YGGC plant in Sana'a. Rough estimates indicate that about one-third of the wheat imports reach consumers via this route. The rest of the wheat products are imported as flour and semolina from the EEC and the U.S. The Red Sea Flour Mills is planning to install additional equipment which will quadruple its capacity. When this is done, the company will probably process the great majority of imported wheat, with the possible exception of such specialty items as durum semolina for pasta and soft wheat flour for biscuits.

If these two mills (Red Sea and YGGC) fortify their flour products with iron a sizable dent could be made in the anemia situation. The level of fortification should be at the 10 mg/cwt level recommended by the U.S. Food and Nutrition Board. The team feels that this recommendation is justified in a developing country such as Yemen without danger of causing iron overload or hemochromatosis. Flour fortification would represent a small additional cost to the Yemeni economy, which would be greatly outweighed by the nutritional benefits.

THE MARKET

As Yemen was closed to the rest of the world prior to 1962, it was very much dependent on local agricultural products. Since 1962, several factors brought about changes in food habits. Following the revolution, a large number of migrants returned to Yemen from various nations around the world, bringing back with them food habits and tastes from other cultures. Contact with the outside world through expatriates and visitors, travel of Yemenis abroad, and the entry of foreign newspapers and magazines all augmented the food habit changes.

Economic growth, especially since the 1970's, increased incomes so people were able to afford imported foods. Open-door import policies, supported by the foreign exchange revenues from remittances, enabled the importation of many processed foods and grains. The increasing costs of local agricultural production and the absence of modern food processing industries within the country resulted in decreased agricultural production and on a dependence on cheaper imported food products. The imports of food products continued to grow, satisfying the increasing demand for grains as well as for processed food. Although changes in food habits started in urban areas, the gradual development of road networks allowed it to reach the once remote and closed rural areas, thus increasing the overall demand in the country.

It is known that food consumption varies from region to region. Thus, due to the absence of comprehensive statistical data, it is difficult to conduct an in-depth analysis of the market demand and food consumption levels in the country. Such a

market analysis is further complicated by the limited availability of other accurate statistical data. An attempt is made here, however, based on official statistical data as well as field surveys in the cities of Sana'a, Taiz, and Hodeidah, to assess the market and its trend for food products. This evaluation is made from a broad perspective of market supply, demand, and consumption of food.

Market Supply

With respect to the Yemeni market for food, it may be generalized that the market supply sets the level of consumption. The volume of imports is based on the private sector's judgement of what it perceives is the demand according to their stock turnover, a trial-and-error approach. Supply level is further complicated by the limited availability of storage facilities and transportation means (especially with some food products which require refrigeration or other specialized handling), all of which have contributed to losses and wastes in the volume of many food products.

The overall market food supply comes from local production as well as imports. A detailed breakdown of imported food products by both volume and value for 1983, the year when the slowdown in the economy due to limited foreign exchange became apparent is provided in Annex C. Around mid 1983, the ban on imports of fruits and vegetables was initiated coupled with decreases in imports of processed foods and other goods by 1984 and onwards. The total import of food items in 1983 was YR 1.64 billion, constituting a large proportion of the total imports of YR 8.Ø8 billion.

Table III presents comparative data estimates of some basic food items supplied to the market in 1983 and 1985. The overall picture presented by the figures from this table indicate an increase in all items except fruits, a decline of one percent, and ghee and vegetable oil, a decline of 25 percent. Cereals, the basic staple food, showed an increase of 1Ø percent resulting from both increased imports and local production. Most of the cereals imported are whole-grain wheat followed by rice and wheat flour. In 1985, around 55Ø,ØØØ metric tons of wheat were imported, showing a change by the consumer from sorghum and millet. As the current level of local wheat production is around 6Ø,ØØØ metric tons per year, indications are that dependence on imports for cereal grains will continue.

The market for vegetables increased between 1983 and 1985 by 13 percent, resulting mainly from growth in local production. Most of the locally-supplied vegetables are sold in the market for fresh consumption. The effect of the import ban is noticeable on fruits which, even though there was an increase in local production of 14 percent between 1983 and 1985, declined by one percent. Poultry is the only segment of the food industry which has shown a substantial increase in local production from

38 percent in 1983 to 84 percent in 1985. The effect of imports restriction, however, has had an adverse effect on poultry production as well, due to an inadeqaute supply of feed resulting from delays in the issuance of import licenses. Although the local poultry production has increased substantially, commercial egg production is still on a small scale, resorting in imports.

The red meat supply includes sheep, goat and cattle; it also showed growth with the majority coming from imports which increased between 1983 and 1985 for sheep and goat meat with a very slight decrease for cattle. The local supply of these animals is dependent on small farm holdings in the country as there is no commercial production of animals for meat. Fish is largely locally produced and delivered to the market fresh. Imports are mainly canned sardines and tuna both of which declined by 50 percent over this two-year period. There are no commercial fishing and processing firms in the country. All current supply is dependent on individual fishermen.

Milk supply showed only a marginal increase of three percent between 1983 and 1985. Milk coming from the local breed of cattle at the individual farm level is meager, barely enough for households which mostly produce cheese and ghee from it. Consequently, the supply of milk to the market is largely dependent on processed reconstituted milk from imports and canned powdered. There are presently only two commercial dairy farms, both belonging to the Ministry of Agriculture and Fisheries. These two farms have 450 Holstein Freisien cows and a daily output of around 1,750 liters. Two private commercial dairy farms are currently being planned. For the foreseeable future, however, the country is likely to continue its dependence on imports. All other dairy products such as cheese and butter are imported, but yoghurt and ice cream are commercially processed from imported powdered milk.

The supply of ghee and vegetable oil has declined from 79,000 metric tons in 1983 to 59,000 metric tons in 1985 as a result of import restrictions. An increase to around 75,000 metric tons by 1987 is anticipated, due to two new processing plants, one of which started production in 1986 and the second in 1987.

The market situation described above covers local production and direct officially-permitted imports. A third source existed until recently, indirect imports or smuggled goods filtering across from Saudi Arabia. It is estimated that illegal imports constitute 25 to 60 percent of the market. The government has clamped down on smuggling beginning in 1984, reducing this source of supply to a negligible level.

Another dimension to the supply essentials of the market comes from the requirements of the poultry and food processing industries for raw materials which have to be imported. Table IV presents the study estimates of these requirements for 1986 based

on the 1985 output and the projected production levels for 1986. The raw materials requirements considered here constitute mainly the basic ingredients which form 70 percent or more of the production inputs. From these figures, the value of the imported raw material requirements of the food processors and the poultry industry is estimated at around YR 1,653 million (at the current official exchange rate of YR 11.86 to the U.S. dollar, a total import value of U.S. $139 million).

Infant cereals and formulas supplied through imports in 1983 constituted 751 metric tons for a value amounting to YR 7,848,000. There are several brands of infant foods and within each brand there are four or five varieties of cereals and formulae. The leading brands by order of market share are:

	Infant	
Brand	Formula	Cereal
Bebelac	First	-
Guigoz	Second	Third
Cerelac	-	First
Farleys	-	Second
Isomil	Third	-

As data for 1986 were not available to assess the prevailing economic conditions a general assessment is made here based on interviews with several businessmen who are major food importers, and on observations of retail outlets. The following are concluded:

- No imports of processed foods were allowed in 1986, though a small quantity may have entered the market illegally.

- Although the imports of wheat, sugar, and rice continued through the controlled-tender system (See Annexes C and D), there were periodic shortages of these commodities.

- Some food processors decreased production in order to extend their stock of raw materials for the longest period possible. The key problem is the excessive delay in obtaining import permits.

- Imports of eggs and meat were limited to quantities below those of previous years.

Demand and Consumption

As a result of the market's early developmental stages, food consumption was determined more by supply than by effective potential demand. It is suspected that rural areas may have lower consumption levels of several food items, especially imported processed foods, for the following reasons:

- Reduced level of availability resulting from an inadequate distribution system.

- Higher product prices as a consequence of increased distribution costs.

- Limited means of storage and food preservation, especially of perishables.

- More traditional dietary habits.

- Lower disposable incomes.

Overall, the prevailing economic conditions, i.e. price escalations, foreign exchange scarcity with reduced imports, and devaluation of the Yemeni currency leads to the view that sustaining the variety in the food supply would be difficult. Taking into consideration the uncertainties of the current economic condition as well as the absence of reliable and accurate data, it would be difficult to forecast future demand and/or growth possibilities.

Prices

The result of the adverse effects of the current economic condition, in spite of the government's price control policy, has been price escalations for practically all food items as depicted in Table V for Sana'a, Taiz and Hodeidah.Note increases as high as 275 between 1985 and 1986. This is likely to lead to decreased levels of consumption, both in terms of quantity and quality of food. A further complication may be the hoarding of goods, especially those in short supply, by some businesses in anticipation of further increases in prices.

Marketing Distribution System

Yemen has achieved substantial growth of highway networks throughout the country. By 1985 the total length of highway networks reached 3,354 kilometers, of which 2,293 kilometers of roads are asphalted. Such a network of roads has substantially contributed to the more efficient transportation of goods as well as in the opening of new markets in many of the rural regions. This still leaves many rural areas of the country isolated due to the lack of roads.

Within the limitations of the distribution system created by the road networks in the country, food suppliers have developed fairly efficient channels of distribution for their goods. The principal flow of food products from local producers or importers to the consumers is characterized by the following five levels:

- First, local producers or major importers of food products.

- Second, regional branches or agents of the above. Regional agents often are not allowed to carry competitive products.

- Third, wholesalers, either in sub-regional or within the urban areas. At this level there are no exclusive relations among the regional level distributors and the wholesalers.

- Fourth, retailers, who form the channel of distribution prior to the goods finally reaching the consumer.

- Fifth, consumers, including institutional customers.

In a few cases, and in particular within the major urban areas, the producers sell directly to retailers and institutional customers. Such exceptions mostly apply to perishable products which may require special storage and/or transportation facilities such as refrigerated cases and trucks.

Advertising Media and Promotion

Table VI depicts the circulation of several newspapers and magazines that could be used for advertising purposes. It is important to keep in mind the low literacy rate in Yemen. While data on listener numbers for radio and television are not available, it is believed that radio may have the widest coverage, though television is still likely to be more effective than printed materials, especially among women.

NUTRITIONAL QUALITY OF YEMENI FOODS

Available data indicate that information on nutritional content, enrichment, fortification, and so forth is not available. Processed foods have such comments such as "contains vitamins A and D" on their lables but without specifying quantities and it is not possible to discern whether the comment refers to what is in the food naturally, or to the fact that it may have been fortified. Even manufacturers are unable to provide information on nutrient content. When asked about fortification manufacturers will often state that the product is fortified, but are unable to provide specific information regarding types or quantities of nutrients added, or losses of nutrients resulting from processing (e.g. Vitamin A losses from palm oil). Thus, the nutrient content of processed food products is almost impossible to ascertain.

As the intent here is to identify food-processing opportunities in the private sector that can positively affect the nutritional status of the target group, this report contains recommendations both in terms of improving the nutrient content of existing foods, and suggestions for food processing opportunities that would improve the overall diet of women and children. Improving the nutritional status of vulnerable groups implies certain expectations such as increased usage of weaning foods and dairy products. It is necessary, therefore, to elaborate the reasons for omitting them from the recommendations. Weaning foods and dairy products are ubiquitous in Yemen and can be found all over the country including rural areas. While the demand may not be fully met, the number of different brands on the market, either imported or processed from imported whole milk, is large. There is virtually no local dairy industry and its development is not feasible. It would not be productive, therefore, to recommend an increase in milk imports.

Regarding infant formula, the problem is not its availability but its improper use. Presently there is no code for the marketing or promotion of breast milk substitutes. The instruction on imported cans of infant formula are meaningless to an illiterate population and quantities such as 60 milliliters of water would stress the capabilities of even literate ones. Furthermore, there is no standardization of proportion of powdered formula to water.

For example, the following instructions are provided for three formulae mentioned earlier: Guigoz 1 - 90 milliliter boiled water to 3 scoops formula, Isomil - 60 ml water to 1 scoop, Bebelac - 60 ml water to 2 scoops. As all formulae are imported, their supply is not constant, thus it is not possible to purchase the same brand at all times. Improper dilution of formula has been documented to be related to scoop size.

There is a need for instructions to be standardized and to be country-specific. Powder to water ratio should be the same for all breast milk substitutes and be specific to the country; in the Yemeni context, water quantity should be related to commercial bottled water as this is the only standard volumetric measure that the total population has access to (i.e. one small water bottle = 750 ml, one large one 1,500 ml). Infant formula instructions call for boiled water which may not be adequate to destroy all potential organisms such as hepatitis virus.

One of the factories in Hodeida (NaNa) is planning to market reconstituted liquid formula from powder imported in bulk. This is likely to be too expensive for the average-income household.

Some of the imported weaning foods do not appear to conform to the spirit of the WHO code. Many products are aimed at one month old infants and are recommended to be fed through a nipple on a bottle. There are a sufficient number of products on the market already to discourage women from breastfeeding; it would be more productive to provide educational programs about them than to create new ones. It is not within the scope of work for this project to make recommendations regarding government policy on breast milk substitutes and weaning foods.

The only explicit nutrient deficiency identified is anemia. This is found in women in almost every country and could be addressed (although not completely alleviated) by iron fortification of processed flour. Commercially prepared wheat products (bread, pasta, biscuits) are consumed by all, but their consumption is higher in urban areas and among landless rural residents than among farmers. As the urban poor and rural landless are the most economically disadvantaged, they are likely to have higher rates of anemia than others. Fortification of wheat flour would have a greater impact on them than on subsistence farmers.

Bread is a main staple in the Yemeni diet, from the Ruti manufactured in the central bakeries to the traditional breads baked in the home. Data indicate that per capita consumption may be at least 50% greater than in the U.S. The flour used is purchased either from the Red Sea Flour Mills, as white flour (72% extraction) or "integral flour" (94% extraction), or as whole wheat flour from the YGGC plant in Sana'a. Rough estimates are that about one-third of the wheat imports reach consumers via this route. The rest of the wheat products are imported as flour and semolina from the EEC and the U.S. The Red Sea Flour Mills is planning to install additional equipment which will quadruple its capacity. When this is finished, the company will probably process the great majority of imported wheat, with the possible exception of such specialty items as durum semolina for pasta and soft wheat flour for biscuits.

If these two mills (Red Sea and YGGC) fortify their flour products with iron a sizable dent could be made in the anemia situation. The level of fortification should be at the 10 mg/cwt

level recommended by the U.S. Food and Nutrition Board. We feel that this recommendation is justified in a developing country such as Yemen without danger of causing iron overload or hemochromatosis.

Flour fortification would represent a small additional cost to the Yemeni economy, which would be greatly outweighed by the nutritional benefits.

YEMENI FOOD PROCESSING INDUSTRY

Yemen started the transition from traditional to modern means of production in manufacturing and processing and from traditional trading to an investor in manufacturing industry in the early 1970's. This dual transitionary process came about with an absence of knowledge in technology transfer or other information relevant to the development of manufacturing and processing industries.

The entry into food manufacturing and processing on a commercial scale was initiated in 1971 by the Hayel Saeed Anam Group, currently the largest in the country. Their first investment was in a confectionery plant in Taiz that produced biscuits and hard candies. Since then, investments in food manufacturing and processing industries gained momentum. By the end of 1986, according to the 1985 Industrial Census by the Central Planning Organization and to records from the Ministry of Economy, Supply and Trade, a total of 112 food manufacturing, processing and extraction plants have been established in the country. As the table below indicates, they are mainly small:

	Food Processing	Other	
Number of Employees	Industries	Industries	Total
Ten or more	26 (23%)	86 (25%)	112 (25%)
Five to ten	86 (77%)	255 (75%)	341 (75%)
Total	112 (100%)	341 (100%)	453 (100%)

Table VII provides basic data on food processing industries in Yemen. The 86 small to medium plants consist mostly of bakeries producing 750 kg. to 1,000 kg. of bread daily. The total costs of inputs of the 26 large food processing plants is YR 745,339,000 for 1985, or 49 percent of the 112 plants in the food manufacturing and processing sector. Similarly, the total cost of output (YR 1,218,041,000) of these food processing plants constitutes 47 percent of the total. The import requirement of these plants for raw materials is estimated at YR 713,383,000 or 58.6 percent of the total cost of outputs.

The benefits from these 26 large food processing plants, in addition to supplying the market with large varieties of products, are contribution in terms of "value-added", estimated at 36 percent of the total cost of outputs. Their net combined value of fixed assets (excluding land) as of 1985 was YR 684,503,000, after deduction of depreciation for past years of operation. These industries employ around 4,248 workers, contributing to the employment of local labor as well as training them in skills. Foreign labor constitutes only seven percent, below the 30 percent permitted by the labor law, as the government has instituted strong measures against imports of foreign labor.

Outputs of the various food processing plants in Yemen are given in Table VIII. For all types of processed food products, the output has shown substantial growth over the period 1981 to 1985. Fruit drinks and milk products have particularly shown significant growth. This growth reflects changes in consumer tastes and preferences for processed foods, thus increasing the effective demand.

Firms operating major food processing plants along with pertinent information regarding their products are listed in Annex E. Many of these firms are producing products under license from foreign firms.

Agricultural production has not reached the level to satisfy existing demand. Unless this situation changes, food processors will have to continue to depend on imports. Currently, food processors import powdered milk, fruit concentrates and syrups, flour, packaging materials, and several other essentials. In spite of the dependence on imports, the food processing industry is viewed to have been performing better than other parts of the manufacturing sector. The figures below depict the magnitude of increased output by the food processing industry from 1981 to 1985:

Rank	Products	Increase
1	Milk and Yoghurt	2,167%
2	Fruit Juices	1,075%
3	Bottled Water	254%
4	Canned Beans	201%
5	Ghee and Edible Oil	156%
6	Biscuits and Confectionaries	131%
7	Ice Cream	85%
8	Bread	60%
9	Soft Drinks	36%

Commercial poultry production has been growing more rapidly than any other food subsector in Yemen. Starting in 1975, broiler production reached 1,400 metric tons by 1976. Within three years, output tripled, and by 1982, production reached

14,500 metric tons. Output doubled by 1984 and doubled again in 1985 when it reached almost 63,000 metric tons. By September 1985, however, poultry imports were totally banned. Additional poultry supply comes from the traditional small village flocks which provide meat and eggs. Commercial egg production is still at its early stage which has necessitated the importation of eggs to supply the market. Most of the inputs for the commercial poultry farms are imported, including chicks, hatching eggs, and poultry feed.

The above results indicate a high demand for processed food. Thus the food processors invested in both expansions of existing facilities and in new projects. This brought about an increased need for other support manufacturing plants, e.g. packaging and labeling. It should also be noted that several food processors are involved in processing more than one food product. According to the Ministry of Economy, Supply and Trade, there are several applications from existing processors and new investors currently pending.

RECEPTIVITY OF YEMENI FIRMS TOWARD ESTABLISHING LINKS WITH U.S. FOOD INDUSTRY

Attitudes

The private sector in Yemen has demonstrated its openness to modern food processing technology, and its willingness to work with foreign firms. Most company management expressed openness towards the idea of a joint venture with an American firm. There seemed to be little bias against outsiders coming in and sharing technical and management expertise with them. This would, of course, have to be explored in much more depth in the early stages of putting together any actual project. The Yemenis recognize, however, that a foreign firm would enter such an agreement expecting to make a profit, and would expect to repatriate some of those profits.

Advantages of Involvement of the Private Sector

The case for involving the private sector more extensively in development programs has been made several times, in the context of the world at large, the Near East, and Yemen itself. While a detailed discussion is not necessary, some of the principals involved are briefly outlined below as they may bear directly upon the over-all effects of the present recommendations.

First, the private sector is more dynamic and flexible than the public sector in capitalizing upon opportunities. There is no need for public policy pronouncements before embarking upon an investment and less red tape is involved in making the decision to proceed. If an investment is not profitable, it is easier for

a private firm to cut its losses as there is no bureaucratic cadre resisting its abandonment. Management of private ventures is primarily responsible to two groups: shareholders and customers. Votes do not need to be solicited.

Second, a successful private venture inevitably generates further ventures. For example, a successful food manufacturing firm requires suppliers of raw materials, packaging, and equipment; technical services, distributors, retailers, advertisers, and perhaps purchasers of byproducts. One job in a food plant generates several jobs elsewhere, thereby contributing to the overall growth of the economy. It is generally observed that developing countries which have a thriving private sector are progressing much faster than countries without this advantage.

Third, successful private ventures depend on a number of inputs that foster growth and thus that of the total economy. Finding a potential investment opportunity requires imagination and creativity. Exploring that opportunity to assess its chances for profitable exploitation demands a thorough investigation of all relevant factors, such as: the market, appropriate equipment, available inputs, government policies, and finances. The investor must also bring together technical and managerial expertise to make the venture a success, implying some sort of promotional or information network.

Fourth, the value-added income generated by a processing plant contributes to general economic growth. This may be especially important with regard to food security. As it is not feasible for all countries to be self-sufficient in producing all the domestically-required foodstuffs, it may be possible to be food secure by having the ability to purchase what is needed on the world market. A thriving private sector, generating value-added income through its activities, is a major contributor toward the economic development of a country, which in turn will enable it to import the additional required food. While the agricultural sector can make a major contribution to the economic wellbeing of a country, its food security may depend upon the dynamism of the private manufacturing sector.

One last principle should be enunciated. The successful application of the four principles listed above depends upon a clear reading of the social milieu of the individual country. A food processing plant in the United States cannot be transplanted in toto to Yemen. The social attitudes which affect the operating assumptions of Yemeni managers and investors are quite different from those of Americans. The application of technical and managerial expertise occurs within this implicit social framework, and a successful technology transfer and/or collaboration requires that the differences be explicitly realized and respected.

Assessment of the Food Processing Industry in Yemen

Next we shall asssess the food processing industry in Yemen in terms of its overall quality, equipment, raw material inputs, product distribution and promotion, management, technical capabilities, and maintenance.

Assessment of Quality. The level of sophistication of the food processing industry is quite variable, as expected. At the upper end, some plants are as modern and well run as any in the developed countries. At the lower end, there are plants which are highly labor intensive and would not be allowed to operate in the United States because of sanitation shortcomings, but which nonetheless turn out products acceptable to the consumer at an economic price.

The variation may be in large part attributed to the financing available to the plant owner; state-of-the-art production equipment is not cheap. The Yemen Company for Industry & Commerce (YCIC - Hayel Saeed's biscuit plant), for example, recently acquired two new high-speed West German mixers, complete with computer-controlled ingredient addition. The Bilqis Sweets & Biscuits Factories (see Annex E), on the other hand, was using one ten-year-old Italian mixer which necessitated hand weighing of ingredients, and which was outmoded technology even at the time it was purchased.

Equipment. Numerous relatively new types of food processing equipment were in place or being installed. The most advanced item was a check-weigher at the YCIC plant mentioned above. As sandwich cookies came from the sandwiching machine they were grouped into slugs of six and overwrapped, and then each slug was weighed on an in-line scale. The weight was fed into a computer which kept a running total and displayed the results on a monitor screen directly above the scale. The display showed the number of slugs at an acceptable weight range and the number having low or high weights. From this display the machine operator could make adjustments on the application of creme in the cookie to keep the output within the targetted weight range. This level of sophistication in biscuit plants is not common even in the U.S.

Other examples of modern equipment were the following: a fully automated spaghetti manufacturing line being installed at Brothers Pasta Plant; a potato chip line at the Yemeni Snack Foods & Manufacturing Co.; the Ocrim (Italian) milling equipment at the Red Sea Flour Mills; and the Tetrabrick packaging line at the United Co. for Industry & Frozens (NaNa) which packages liquid milk in aseptic cartons that completely excludes air, providing it an extended shelf life.

There were examples of inadequate equipment. The Bilqis biscuit plant was the most glaring case, but a few others in otherwise well-equipped operations were the following: the de-canning and mixing of mango pulp for juice drink at the Sana'a Beverages & Industry Co.; the bottle-washing machine at the

Sheibani Bottling Co.; and the hand-packaging of bread products at the Yemen General Grain Corporation. Most of these are relatively minor aspects in the whole picture, however, and in most cases could be rectified with modest expenditures.

In summary, those plant operators who have adequate financial backing appear to be purchasing state-of-the-art food processing machinery and are using it to its design capabilities. The leading food companies are fully as advanced as the best companies in the United States.

Raw Material Inputs. The Yemeni food industry has to import nearly all its raw materials, both the basic food ingredients such as flour, sugar, and fruit pulp, as well as all packaging materials. At a time when foreign exchange is in short supply and the YARG is trying to hold down the trade deficit by limiting imports, this causes intermittent problems for the food processor.

During the team's visits some of the plants had suspended part or all of their operations because of some lack. The pasta plant was not running because they were out of packaging materials. The 7-UP line at the Sana'a Beverages plant was not in operation due to a shortage of flavoring. The potato chip plant was unable to get vegetable oil for their frying operation. We raised this question with most of the plant managers. In general they seemed to feel that while recurring shortages were not desirable they could live with the situation.

Very little of the raw material input was of domestic origin. Even for those items which could be available - wheat to the flour mill, mangos and other fruits to the juice processors - the usual observation was that the quality was low and uneven, the quantity inadequate, and the prices higher than for imports. It seems that to get manufacturers interested in using locally-supplied farm products for raw materials a program to increase production and to enhance the quality will be necessary.

Product Distribution and Promotion. As has been noted in previous reports the system for distribution of goods in Yemen is well developed, based upon traditional suqs (markets) and trading methods. Some of the larger companies maintain their own truck fleets for transporting finished goods to distribution points throughout the country. In a few cases this even extends to having a sales force which deals with the many small retailers in towns and villages. Other companies have warehouses in the major towns and work through independent wholesalers. A few of the smaller concerns sell to wholesalers at plantgate, and use established connections for distribution.

Promotional advertising is not extensive. There are no magazines of note in Yemen (see Table VI), and the rather high illiteracy rate makes the newspaper an unattractive medium. Some food processors advertise on television (Yemany is the largest user of this route) but this does not seem to be common. Most of

the processors use giveaway promotions of some sort, aimed at getting repeat sales.

The manufacturers did not think there was a great deal of brand loyalty among consumers. The main impact on market share appears to be the attitude of the retailer. Since most of the retail outlets for processed foods are quite small they have a limited capacity for offering several different brands of each product. The retailer forms his own judgements about which brands will sell best and stocks primarily those brands. We suggested to some of the processors that to build market share they ought to be targeting their incentive programs at the retailer rather than the consumer.

The present situation regarding advertising and marketing means that it is difficult for a food manufacturer to successfully sell a nutritionally superior product. In certain cases (i.e. fruit drinks and wheat flour) the government has instituted price controls, so a superior orange juice, for example one containing a higher percentage of orange pulp, or one that is nutrient-fortified, is at a marketing disadvantage.

Management. A common theme in our discussions was the shortage of good middle management and technical personnel. In those companies with more limited financial resources this is more obvious than in the large, well-financed concerns. Nevertheless, even the up-scale companies evinced some concerns about developing and retaining good managers.

This is not unique to the private sector. A number of reports have fully documented the need for better management skills in both private and public institutions. The means for meeting this need is, of course, education, which does not occur overnight. Some of the very large companies such as Hayel Saeed are developing managers from within, by training and giving them opportunities to manage various units within the plants. Some send them abroad for training. Many of the mid-sized companies, however, were relying on expatriates to fill positions such as technical director, production supervisor, and head of the maintenance department.

In addition to direct management of plant functions (i.e. raw materials procurement, processing, warehousing, financies) the policy aspects of management also need to be learned. These are such things as efficient marketing, corporate responsibility to consumers, and industry self-policing. These aspects of management are more intangible than directly productive activities, and it will undoubtedly take a longer time for their importance to be appreciated, just as they are not even widely accepted yet in the U.S.

Developing management skills by on-the-job training ought to be a part of the job of expatriate managers. They should be trying to train their successors; we did not explore this

question in any depth. This could be an advantage of collaboration with U.S. companies.

Technical Capabilities. There are some examples of outstanding technical innovations to be found, but in other instances the inability to cope with technical difficulties was causing plant inefficiencies. This seemed to be related less to the size of the company than to the willingness of the manager in charge to take risks, and to be innovative.

The NaNa plant, for instance, is using a Swedish machine to form plastic cups for its ice cream. It's managment wanted to make a cone-shaped cup for a new marketing idea. The Swedish company wanted $20,000 to make the new mold. The Technical Manager gave the task to his machine shop, which designed and built the mold for about $1000.

On the other side, a plant manager was having trouble with the chemicals being used to clean his potato chip frying equipment. The caustic cleaner used was causing the fryer to rust. He knows he has a problem, but the technical resources for solving it are not readily available to him.

The Yemeni food-processing industry as a whole faces these difficulties because the technical knowledge needed is often only obtainable from overseas at a great cost. In the long run this lack will be best met as a technically-based support industry is built up within the country.

Maintenance. Maintenance of modern food processing equipment is highly variable. The equipment suppliers give training to plant personnel at the time of installation, but maintaining this knowledge as people leave the job is not always successful. Hayel Saeed is establishing a maintenance school within their complex of companies, in which workers will be trained to service their machinery. This will be done through training classes interspersed with working in the plant. They hope to reduce their dependence on expatriates in this area to a few key people within a few years.

Most of the other companies are forced to bring in repair personnel from the manufacturer at great expense if they have severe equipment malfunctions or else try to make do with some sort of temporary repairs. Maintenance workers who have been trained in a good vocational school would find ready employment in all phases of the private sector in Yemen.

EXISTING CONSTRAINTS TO INVESTMENT IN THE YEMEN PRIVATE SECTOR

The prevailing constraints which have adversely affected private sector investments, especially in production, are:

Information and Data Availability

Information and data constitute the base for any type of development through either the public or private sector. Information and data are required on: the market; technology and know-how; competitors; financial services; government policies; and government assistance.

As a result of unavailable and inaccessable information, several problems are being faced by the private sector:

- Inability to identify projects that may be essential to the development of vertical integration such as the poultry industry.

- Lack of ability to identify sources of inputs by type and use.

- Inability of feasability studies to represent any degree of accuracy on market prospects of potential products.

Price Control

Price control policies are a disincentive to private sector investments in any productive sector of the economy. By fixing prices investors are denied the use of market forces to set prices as instruments of competition such as product improvement. Furthermore, price controls result in further complications by disrupting equilibrium for reasons such as the following:

- Those fixing prices do not necessarily have knowledge of production and its costs and hence use ad-hoc estimates in establishing prices.

- Prices are fixed for long time periods ignoring increases in raw materials needed for processing the product or the effects of currency devaluation.

- Another detrimental effect of price control is that both wholesalers and retailers often switch to products giving the highest margin, hence reducing the variety of items distributed.

Foreign Exchange and Import Restrictions

The prevailing policy of foreign exchange and import control is disrupting the market and thus the economy. Such policies may result in:

- Over-valuation of the local currency which could adversely affect production by raising the costs of inputs and hindering exports.

- Non-accessability to capital goods and to essential inputs giving the importer limited options of suppliers and thus of prices and terms for goods purchased.

- Discouragement of both local and foreign investors.

- Creation of a black market for foreign exchange which becomes costly for the government to control.

- Irregular and discontinuous supply of imported raw materials which results in ineffective and inefficient utilization of production capacity by local industries.

Bureaucratic Obstacles

Several problems arise from bureaucratic obstacles. Furthermore, these obstacles create an environment conducive to corruption and bribery. The prevailing difficulties are:

- Elaborate procedures within and among agencies that create delays that waste much time. The process to obtain an investment project approval requires that the project application clears at least 17 sections in the Department of Industries at the Ministry of Economy, Supply and Trade; the process takes at least three months.

- Inter-agency processing of documents faces conflicting rules and procedures. A common example is the import license which is issued by the Ministry of Economy, Supply and Trade, but is sometimes rejected by the Customs Authorities with whom the imported goods have to be cleared. Also, duplication of procedures among the agencies is very common.

- The processing of documents may be very costly to investors and project operators.

Scarcity of Skilled Manpower

The lack of sufficient native skilled manpower constitutes a major problem to the development of the productive sectors of the economy. This problem is rampant at all levels of management and with regard to technicians. As a result demand is high for

foreign expatriates. Although previously the investors in the productive sectors were permitted to employ foreign expatriates up to 30 percent of their manpower requirements, the prevailing slowdown in the economy has instigated the government to impose restrictions on the employment of foreigners.

Customs Tariffs and Duties

There are no clearly defined tariffs and duties to differentiate between imported finished goods, imported raw materials, and other inputs for industry. This resulted in high tariffs and duties which have both restricted access to improved technology and increased the cost of production. An instance of this is the nominal duty imposed on finished, imported poultry feed and a high duty imposed on ingredients for poultry feed imported for processing by the local feed mills.

Financial Institutions

Almost every investment project requires loan financing. Although several development banks are present in the country, the problems faced in obtaining financing include the following:

- Inadequate resources of the development banks limit the amount of financing available for investment projects.

- The excessively conservative attitudes to risk aversion by both development and commercial banks has led to requirements for high collaterals reaching as high as 150 percent of the loan value. This is a disincentive especially to small and medium-sized investors and is a hindrance to joint-ventures with foreign firms that do not accept such conditions.

NUTRITION INFORMATION AND EDUCATION

Many of the nutritional problems identified, and others that may be present, could be solved by promoting nutrition and health education. Some of education needs to be aimed at food processors, some at shopkeepers, and others at health practitioners and consumers.

Food Processors

There are several areas in which information provided to food manufacturers may go a long way toward improving child survival statistics and contribute to improved health and diet for all.

It appears necessary that food processors in Yemen be given workshops, information, and follow-up help in implementing Good Manufacturing Practices (GMP's) in their operations. This includes such factors as plant and worker sanitation, awareness of the nutritional content of the foods processed, and responsibility for educating the consumer by appropriate instructions and labelling.

As with many other aspects of the food processing industry in Yemen, the level of sanitation in manufacturing plants is highly variable. The team saw some plants with high levels of cleanliness in their equipment and buildings, and some with very low levels. Even within an otherwise well-run plant, there were items which could well be improved. In a juice bottling plant in Taiz, for example, even though great care was taken to sterilize and pasteurize the juice and sugar syrup before it was piped to the bottling machine, the technical manager admitted that the bottle washing machine was sub-standard (he was trying to buy a new one). A beverage packer in Sana'a had an excellent bottle washer and aseptic packaging line, but the mode of de-canning mango pulp and mixing with the syrup was extremely poor from the GMP standpoint.

An important aspect of sanitation deals with the workers. There were no hairnets seen, even where raw materials were being mixed to make a dough or juice. Workers wore any kind of clothes or footwear. Only one plant had uniforms and then only for female workers. Most workers wore sandals, which is an obvious safety hazard. The food is often handled by hand, for instance, in packaging baked goods such as bread or cookies. There was no washing facility present as far as we could determine, and seemingly little or no concern for the microbiological cleanliness of the hands doing the packing. Plant managers should be aware of the dangers inherent in unsanitary personnel practices and programs should be developed for addressing them.

Plant and worker sanitation are totally unsatisfactory, as pointed out above. Providing manufacturers with information on the need for sanitary manufacturing practices and technical knowledge on how to meet acceptable standards should contribute greatly toward improving the health of the target population of children. The following can be done in this regard:

- Institutionalized cleaning of hands with an antiseptic substance.

- Reducing the number of different persons touching ready-to-pack food item with hands.

- Awareness of workers for head covers (not especially difficult in an Arab culture), clean clothes, and proper footwear.

The National Health Laboratory is initiating workshops for food processors and handlers, in which principals of good

sanitation will be taught. As part of the implementation of this recommendation, USAID should support and cooperate in these efforts.

In addition to workshops for informational purposes, we suggest that the food processing industry be encouraged to set its own standards for plant sanitation, nutritional guidelines, and labeling. This should be sponsored by the Federation of the Chambers of Commerce, and the enforcement of the standards would be on a voluntary basis, but with enough pressure to make sanctions of violations effective. There are precedents for this type of activity. In the U.S. bakers and manufacturers of bakery equipment formed the BISSC (Baking Industry Safety Standards Committee) to improve the safety of bakeries. Today, no bakery will buy equipment which doesn't meet these standards. In Yemen, the Arbitration Court adjudicates disputes between businessmen. A similar entity could hear cases in which violation of GMP standards are alleged.

There is no awareness whatsoever among food manufacturers about nutrient fortification, enrichment, or losses due to processing. One manager mentioned that as long as protein needs were met, nothing else was relevant. Another technical expert claimed that his plant fortified fruit-flavored drinks with vitamin C, but did not know how much. Yet another manager stated that they fortified when the "ingredients" were available, but did not know what they were.

Losses were also not noted; it was not possible to find out how much vitamin A was left in the refined palm oil product, or if the bottled drinking water was fortified with fluoride. Many of the manufacturing plants had sophisticated, well-equipped laboratory facilities, thus dealing with potential nutrient losses and gains should not be a burden to them.

Iron fortification, for example, may be desirable, yet mills and processors who use flour are not aware of its potential benefits nor do they have the technical knowledge to accomplish it. The vitamin A content of imported palm oil is high, yet much of it is lost in processing. It is not known if fluoride is added to bottled water, or how much of such water is consumed by children during the crucial years while teeth are formed. On the other hand, fluorosis appears to be a problem in the Taiz area and should not be exacerbated with additional fluoride in the drinking water.

Sensitizing manufacturers to food fortification possibilities and to nutrient losses during processing would contribute to food products with improved nutrient contents. There are several areas in which information provided to manufacturers may go a long way toward improving child survival statistics and contributing to improved health for all.

Regarding instruction, the misuse of infant formula is rampant all over the world and Yemen is no exception. All the

presently available formulae are imported from a number of different countries and as there is no policy regarding their use and distribution they cause much ill health. It has been found that formula is both over and underdiluted. This is likely the result of confusing written instructions to a population with a high rate of illiteracy, especially among women. It is preferable in this situation to have instructions in pictographs instead of script and standardized across all brands; see above for a more elaborate description of this problem.

Shopkeepers

Shopkeepers are important because people purchase their manufactured food items from small shops. These shops can only afford to stock a limited number of items and/or brand names within an item. Each consumers' choice, therefore, is restricted by what the shopkeepers stock. If shopkeepers are aware of the nutritional advantages of some foods over others, they are in the best position to promote such products. It would be beneficial to aim promotion on the health benefits and proper usroducts at shopkeepers as well as at consumers.

Shopkeepers exercise power by stocking or not stocking certain products. Thus they can exert pressure on manufacturers if they are aware of the beneficial or potentially harmful aspects of certain products. They could be educated so that they are able to explain to others how processed foods, such as infant formulae, should to be used.

Health Practitioners

Health practitioners either provide incorrect information or are not able to communicate the necessary information to clients.

A number of women reported, for example, that they stopped breastfeeding because the "doctor" at the hospital or clinic told them to. They stated "allergies" as the reason. It is unlikely that a high proportion of Yemeni infants are allergic to their mothers' milk. There is a need for health professionals to promote breast feeding and to improve communication between patients and themselves.

Health practitioners are in an ideal position to promote child-rearing practices that lead to better nourished infants because they are trusted and looked up to by the population. They should deal with the problem of child neglect, explaining to mothers why leaving children alone, or not feeding them for long periods, or propping bottles, is not conducive to the child's optimal development. Most mothers want to do the best they can for their child and are unaware of the potential harm some of their practices cause.

Consumers

Before food is consumed, there are a number of gatekeepers: the manufacturer that decide what foods will be marketed, the shopkeeper who limits what is available by what he stocks, the male head of household who selects the food items for purchase, and the female who prepares the food.

Improving tbe extent and duration of breastfeeding is of the highest priority. It would provide large benefits toward child survival. The most common reason women give for not breastfeeding is an inadequate supply. Women do not appear to understand the mechanism of human milk production and therefore do not know how to increase the supply of breast milk. In addition to frequent suckling of the infant and manual expression of milk, a number of nutritional practices are also advisable, such as the following:

- Increased fluid intake.

- Increased total food intake and the nutrient density of the food consumed. This would also improve general health and prepare for the next pregnancy.

- Increased frequency with which food is consumed. Qat chewing should be discouraged during lactation and pregnancy because of its anorexic component.

The proper time and type of food to use for weaning is very important for the optimal health of the infant. Presently there does not appear much knowledge on this topic.

Preparing women for pregnancy and lactation is also a priority. As it is not possible to meet iron needs through food intake, pharmaceutical iron supplementation should be strongly encouraged.

Vitamin D deficiency rickets is most likely a result of inadeqaute exposure to sunshine. Milk intake appears sufficient to take care of calcium needs. A wide-spread program promoting exposure of children and women to sunlight should correct this problem.

Dehydration frequently results from following beliefs that put water intake in a negative light. Promoting the importane of fluids to infants and children is very important.

Many of the infections and childhood diarrhea result from unsanitary hygienic practices at the household level. The importance of clean food, drink, and eating utensils to children cannot be overstressed.

Some of the nutritional problems are due to neglect which may be a result of not knowing the potential harmful effects of certain practices, such as leaving children for long periods

without food or water. Education programs promoting healthful child rearing practices are much needed.

In Yemen food shopping is generally done by males, therefore nutrition education programs should be also aimed at them.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of the assessment of the overall nutritional situation it was concluded that such symptoms as diarrhea, dehydration, and failure to thrive reflect general cultural behavior and unsanitary food and water supplies rather than lack of specific nutrients. These are more successfully addressed by education than by marketing of a new or improved food product. Iron-deficiency anemia is a major problem especially among women of child-bearing age and should be addressed through fortification.

A survey of markets indicates that the demand for food exceeds local production; the difference is met by imports. Demand for variety of food is also greater than available supply and this presently is not being fully met by imports.

The team's position on weaning foods is that a variety of nutritonally-adequate weaning foods are already available and thus it is not necessary or advisable to attempt to improve any of them. No single weaning food is sold all over Yemen and given the marketing system it is not possible to reach a majority of the weaning-age children with any single food.

It is concluded therefore, that improving the the nutritional status of the target population can most successfully be addressed through nutrition information and education program aimed at manufacturers, retailers, health professionals, and consumers.

On the basis of analysis of available information, it is suggested that AID proceed with Phase II of the Near East Private Sector Regional Nutrition Project; i.e. implement the recommendations below:

As part of the education thrust of this project we recommend that food processors in Yemen be given workshops, information, and follow-up help in implementing good manufacturing practices in their operations. This includes such factors as plant and worker sanitation, awareness of the nutritional content of the foods they are producing, and responsibility to educate the consumer by appropriate instructions and labelling.

Nutritional awareness among food retailers should be promoted so they can make appropriate choices in the food items sold in their shops.

There is a need to provide appropriate information and better communication techniques to health professionals on the nutritional needs of target groups.

Some of the nutrition problems, such as vitamin D deficiency, infections due to hygienic practices, and improper formula dilution could be addressed with education aimed at consumers, therefore a program of consumer nutritional education aimed at males as well as females is urgently needed.

It is suggested that a systemized data collection system regarding investments should be established to allow exchange of information between the public and the private sectors.

In addition we recommend that the following potential opportunities for collaboration between U.S. and Yemeni food processing companies be considered (see Annex B for elaboration):

- Iron fortification of wheat flour. Iron-deficiency anemia has been identified as a major nutritional problem. As most of the wheat is imported and milled at two in-country flour mills, this should be an easy and inexpensive way to provide additional iron.

- Vegetable and fruit drying. These seasonal foods are consumed in very small quantities, though overall availability has improved. Increased consumption of fruits and vegetables would improve the vitamin and mineral nutrition of the target group.

- Oilseed crushing plant. This venture would provide poultry feed as well as edible oil, both presently imported. The resulting increase in poultry production would improve the diet of young children whose animal protein sources are dairy, eggs, and chicken, the last two in short supply. In-country oilseed crushing, even from imported seeds, will provide savings in foreign exchange and contribute the value added benefit.

- Production of industrial cleaning chemicals. The major health problem for infants and children is diarrhea, some of which is caused by foods processed on inadequately cleaned machines. This type of venture could improve child mortality rates.

Table I

Demographic Data

Governorate	1975 Census Total Population	1975 Census House-holds	1975 Census Population of Capital	1986 Census Total Population	1986 Census House-holds	1986 Census Population of Capital
Sana'a	1,129,944	155,060	135,625	1,856,876	277,661	427,150
Taiz	1,217,125	179,649	79,720	1,643,901	258,924	178,043
Hodeidah	874,038	143,725	72,895	1,294,359	203,891	155,110
Ibb	1,107,652	161,268	17,496	1,511,879	216,986	48,806
Dhamar	616,948	96,621	19,540	812,981	124,702	47,733
Hajja	520,391	66,418	3,294	897,814	117,603	15,878
Sa'ada	290,966	30,861	3,806	344,152	50,675	11,759
Al Mahweet	242,494	34,420	2,292	322,226	48,663	5,166
Al Baidha	248,583	30,199	10,419	381,249	45,491	12,370
Marib	244,389	7,964	292	121,437	14,503	1,457
Al Jawf	-	-	-	87,299	7,361	2,216
Total	6,492,530	906,185	345,379	9,274,173	1,366,460	905,688
1. Migrants Outside Yemen	1,234,000	-	-	1,168,199	-	-
2. Resident Population	5,258,530	-	-	8,105,974	-	-
3. Uncovered Areas Popula.	294,500	-	-	-	-	-
4. Unenumerated Population/ Social/Technical Reasons	423,800	-	-	376,743	-	-
5. Recorded Resident Pop.	4,540,230	-	-	7,729,231	-	-
6. Average Number of Persons per Household	5.1	-	-	5.7	-	-
7. Annual Growth Rate			3.29%			
8. Recorded Resident Population Sex Distribution:						
- Males	2,163,142	-	-	3,800,791	-	-
- Females	2,377,107	-	-	3,928,440	-	-
- Sex Ratio (M:F)	91%	-	-	97%	-	-
9. Urban: Rural Ratio	11% to 89%	-	-	14% to 86%	-	-
10. Other Indicators:						
- Crude Birth Rate			51.9			
- Crude Death Rate			26.4			
- Infant Mortality Rate			173.5			
- Total Fertility Rate (adj.)			6.85			
- Illiteracy Rate: Males			57.9%			
Females			92.5%			
National			74.9%			

Source: Central Planning Organization

Table II

Balance of Payments
(In Million Rials at Current Prices)

	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981	1982	1983	1984	1985
1. Exports of Goods	55.3	83.9	31.8	13.2	32.1	72.1	47.4	21.6	44.0	47.5	61.0
2. Imports of Goods	-1,721.3	-3,283.8	-4,134.5	-5,626.4	-6,957.6	-7,652.2	-7,867.8	-8,785.7	-8,082.0	-7,507.2	-7,959.4
Trade Balance	-1,666.0	-3,199.9	-4,102.7	-5,613.2	-6,925.5	-7,580.1	-7,820.4	-8,764.1	-8,038.0	-7,459.7	-7,898.4
3. Receipts Against:											
- Services	342.8	422.3	589.7	997.6	1,525.9	1,616.3	1,606.8	1,521.5	1,347.8	1,290.3	1,367.8
- Private Transfers	2,363.3	4,561.2	6,350.7	5,595.0	6,118.4	4,935.8	4,444.2	5,360.6	5,600.7	5,666.2	6,020.8
- Official Transfers	513.2	469.9	452.3	1,402.6	503.1	670.5	1,516.4	2,109.0	851.6	761.4	660.5
4. Payments Against:											
- Services	-146.9	-225.7	-371.0	-1,158.4	-1,527.4	-1,734.5	-1,838.6	-1,690.0	-1,580.5	-1,533.1	-1,886.9
- Private Transfers	-306.0	-770.4	-1,446.3	-1,844.9	-1,174.9	-888.3	-897.2	-1,202.2	-633.1	-388.1	-459.9
- Official Transfers	-	-	-	-	-	- 2.3	-0.6	- 1.1	-	-	-
Current Balance	1,100.4	1,257.4	1,472.7	-621.3	-1,480.4	-2,982.6	-2,989.4	-2,666.3	-2,451.5	-1,663.0	-2,196.1
5. Capital Account:											
- Drawing on Loans	213.1	207.6	366.5	517.7	558.8	1,149.3	1,178.9	1,042.6	1,006.8	1,139.3	1,052.1
- Repayment of Loans	- 14.1	- 19.4	- 26.1	- 44.3	- 33.5	-287.2	-258.8	-197.1	-106.4	-337.7	-307.8
- Others	-	-	-	465.1	776.5	355.8	470.0	21.5	323.2	-253.6	101.2
6. Errors & Omissions	123.0	53.5	199.5	452.8	169.4	-230.8	418.1	300.8	253.6	471.2	200.4
7. Overall Balance	1,422.4	1,499.1	2,012.6	770.0	- 9.2	-1,995.5	-1,181.2	-1,492.5	-974.3	-643.8	-1,150.2
8. Reserves	1,186.0	2,608.4	4,107.5	6,120.1	6,890.1	6,880.9	4,885.4	3,704.2	2,205.7	1,231.4	587.6
Average Exchange Rate YR per US $	4.57	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.58	5.35	6.49

Source: Central Bank of Yemen

Table III

Estimated Supply of Some Basic Foods
(1983 and 1985)

Basic Food Item	Unit of Measure	Local Production 1983 Qty.	Local Production 1983 %	Local Production 1985 Qty.	Local Production 1985 %	Imports 1983 Qty.	Imports 1983 %	Imports 1985 Qty.	Imports 1985 %	Total Supply 1983	Total Supply 1985	Percent Change
Cereals	1,000 MT	363	37	419	39	630	63	669	61	993	1,088	+10%
Vegetables	1,000 MT	489	97	563	99	17	3	8	1	506	571	+13%
Fruits	1,000 MT	163	87	186	100	25	13	N.A.	-	188	186	- 1%
Poultry Meat	1,000 MT	23	38	63	84	37	62	12	16	60	75	+25%
Sheep & Goat Meat	1,000 MT	9	45	8	38	11	55	13	62	20	21	+ 5%
Cattle Meat	1,000 MT	13	48	15	50	14	52	15	50	27	30	+11%
Fish	1,000 MT	18	82	21	91	4	18	2	9	22	23	+ 5%
Milk & Yoghurt	1,000 MT	98	83	105	87	20	17	16	13	118	121	+ 3%
Eggs	Million Eggs	129	34	215	48	247	66	229	52	376	444	+18%
Ghee & Vegetable Oil	1,000 MT	21	27	37	63	58	73	22	37	79	59	-25%

Source: Survey Estimates based on Appendix 7.3, Customs Authority Statistics, Tables VI, XI, and the report, Economic Analysis of the Poultry Industry of the YAR by Floyd A. Lasley, Kendrick A. Holleman and J. Robert McDowell.

Table IV

Estimated Import Requirements of Raw Materials and Inputs for Poultry and Food Processing Industries

Industry	Main Input	Quantity Required	Estimated Value (Million YR)
Dairy Processing	Powdered Milk	8,500 MT	57
Vegetable Oil & Ghee	Crude Oil	50,000 MT	279
Juice Processing	Concentrates & Flavors	17,000 MT	148
Confectionaries	Fours & Additives	40,000 MT	315
Poultry:	Day-old Chicks	42,650,000 chicks	205
	Hatching Eggs	36,400,000 eggs	109
	Feed	180,000 MT	540
Total Value			1,653

Source: (1) Survey Data Estimates.
(2) Agricultural Processing Industry in Yemen Arab Republic: Possibilities for Providing Raw Materials Locally by Victor F. Amann and Abdul Malek Qassem Al Thour, MAF, Sana'a, YAR.

Table V

Average Retail Food Prices in Sana'a, Taiz, and Hodeida (in YR)

Food Item	Unit of Measure	Source	CPO Data 1984	CPO Data 1985	Survey Data Dec.1986	% Increase (+) or Decrease (-) 1985 to 1986
1. Cereals:						
- Whole Wheat	Kg	Imported	2.38	2.80	4.00	+43%
- Whole Wheat	Kg	Local	5.49	6.42	6.50	+ 1%
- Sorghum & Millet	Kg	Local	5.54	6.69	6.50	- 3%
- Maize (Corn)	Kg	Local	4.59	5.06	6.50	+28%
- Barley	Kg	Local	3.74	4.81	3.00	-38%
- Wheat Flour	Kg	Imported	2.83	3.15	4.00	+28%
- Rice	Kg	Imported	3.67	6.00	5.50	- 8%
2. Pasta & Bread:						
- Macaroni	453 gm. pkt.	Imported	4.82	5.83	10.00	+72%
- Spaghetti	453 gm. pkt.	Imported	4.82	5.83	10.00	+72%
- Bread (Rooti)	loaf 200 gm.	Local	1.00	1.00	1.00	0
- Bread (Sliced)	loaf 450 gm.	Local	2.50	2.50	2.50	0
3. Legumes:						
- White beans - dried	Kg	Local	17.97	20.37	20.00	- 2%
- Red beans - dried	Kg	Local	17.97	20.37	25.00	+23%
- Broad beans - dried	Kg	Local	10.61	14.07	12.00	-15%
- Lentils - dried	Kg	Local	9.50	13.40	12.00	-10%
- Chick peas - dried	Kg	Local	16.05	25.67	20.00	-27%
4. Fresh Vegetables & Fruits:						
- Potatoes	Kg	Local	5.81	6.83	9.50	+39%
- Tomatoes	Kg	Local	7.92	7.15	8.00	+12%
- Onions	Kg	Local	5.19	6.14	5.00	-19%
- Okra	Kg	Local	12.84	11.47	12.00	+ 5%
- Cauliflower	Kg	Local	7.70	10.83	12.00	+11%
- Lettuce	Head	Local	1.00	1.50	4.00	+167%
- Carrots	Kg	Local	6.55	7.65	7.50	- 2%
- Oranges	Kg	Local	15.00	20.00	30.00	+50%
- Bananas	Kg	Local	15.00	20.00	20.00	0
- Grapes	Kg	Local	20.78	22.15	25.00	+13%
- Limes	Kg	Local	27.50	30.00	40.00	+33%

Table V (continued)

Food Item	Measure	Source	CPO Data 1984	CPO Data 1985	Survey Data Dec.1986	% Increase (+) or Decrease (-) 1985 to 1986
5. Processed Food:						
- Creamed Biscuit (Boy Brand)	179 gm. pkt.	Local	2.00	2.00	2.50	+25%
- Mixed Vegetable	240 gm. can	Imported	2.90	3.82	5.00	+31%
- Tomato	240 gm. can	Imported	2.90	3.82	N.A.	-
- Tomato paste (puree)	198 gm. can	Imported	1.83	3.38	4.00	+18%
- Pears	425 gm. can	Imported	4.33	5.65	15.00	+165%
- Peaches	425 gm. can	Imported	4.50	5.65	10.00	+77%
- Pineapple	425 gm. can	Imported	4.50	6.40	10.00	+56%
- Toffee Candies	Kg	Local	15.67	16.00	16.00	0
- Hard Candies	Kg	Local	14.00	14.00	16.00	+14%
- Toffee & Candies	Kg	Imported	30.00	33.73	55.00	+63%
- Jam	Jar	Imported	7.00	7.50	12.00	+60%
- Honey	Jar	Imported	12.00	12.00	45.00	+275%
- Sardine with oil	200 gm. can	Imported	2.00	2.50	7.00	+180%
- Sardine with tomato	200 gm. can	Imported	2.00	2.50	7.00	+180%
- Tea leaves (Ceylon)	Kg	Imported	33.75	53.00	75.00	+42%
- Tea bags	pkt. of 100	Imported	19.59	27.00	35.00	+30%
- Yemeni Ground Coffee	Kg	Local	60.00	67.00	140.00	+109%
- Yemeni Coffee Husks	Kg	Local	37.92	58.20	120.00	+106%
- Ghee	Kg	Local	10.22	12.33	13.00	+ 5%
- Vegetable Oil	Gallon	Local	31.79	39.43	41.50	+ 5%
- Sugar (refined)	Kg	Imported	3.00	3.00	6.00	+100%
6. Dairy Products;						
- Cheese	113 gm. can	Imported	3.00	3.70	6.50	+76%
- Powdered Milk	2500 gm. can	Imported	50.00	66.00	120.00	+82%
- Condensed or Evaporated Milk	340 gm. can	Imported/ Local	3.00	3.80	5.00	+32%
- Reconstituted UHT Milk	liter packs	Local	4.00	4.00	5.00	+25%
- Fresh Milk	Liter	Local	6.00	6.00	6.00	0

Table V (concluded)

Food Item	Unit of Measure	Source	CPO Data 1984	CPO Data 1985	Survey Data Dec.1986	% Increase (+) or Decrease (-) 1985 to 1986
7. Meats:						
- Sheep & Goat	Kg	Local	64.58	67.33	105.00	+56%
- Beef	Kg	Local	35.70	40.00	50.00	+25%
- Veal	Kg	Local	55.00	60.00	90.00	+50%
- Chicken: - Frozen	Kg	Imported	10.67	13.00	N.A.	-
- Live broiler	Bird	Local	20.00	21.00	25.00	+19%
- Fish	Kg	Local	32.50	34.33	35.00	+ 2%
- Eggs	Dozen	Imported/Local	8.64	12.00	18.00	+50%
8. Baby Foods & Formulas:						
- Farleys	170 gm. pkt.	Imported	-	-	35.00	N.A.
- Phosphatin	250 gm. pkt.	Imported	-	-	25.00	"
- Farleys Rusks	300 gm. pkt.	Imported	-	-	45.00	"
- Guigoz	450 gm. can	Imported	-	-	25.00	"
- Cerelac	400 gm. can	Imported	-	-	30.00	"
- Buitoni Biscuits	140 gm. pkt.	Local	-	-	7.00	"
- Beechnut High Protein	227 gm. can	Imported	-	-	21.00	"
- Isomil	400 gm. can	Imported	-	-	31.00	"
- Farex	250 gm. can	Imported	-	-	35.00	"
- Farlac	350 gm. can	Imported	-	-	35.00	"
- Bebelac (Acidified)	400 gm. can	Imported	-	-	25.00	"
- Mamex	400 gm. can	Imported	-	-	30.00	"
- Omilac	400 gm. can	Imported	-	-	30.00	"
- Biomil	454 gm. can	Imported	-	-	25.00	"
- Morinaga	450 gm. can	Imported	-	-	30.00	"

Source: Statistic Yearbook 1985, CPO and Study Survey Data.

Table VI

Advertising Media Available in 1985

Media	Number of Circulation	Issued
A. Newspapers:		
1. Al Thawra	35,000	Daily
2. Al Jamhouriya	6,000	Daily
3. Al Amal	5,000	Weekly
4. 26th September	80,000	Weekly
5. Al Meethaq	15,000	Weekly
6. Al Ra'ai Al A'am	5,000	Bi-weekly
7. Al Sha'ab	5,000	Bi-weekly
8. Sana'a	5,000	Bi-weekly
9. Al Horriya	10,000	Bi-weekly
10. Al Wahda	5,000	Bi-weekly
11. Al Maseera Al Ta'awania	3,000	Bi-weekly
B. Magazines:		
1. Ma'een	10,000	Bi-weekly
2. Al Yemen Al Jadeed	10,000	Monthly
3. Al Ikleel	20,000	Monthly
4. Adhwa Al Yemen	30,000	Monthly
5. Al Nidhal	5,000	Monthly
6. Al Maseera Al Yemenia	10,000	Monthly
7. Al Horras	5,000	Monthly
8. Al Jeish	15,000	Monthly
9. Al Amal	10,000	Monthly
10. Al Tamween Wal Tijara	5,000	Monthly
11. Al Iqtisad Wal Tijara	3,000	Monthly
12. Al Watan	15,000	Monthly
13. Al Irshad	10,000	Monthly
14. Al Aqlam	5,000	Monthly
C. Television:	Daily Broadcast	4 p.m. to 11 p.m.
D. Radio:	Daily Broadcast	6 a.m. to 10 a.m. & 3 p.m. to 10 p.m.

Source: Statistical Yearbook 1985, CPO

Table VII

Basic Data on Food Processing Industries (1985)

	Large Plants (10 or more Employees)	Small-Medium Plants (5-9 Employees)
1. Number of Plants Distribution:		
- Sana'a	8	27
- Taiz	6	24
- Hodeidah	12	21
- Ibb	-	12
- Baidha	-	2
Total	26	86
2. Total Number of Workers	4,248	684
3. Total Costs of Inputs (1,000 YR)	745,339	24,350
4. Total Costs of Outputs (1,000 YR)	1,218,041	49,529
5. Total Costs of Imported Inputs (1,000 YR)	713,383	N.A.
6. Net Total Fixed Assets Excluding Land (1,000 YR)	684,503	17,263
7. Value-Added Based on Cost of Output	36%	29%
8. Average Annual Pay Per Worker (YR)	29,512	27,083
9. Number of Plants by Type of Incorporation:		
- Public Corporations	2	-
- Mixed Corporations	1	-
- General Partnership (Joint Liability)	3	-
- Limited Liability Partnership	13	-
- Individual or Family	7	86

Note: Public Corporations refer to those owned by the government while Mixed Corporations refer to jointly owned firms by government and private sector.

Source: Manufacturing & Processing Industry Survey Results, Central Planning Organization, July 1986.

Table VIII

Output of Food and Beverage Industries

Industry	Unit	1981	1982	1983	1984	1985
Bread	MT	1,506	2,144	2,123	2,181	2,417
Biscuits and Confectionaries	1,000 MT	21.8	25.6	31.9	38.2	50.3
Ghee and Edible Oils	1,000 MT	14.4	16.6	21.0	22.3	36.9
Canned Beans	MT	-	-	-	2,195	6,598
Tomato Paste	MT	-	-	-	554	-
Potato Chips	MT	-	-	-	-	147
Soft Drinks (Carbonated)	Million Liters	74	83	97	108	101
Bottled Water	1,000 m^3	33.6	60.0	83.4	100.0	119.0
Fruit Drinks & Syrups	1,000 liters	4,147	3,646	16,694	26,460	48,734
Milk & Yoghurt	1,000 liters	977	3,817	10,307	18,167	22,145
Ice Cream	MT	379	448	622	785	701

Source: Statistical Yearbook 1985, CPO

Annex A

Yemeni Foods

Some food items in the Yemeni diet are described below. While this is not an exhaustive list of Yemeni foods it does provide a good overview of food consumed on a regular basis.

Breads

Bint al Sahn - "Daughter of the Dish", a sweet pastry made of wheat flour, eggs, and clarified butter, baked in a pan inside the tannur. It is sprinkled with clarified butter and honey before serving. Consumed at the beginning rather than at the end of the meal.

Fattir - unleavened sorghum or corn bread, with oat added for flavor.

Jahin - flat bread of wheat flour leavened either with yeast or starter and baked on one side on the wall of a tannur, smaller and thicker than the more commonly used khubz. Used fresh or as a component in many traditional dishes (see below).

Kedam - "soldiers bread", leavened small round loaves of bread prepared by the military bakery from a mixture of cereals, inexpensive.

Khameer - fried doughnut of flour, sugar, yeast and egg. Popular for breakfast in the South.

Khubz - flat bread of wheat flour leavened either with yeast or starter, flattened with the aid of a pillow-like implement and baked on one side on the wall of a tannur. Used fresh or as a component in many traditional dishes (see below).

Khubz Arabi - pocket-type leavaned flat bread, a popular substitute for indigenous breads. Made of whole wheat and white flour, sometimes part sorghum flour for "Yemeni style".

Khubz tawwa - leavened flat bread of wheat flour, with or without fat used used in its preparation, roasted on large flat disks called "tawwa", similar to Indian-style breads.

Kider - unleavened sorghum or millet bread made with soured milk and shemir.

Kubana - made of cornmeal, yeast, and fat, baked in a black stone container on the floor of the tannur. Black cumin seeds can be sprinkled on top. Moist, fine texture.

Lahuh - leavened bread traditionally of sorghum but wheat and barley flour can be mixed with it. The sorghum grain is soaked in water before it is ground. It is cooked on large flat disks on top of the tannur and appears as a thin, large crepe. Mainly used for shafut, or served with soup poured over it.

Maluj - flat bread leavened either with yeast or starter, from barley or from a mixture of cereals. Flattened by hand, often with hilba, onto the wall of the tannur, then roasted in the open fire for a brief period. Considered especially appropriate with hilba or selta.

Mutabbaq - unleavened bread dough with meat, eggs, chinese chives, prepared on a tawwa or baked inside the tannur; also a type of pancake used for weaning.

Rashush - flat bread of white flour leavened either with yeast or starter, made flaky by layering the pulled, thin dough with ghee. Sprinkled with black cumin seeds before baking on one side on the wall of a tannur.

Ruti - commercially-prepared leavened white bread sold in a variery of shapes and sizes such as sliced 500 gram packaged loafs or in 200 gram crusty long rolls, or as 50 grams buns and rolls. Any type of Western bread is a ruti. It is especially popular in urban areas.

Sabaya - sweet wheat bread made with butter, cooked on the side of the tannur, and served with honey.

Susi - egg bread, made from khubz, eggs, clarified butter, sprinkled with black cumin seed and baked on a black-stone container inside the tannur.

Porridges and Gruels

Asid - thick porridge of sorghum or maize or a mixture of flours including wheat, eaten with hilba, sahaweq, clarified butter, soured milk or soup.

Hareesh - thick porridge of wheat (cracked or flour), often served with honey and clarified butter.

Madid - thin gruel of barley, sorghum, millet, or wheat flour with soured milk and spices.

Nashuf - thin gruel of barley or wheat flour cooked with soured milk and spices with the addition of stale bread. It is served with clarifid butter. Can be consumed with asid, fattah, or plain khubz; considered to be poor man's food.

Shabisa - pap of any flour and fat often with egg added, used for weaning food.

Shagur - porridge of millet and white wheat flour, dough is left to ferment overnight. Small dumplings formed from dough is boiled in a soured milk with sugar until mixture is thick. Served with ghee.

Shurba - gruel of wheat (or rice flour), soured milk, butter, and scallions.

Traditional Dishes

Bamia - okra with ground meat, onions, tomatoes, garlic, and spices. Okra is an extremely popular vegetable.

Fassoulia - white beans cooked with onions, tomatoes, garlic and consumed for the morning or sometimes evening meal.

Fattah - any type of bread softened by pouring soup, ghee and eggs, ghee and dates, bananas and honey, or ghee and honey over it. Consistency is similar to stuffing (such as dressing used for poultry).

Ful and ful madames - beans, such as dark beans, cooked with onions, tomatoes, garlic and consumed for the morning meal or purchased cooked from little stalls, often by school children.

Hanid - roast lamb or other meats, may be stuffed with spiced rice. Lamb is the required meat for special occassions, though chicken and beef have become popular.

Humus - sesame-seed paste and mashed chick peas (garbanazo beans).

Mahallabia - type of pudding made of milk, cornflour, sugar, and spices.

Mahshee - grape leaves, cabbage, bell peppers, or zucchini stuffed with a mixture of ground meat that has been sauteed with onions, garlic, tomato sauce; clarified butter, parsley, mint, and rice or cracked wheat. Can be steamed or baked.

Maraq - soup of beef, lamb, mutton, or chicken with one or more of the following: onions, potatoes, tomatoes, scallions, chilies, tripe, and spices (e.g. black pepper and ground cumin). The broth is poured off either to be drunk from a bowl or to be used for selta. Bowl of broth between courses is traditional. The remainder is consumed as stew.

Maraq hamedh - sour version of the above, an herb called "helka" is used to achieve sour flavor. Popular in the south and especially appropriate with asid.

Mushabak - thin threads of pasta fried, cooked in water with sugar and clarified butter.

Samak - fish, can be grilled, fried, baked, or cooked with sauce, but not cooked with vegetables. In Hodeida it is cooked with rice.

Selta - stew made in a special black stone pot of hilba (see below) and broth from marez and one or more of the following: potatoes and other vegetables boiled in the soup, egg, shahaweg, etc. Has to be served with bread, especially good with maluj.

Shafut - bread, especially lahuh, with a sauce of yogurt and any of the following: garlic, mint, chili, cilantro, tomatoes, chinese chives, and spices.

Shorba - soup made of grains of wheat, especially popular during Ramadan.

Non-Traditional Dishes

Chicken - inexpensive, thus much used either for soup or roasted. Its softer meat is more likely to be fed to children than beef or mutton.

Egg - result of poultry industry. Used in some traditional breads and occasionally in selta, but as more readily available, also popular for breakfast and sometimes for children's evening meals.

Pasta - e.g. macaroni cooked with ground beef and tomato sauce, or with tomatoes, onions, spices, and sauce; can be substituted for fattah. Sometimes prepared with cheese or served plain with no sauce on top.

Rice - not native to Yemen, but becoming increasingly popular. It may be mixed with pasta while cooking, or with tomatoes and/or other vegetables, or maybe cooked with meat or fish or in soup, or with spices such as cinnamon and cloves with onions. Often served with hot sauce, never with lahuh or selta. Usually made with clarified butter rather than with vegetable oil. In Taiz which has much Indian influence, often cooked or served with "dhal".

Salad - a more recent addition to Yemeni diets, it is a mixture of any of the following, cut into managable pieces: lettuce, tomato, cucumbers, onions, and carrots. Consumed by mixing with other foods during the meal.

Tuna fish (canned) - consumed with bread

Condiments

Hamidha - hilba (see below) with vinegar and sugar added for flavoring; especially appropriate at Ramadan.

Hilba - mixture of fenugreek seed, and a puree of the following: chinese chives, garlic, chilies, coriander leaves, mint, spices, and so forth. The fenugreek seed is ground (some wheat grains may be added), soaked in water for 1-3 hours, and with the help of a saponin-containing root whipped until foamy, then mixed with the puree of ingredients. Raw vegetables such as chinese chives, red and white radishes, green radish leaves, etc. are dipped into it.

Samn - clarified butter, similar to Indian "ghee" but rendered with millet, hilba and other spices, and flavorings.

Sahaweq - chopped tomatoes, chilies, and garlic, and any of the following: onions, ground nuts, crumbled cheese; or a blend of chilies, chinese chives, garlic, mint, and coriander leaves usually mixed with whipped fenugreek to make hilba or served by itself.

Wazif - small salted and dried fish that is ground and mixed with water to be served as is, or is mixed into other foods.

Beverages

Canada Dry - type of cola referred to by its brand name.

Coffee - prepared strong with sugar.

Fruit-flavored drinks - called "juice", a variety of ready-to-drink beverages sold in 250 ml cardboard containers. Some fruit pulp (could be less than five percent) is used in its processing. Popular flavors are: apple, grape, guava, mango, mixed fruit, orange, and peach.

Milk - for children with bread may be the main part of the evening meal, sugar and ghee may be added to it.

Haqeen - butter milk mixed with garlic, ground cumin seed, and salt.

Mazghool - weak coffee with cinnamon, cardamom, cloves, and sugar.

Qishr - mixture of roasted and unroasted ground coffee husks boiled and flavored with ginger, sugar, and other spices.

Sorghum coffee - sorghum grains boiled with cardamom, sugar, possibly other spices. When liquid is consumed, cooked sorghum on bottom of container is eaten.

Tea - prepared with sugar, often served to children mixed with milk as part of the evening meal.

Vimto - grape-flavored soft-drink, made by diluting syrup.

Weaning Foods

The following have been mentioned as foods used for weaning purposes: asid, banana, biscuits, Cerelac (brand name of infant cereal used for other brands as well), bread soaked in soup, carbonated beverages, fruit-flavored drinks, hareesh, infant formula, madid, mahallabia, mutabbah, powdered whole milk, shabisah, soup (broth only), rice, and tea with milk and sugar.

Snack Foods

The following are used for snacks between meals: biscuits, much more expensive than bread; bread roll sliced lengthwise with minced meat mixture; bread with soured milk; boiled and roasted ears of sorghum; ice cream, popcorn, potato boiled with hot sauce or hot pepper; potato chips; roasted legumes; soft drinks, either carbonated or fruit-flavored drinks; and yogurt.

Annex B

Potential Interventions

Some interventions along with their applicable data are discussed below.

During the survey of Yemeni food processors a "brainstorming" list of possible food industry related projects were developed. Four from this list were selected as they appeared to have good potential to improve the food situation in Yemen, have a positive impact on the overall nutritional status of the country, and provide a step toward alleviating specific nutritional deficiencies in the target population. It seems worthwhile to include this "brainstorming" list here in the hopes that these entries might stimulate other creative ideas.

Automatic line for khubz
Automatic production of lahuh
Centralized maintenance service group
Cleaning chemicals for food processors
Dried banana chips
Dried eggs
Dried fruit-leather confection
Dried fruits
Dried vegetables
Flour fortification
Greenhouse technology
Hydroponic technology
Instant coffee
Jojoba cultivation, processing
Kidam sandwich buns
Liquid smoke flavor (for ghee)
Nutritious chocolate-flavored drink
Nutritious coffee-flavored drink
Oilseed crushing plant
Okra oilseed cultivation, crushing
Oral rehydration salt packets for 750 ml. water bottles
Pizzerias
Powdered fortified fruit drinks
RTE breakfast cereals
    hot-rolled, e.g. cornflakes
    extruded, e.g. Cheerios
    instantized, e.g. instant oatmeal

Big showplace projects are not necessary, although bigness by itself should not be a negative factor. A venture which anticipates controlling a majority of the marketplace is not

usually viable. A small, efficient plant which supplies 10 to 25% of the demand is easier to build, de-bug, and run profitably.

Criteria for Project Selection. Out of the list above four projects were selected. Three of these are not improvements on the nutritional content of existing foods, but interventions that in addition to improving nutritonal status also meet other important criteria listed below. A proposed project must provide nutritional impact (first criterion listed) but may not satisfy all the others if it meets one criterion to an unusually high degree.

Nutritional impact. The intervention will address a specific nutritional need and will raise the nutritional status of the target population.

Public health considerations. The intervention will contribute toward improving the public health situation by promoting better food manufacturing practices in such areas as sanitation.

Balance of payments. The intervention will improve the country's trade balance, either by replacing imports with value-added products from processing of imported commodities, or by generating exportable goods.

Agricultural income. The intervention will enhance the income of farmers, either by providing additional outlets for their products, or by increasing the prices paid.

Meeting consumer demand. The intervention will assist in meeting the increasing consumer demand by alleviating some constraints on food production.

The Most Promising Projects. The following were considered to be the most important and viable projects for the reasons provided:

Flour fortification. The only explicit nutrient deficiency identified is anemia. This is found in women in almost every country and could be addressed (although not completely alleviated) by iron fortification of processed flour. Commercially prepared wheat products (bread, pasta, biscuits) are consumed by all but their consumption is higher in urban areas and among landless rural residents. As the urban poor and rural landless are the most economically disadvantaged, they are likely to have higher rates of anemia than others. Fortification of wheat flour will have a greater impact on them than on subsistence farmers.

Bread is a main staple in the Yemeni diet, from the Ruti manufactured in the central bakeries to the traditional breads baked in the home. Consumption figures indicate that per capita

consumption may be at least 50% greater than in the U.S. The flour used is purchased either from the Red Sea Flour Mills, as white flour (72% extraction) or "integral flour" (94% extraction), or else as whole wheat flour from the YGGC plant in Sana'a. Rough estimates indicate that about one-third of the wheat imports reach consumers via this route. The rest of the imported wheat products are as flour and semolina from the EEC and the U.S. The Red Sea Flour Mills is planning to install additional equipment which will quadruple its capacity. When this is finished, the company will probably process the great majority of imported wheat, with the possible exception of such specialty items as durum semolina for pasta and soft wheat flour for biscuits.

If these two mills (Red Sea and YGGC) are convinced (or required) to fortify their flour products with iron a sizable dent could be made in the iron anemia situation. The level of fortification should be at the 10 mg/cwt level recommended by the U.S. Food and Nutrition Board. We feel that this recommendation is justified in a developing country such as Yemen without danger of causing iron overload or hemachromatosis.

Flour fortification would represent a small additional cost to the Yemeni economy, which would be greatly outweighed by the nutritional benefits.

Vegetable and Fruit Drying. At the present time there is an inadequate consumption of vegetables and fruits which are seasonal produce. Increased intakes of these food items would improve the vitamin and mineral nutrition of the population throughout the calendar year. As meat is a scarce and high status food, more of it is consumed by men than by women and children; adding vegetables to soups and stews would thus provide a disproportionately higher quantity of them to women and children.

At the present time it is not known whether or not folic acid deficiency contributes to the high prevalence of anemia. Increased consumption of vegetables would increase folic acid intake. Fruits could be used as in-between snacks for children whose present fruit consumption is extremely low and often consist of only fruit-flavored drinks which may have fruit contents of five percent of less.

Yemeni fruit and vegetable growers cannot satisfy the domestic demand for fresh products. In the past part of this shortfall was met with imports, but the recent YARG ban on such imports has left the supply much lower than the demand. At present the only fruit which is not completely consumed in the fresh form is grapes. All the vegetables apparently are consumed fresh.

Accurate data for production and consumption of fruits and vegetables are difficult to obtain. The best production estimates for 1986 are 632,210 tons of vegetables and potatoes,

and 233,400 tons of fruits. About 75,000 tons were used by food processors (e.g. potato chip plants and the Bajil tomato paste factory) and 125,000 tons were consumed on the farm and outside regular marketing channels. Depending upon the econometric and demographic assumptions used, it is estimated that vegetable production would have to increase two to three fold to satisfy domestic demand, and the demand for fresh fruit may be from two to six times present production. Thus, at first glance it would not seem that preservation of fruits and/or vegetables by drying is an economically viable venture.

There may well be a niche for such a plant, however. Fruit and vegetable production is seasonal, and during certain times of the year there is a surplus of produce in the local markets. The situation with grapes is the prime example of this phenomenon. The excess grapes are dried by farmers to produce raisins which are generally conceded to be of low quality. A modern raisin processing plant could possibly correct this situation, either by upgrading the quality of raisins purchased from farmers, or by purchasing the fresh grapes and sun-drying them under conditions conducive to a high quality product. The raisins could be sold domestically, and some portion could conceivably be exported.

A spin-off from such an operation is the production of fruit leather confections. These are made by pureeing fresh fruit, removing unwanted parts such as the seeds, adding some sugar and gum stabilizers, and drying to produce a chewy confection having a fairly high fruit content. Fruit candidates for such production could be grapes, mangoes, and apples. As the domestic supply expanded other fruits could be added to the list. Given the current sales of sweets in Yemen, fruit leathers which are nutritous confections, would displace some of the sweets from the market.

The situation with regard to vegetables is more problematic at this time. Given the wide variety of micro-climates in Yemen, vegetable production is less seasonal than fruit production. Drying of vegetables near the production sites, however, makes transportation more efficient, because the large amount of water in fresh vegetables is not hauled to the market. The use of dried vegetables would fit in well with the Yemeni style of cooking, where they would be used in soups and stews. If production could rise significantly dried vegetables could be exported to neighboring countries. Thus, it may be more cost effective to grow vegetables and fruits on newly irrigated land than to grow wheat. An advantage of this type of industry is that it could be small (household or village level) without large investments.

Oilseed crushing plant. Yemen imports its entire supply of vegetable oil for culinary uses. In addition, its burgeoning poultry industry generates a high demand for imported poultry feed. These two items lead us to conclude that an oilseed crushing facility would be a highly desirable investment. The

resulting increased poultry and egg availability would greatly benefit children. Yemenis believe that children should consume only soft, easily digestible foods. Lamb, mutton, and beef are all considered too tough for children. Poultry cooked in soup, which is the way meats are most often used, becomes tender and soft enough to be fed to young children. Eggs are a popular item for the morning meal and are given to children; presently, however, there is a shortage of them. An increased supply would provide more of this high quality protein in children's diet. If the supply is increased prices may drop to a level that low-income households could afford to consume eggs on a regular basis.

The poultry industry in Yemen is growing rapidly, due in large part to the USAID-supported PETS project. Production of broilers was 74,700 tons in 1985, and is expected to grow to 100,000 tons by 1990. Egg production will grow from 5,400,000 dozen in 1985 to an estimated 21,000,000 dozen by 1990. All these birds require feed, nearly all of which is imported at a cost (1985) of around $250 to $275 per ton. Feed imports in 1985 were 179,000-195,000 tons (two estimates), and if the expected growth is to be experienced in 1990 the requirement will be 256,000- 294,000 tons. This represents a significant drain on Yemeni foreign exchange.

The consumption of vegetable oil in 1986 is estimated at 72,000 tons. This is met by importing crude oil, mainly palm oil from Malaysia and Africa, and refining it at one of the three domestic refineries located in Taiz, Hodeida, and Sana'a. The current price for imported palm oil is $600/ton. After refining it is canned and sold for cooking oil, treated with smoke flavor and sold as ghee, or partially hydrogenated and combined with butter oil and a water solution to make margarine. The demand for vegetable oil is expected to grow by 3.5% per year, in line with the expected population growth. Thus the predicted demand in 1991 is 84,000 tons.

A crushing plant for extracting oil from soybeans would contribute to saving import dollars in both these areas. From 100,000 tons of beans a plant would produce about 18,000 tons of crude oil and 79,000 tons of 48% protein soy meal. If a poultry feed formula used 30% soy meal, the 1990 demand of 275,000 tons of feed would require 82,500 tons of meal. The products from 100,000 tons of soybeans would provide the soy meal required for the country's poultry feed, and 21% of the domestic vegetable oil demand.

The actual situation could prove to be even more favorable than this. One of the PETS technical personnel opined that in all forms, for various animal feeds, Yemen could easily use 300,000 tons of soy meal per year. The oil equivalent to this much meal is 64,500 tons, or 77% of the 1990 demand. An alternative is to bring in other oilseeds with higher oil content, such as sunflower which has about 40% oil. In this case 82,500 tons of meal would correspond to 55,000 tons of oil.

There are a number of scenarios which would serve to optimize the balance between oil and meal production, and to maximize the profits from an oilseed crushing plant.

An additional factor is that a poultry feed mill using this domestically-produced oilseed meal could also use a significant amount of the wheat bran being produced by the Red Sea Flour Mills. They are producing about 140 tons of bran per day (and are planning to quadruple their capacity next year), or approximately 42,000 tons of bran per year. If used at 15% of the feed formula, this would equal the required input for poultry feed in 1990.

Industrial cleaning chemicals. There is a high prevalence of diarrhea and malabsoption among young children. All children consume manufactured foods such as dairy products, biscuits, bread, and canned beans. Much of it may be caused by equipment that is not properly cleaned due to unavailability of industrial cleaning chemicals and lack of knowledge of their use.

There are several companies in Yemen presently manufacturing soaps and detergents for the consumer market. During the team's visits to food processors it became apparent that proper sanitation was sometimes a problem. In at least one case (Yemen Snack Foods) effective sanitation was stymied by lack of the proper cleaning chemical and/or technical advice on its use. A local manufacturer of industrial-strength cleaners, including a knowledgeable technical sales force, would do a great deal to upgrade the sanitation level of manufactured foods.

The extractive industries in Yemen (e.g. salt and petroleum) could perhaps provide some raw materials for such a plant. A major input would be technical assistance from a company already engaged in this activity in the U.S. While much of the raw material such as caustic soda and sulfuric acid would be imported initially, the presence of a demand for these items might spur the formation of a small domestic chemical processing industry.

Annex C

Commodity Imports Into the Yemen Arab Republic

In general, all commodities imported into the Yemen Arab Republic, as well as their distribution and sales in the market, are brought in through private companies and a few public corporations. However, all imports of such commodities are under the control and supervision of the Ministry of Supply and Trade whose main roles are:

1. Issuing the tender notice for the import of each commodity;

2. Determining the quantity of each commodity to be imported on every tender. Due to the limitation of storage facilities, each tender issued is for a specified quantity of the commodity and several tenders are issued at intervals for each commodity;

3. Supervising the opening of the bids and determining the winner, under a committee and in the presence of the bidders;

4. Following up on the winning bid and assuring the performance of the winner in abiding by the terms of the sales contract;

5. Penalizing non-performers by taking action against them;

6. Assigning the tendered quantity among the bidders (importers);

7. Following up to assure that the L/C is opened in favor of the exporter by the representative of the winning bidder (exporter);

8. Determining and setting the wholesale and retail prices of the commodity based on the price of the winning bidder.

Even though the Ministry is the controlling authority of imported conmodities, the actual imports as well as the financing of such imports are done by the private sector and the few public corporations involved. Under the terms and conditions of the Ministry, the role of the importers include:

1. Contacting and acquiring agencies of exporters from various countries; and, in turn, such exporters would give their offer on each tender through their local agent or contact;

2. Arranging and coordinating with the exporter the preparation of offers and bid bonds for each tender;

3. Lobbying on behalf of their principal (exporter) in the tender;

4. The agent of the exporter who wins the tender coordinates and arranges the opening of the L/C. The L/C, though opened in the name of the agent of the exporter who wins the tender, is covered by each importer who gets a share of the total quantity specified in the tender. In other words, the financing of the L/C is pooled by all the firms who obtain a share in that specific tender;

5. On arrival of the commodity, the agent allocates the share of each firm and delivers that assigned share;

6. After receiving its share, each firm, in turn, distributes and markets the commodity in its regional area of business activity. In most cases, this is a distribution of the commodity to wholesalers in various regions.

The actual purchasing and selling of commodities is done by the private sector as well as the public corporations. The distribution of the shares to each firm from the quantity imported is made after deciding on the winning offer. The proportions of the shares are made on the following basis:

Public Corporations. On each quantity imported, public corporations are assigned forty percent of that total quantity, with each corporation, in turn, assigned an arbitrary portion of that 40 percent, depending on its main activities. These public corporations are:

- General Corporation for Foreign Trade - a majority government-owned corporation;

- Military Economic Corporation - belonging to the military and the police of the country;

- Government and Public Consumer Association.

Normally, the first two of the above receive the greater portion of the forty percent.

Private Corporations. The private sector gets sixty percent of the quantity which is distributed among them according to the bid offer given by their principals (exporters) and the number of firms which have entered the bid (normally 8 to 12 firms enter a tender). However, the winning bidder gets the biggest share of about 25 to 30 percent of the 60 percent assigned to the private sector. The shares of the remaining firms are determined by the competitiveness of their offered prices, relative to that of the

winning bidder. That is, the second-best offer gets the second highest share and so on to the highest bidder.

Terms_of_Tenders

Include shipping schedule, deliver, validity of offer, tender closing date, price, terms of payment, bid and performance bonds, and sales contract.

Shipping_Schedule.

- The total quantity is normally divided into several shipments depending on the quantity of each specific tender as well as the type of commodity;

- The vessel on which the cargo is shipped must not be over the age of 15 years; otherwise, the shipper (exporter) must bear any excess insurance premium charged;

- Demurrage charges must be defined in the offer;

- Shipment must be by chartered vessel or by conference line on full liner terms.

Delivery.

- Port of discharge - Hodeidah/ Ras Al Kateeb, Y.A.R.;

- Each shipment should be delivered according to the specified dates in the tender;

- Average daily unloading rate - specified -750 MT/day;

- Discharge for bulk grain should be made directly to the grain silos;

- Penalty for delay - for every day of delay beyond the specified delivery date a penalty of U.S. $5,000 is charged the supplier;

- Berthing - a specified time is required for the notice to berth.

Loading_Port. This must be specified in the offer.

Validity_of_the_Offer. The offers must be valid for at least 72 hours from the tender closing date.

Tender_Closing_Date. At the announcement of each tender, the closing date is specified, and a period of at least one week is normally given, before such a closing date, in order for the bidders to obtain their offers.

Price. The offered prices are normally requested to be on a C&F

basis. It is preferable, however, to break down the price into the FOB price and the freight costs.

Terms_of_Payment. Payments are made through a direct, irrevocable and confirmed letter of credit for the total amount in favor of the exporter.

Bid_Bonds_and_Performance_Bonds. In all tenders, "bond guarantees" are required to accompany all offers.

- Bid_Bond: A bid bond of 5 percent is required to accompany the offer. The validity of this bid bond must be for at least one week from the tender closing date.

- Performance_Bond: The exporter who wins this bid is required to raise the bid bond from 5 percent to a performance bond of 10 percent on the total C & F value of the tender. This performance bond must specify the issuing bank, the bond guarantee number, and the date of issuance of the bond.

Sales_Contract. Upon notification of the winner, the winning firm is required to send a representative to sign a formal contract of sales with the Ministry of Supply and Trade.

Types of Commodities

The food commodities which fell under the control of the Ministry of Supply & Trade and imported through the tender system are:

Wheat

Whole grain. There are two types imported: Australian White Wheat or U.S. Western White Wheat. Yemen has been chiefly importing its wheat from Australia and occasionally from the United States until the recent blended credit program was instituted with the U.S. Department of Agriculture.

Flour. Flour is one commodity to which the EEC member countries have dominated the market, and in particular France. They have taken such a lead because of competitive prices from the subsidies given by their respective governments. The following types have been imported from various EEC countries:

- Regular flour: Maximum 0.52 percent ash on dry basis; mininum 10 percent and maximum 12 percent protein; maximum 14 percent moisture; maximum 72 percent extraction.

- Biscuit flour: Maximum 0.52 percent ash on dry basis; minimum 8 percent and maximum 10 percent protein; maximum 14

percent moisture; maximum 72 percent extractions.

- Baking flour: 0.40 to 0.45 percent ash on dry basis; 11.5 to 12 percent protein; maximum 14 percent moisture, N x 5.7 with 14 percent moisture; 50/65 percent extraction; 250/300 second alpha amylase by Hamburg method.

Rice

The following types are imported: American parboiled rice No. 2 or better with maximum broken of 4 percent and maximum of red grains of 1.5 percent. Only from the United States of America.

Sugar

The following types are imported: White, crystalline, refined fine or medium-grain sugar with maximum polarization of 99.80 degrees, and maximum of 0.1 percent moisture at time of shipment. Sugar has been imported from various sources of origin depending on the exporters supply sources.

Item	Unit	Quantity	Value (1,000 YR)
1. Live Animals:			
- Cattle	Heads	60,304	55,307
- Sheep	Heads	232,465	40,657
- Goats	Heads	136,388	19,719
- Chicks	Birds	26,796,940	47,537
- Other Animals	Heads	114	171
Subtotal:			163,391
2. Meats:			
- Frozen or Chilled Beef and Veal	MT	1,379	15,738
- Frozen or Chilled Sheep and Goat	MT	570	5,796
- Frozen Chicken	MT	18,374	54,505
- Edible Offals	MT	81	372
- Preserved Meats	MT	61	446
Subtotal:		20,465	76,857
3. Fish:			
- Chilled and Frozen Fish	MT	5	89
- Dried and Salted Fish	MT	1	9
- Crustaceans and Mollusks	MT	0.4	4
- Canned Fish	MT	3,508	23,081
Subtotal:		3,514.4	23,183
4. Poultry Eggs:	Dozens	7,731,984	33,648
5. Dairy Products:			
- Evaporated and Powdered Milk	MT	14,969	173,056
- Butter	MT	3,524	37,883
- Cheese	MT	1,733	9,762
Subtotal		20,226	220,701
6. Cooking Oil and Shortening:			
- Ghee and Margarine	MT	37,491	12,301
- Soybean Oil	MT	12,736	20,832
- Cotton Seed Oil	MT	194	629
- Olive Oil	MT	346	2,474
- Palm Oil	MT	3	4
- Coconut Oil	MT	412	1,403
- Vegetable Oil	MT	3,107	12,425
- Others Oils from Vegetables or Animals	MT	3,831	5,070
Subtotal		58,120	55,138

Item	Unit	Quantity	Value (1,000 YR)
7. Grain and Other Commodities:			
- Whole Wheat	MT	346,460	284,925
- Rice	MT	36,539	67,852
- Barley	MT	349	924
- Maize	MT	8,875	9,700
- Rye	MT	27	54
- Oats	MT	194	913
- Millet	MT	36	59
- Sorghum	MT	4,937	5,263
- Other Cereals	MT	72	485
- Wheat Flour	MT	105,928	91,118
- Other Milled Grains	MT	233	288
- Crude Sugar	MT	2,319	3,002
- Refined Sugar	MT	120,069	129,791
- Ground Nuts (Peanuts)	MT	858	5,342
- Soya Beans	MT	1	3
- Sunflower Seeds	MT	137	1,371
- Sesame Seeds	MT	2,570	9,245
Subtotal:		629,604	610,335
8. Processed Foods:			
- Breakfast Cereals	MT	452	3,783
- Malt Barley	MT	72	582
- Pasta	MT	2,004	8,080
- Confectionaries	MT	1,398	13,410
- Baby Cereals	MT	751	7,848
- Candies and Sweets	MT	2,492	22,808
Subtotal:		7,169	56,511
9. Vegetables:			
- Potatoes	MT	258	922
- Dry Legumes	MT	1,900	4,142
- Fresh or Frozen Vegetables	MT	320	1,158
- Onions and Garlic	MT	134	363
- Preserved and Canned Vegetables	MT	14,537	49,119
- Sweet Potatoes	MT	21	92
- Sugar Canes (fresh)	MT	0.4	2
- Dehydrated Vegetables	MT	38	115
- Pickles	MT	5	33
Subtotal		17,213.4	55,946

Item	Unit	Quantity	Value (1,000 YR
10. **Fruits:**			
- Oranges (fresh)	MT	3,853	13,132
- Tangerines (fresh)	MT	680	3,948
- Lemons and Limes (fresh)	MT	150	680
- Grapefruit (fresh)	MT	12	46
- Unclassified Citrus Fruits	MT	522	1,082
- Bananas (fresh)	MT	3,813	9,700
- Apples (fresh)	MT	4,075	16,210
- Fresh Grapes	MT	39	321
- Raisins	MT	5	134
- Figs	MT	0.5	2
- Fresh and Dried Coconut	MT	64	290
- Pears	MT	134	653
- Pineapples	MT	309	994
- Dates	MT	1,495	18,947
- Mangoes	MT	354	1,957
- Dried Fruits	MT	317	820
- Other Fruits	MT	1,197	2,138
- Canned Fruits	MT	7,675	30,659
Subtotal		24,694.5	101,713
11. **Juices and Beverages:**			
- Fruits and Vegetable Juices	MT	7,004	29,823
- Tomato Juice	MT	466	2,693
- Syrups	MT	955	1,980
- Coffee Husks	MT	1	51
- Roasted Coffee	MT	6	113
- Instant Coffee	MT	20	543
- Cocoa Beans	MT	0.3	3
- Cocoa Powder	MT	117	758
- Chocolate	MT	797	8,067
- Tea	MT	3,212	39,622
Subtotal		12,578.3	83,653
12. **Nuts and Other Snacks:**			
- Cashew Nuts	MT	39	271
- Almonds	MT	87	402
- Other Edible Nuts	MT	32	486
- Roasted Nuts	MT	18	211
Subtotal		176	1,370

Item	Unit	Quantity	Value (1,000 YR)
13. Spices, Herbs and Condiments:			
- Chillies and Pepper	MT	608	4,609
- Cinnamon	MT	105	1,190
- Cloves	MT	9	196
- Nutmeg, Mace and Cardamon	MT	97	947
- Anise, Cumin and Caraway	MT	678	4,170
- Ginger	MT	698	4,871
- Thyme, Saffron, Bay Leaves and Other Spices	MT	206	970
- Sauces, Mixed Condiments and Seasonings	MT	515	1,940
- Yeast	MT	847	9,854
- Vinegar	MT	228	549
- Other Food Ingredients	MT	3,822	42,710
Subtotal		7,813	72,006
14. Other Foods:			
- Jams and Marmalades	MT	350	1,377
- Natural Honey	MT	196	2,607
- Artificial Honey	MT	1,566	6,686
- Soups and Broths	MT	21	131
Subtotal		2,133	10,801
15. Animal Feed:	MT	45,422	73,131
GRAND TOTAL VALUE OF IMPORTED FOODS			1,638,384

Source: Foreign Trade Statistics, Statistical Data Bank, CPO.

Annex D

Commodity Import System

In general, all commodities imported into the Yemen Arab Republic, as well as their distribution and sales in the market, are brought in through private companies and a few public corporations. However, all imports of such commodities are under the control and supervision of the Ministry of Supply and Trade whose main roles are:

1. Issuing the tender notice for the import of each commodity;
2. Determining the quantity of each commodity to be imported on every tender. Due to the limitation of storage facilities, each tender issued is for a specified quantity of the commodity and several tenders are issued at intervals for each commodity;
3. Supervising the opening of the bids and determining the winner, under a committee and in the presence of the bidders;
4. Following up on the winning bid and assuring the performance of the winner in abiding by the terms of the sales contract;
5. Penalizing non-performers by taking action against them;
6. Assigning the tendered quantity among the bidders (importers);
7. Following up to assure that the L/C is opened in favor of the exporter by the representative of the winning bidder (exporter);
8. Determining and setting the wholesale and retail prices of the commodity based on the price of the winning bidder.

Even though the Ministry is the controlling authority of imported commodities, the actual imports as well as the financing of such imports are done by the private sector and the few public corporations involved. Under the terms and conditions of the Ministry, the roles of the importers include:

1. Contacting and acquiring agencies of exporters from various countries; and, in turn, such exporters would give their offer on each tender through their local agent or contact;

2. Arranging and coordinating with the exporter the preparation of offers and bid bonds for each tender;

3. Lobbying on behalf of their principal (exporter) in the tender;

4. The agent of the exporter who wins the tender coordinates and arranges the opening of the L/C. The L/C, though opened in the name of the agent of the exporter who wins the tender, is covered by each importer who gets a share of the total quantity specified in the tender. In other words, the financing of the L/C is pooled by all the firms who obtain a share in that specific tender;

5. On arrival of the commodity, the agent allocates the share of each firm and delivers that assigned share;

6. After receiving its share, each firm, in turn, distributes and markets the commodity in its regional area of business activity. In most cases, this is a distribution of the commodity to wholesalers in various regions.

The actual purchasing and selling of commodities is done by the private sector as well as the public corporations. The distribution of the shares to each firm from the quantity imported is made after deciding on the winning offer. The proportions of the shares are made on the following basis.

1. Public Corporations: On each quantity imported, public corporations are assigned forty (40) percent of that total quantity, with each corporation, in turn, assigned an arbitrary portion of that 40 percent, depending on its main activities. These public corporations are:

a. General Corporation for Foreign Trade - a majority government-owned corporation;

b. Military Economic Corporation - belonging to the military and the police of the country;

c. Government and Public Consumer Association.

Normally, the first two of the above receive the greater portion of the forty percent.

2. Private Corporations: The private sector gets sixty percent of the quantity which is distributed among them according to the bid offer given by their principals (exporters) and the number of firms which have entered the

bid (normally 8 to 12 firms enter a tender). However, the winning bidder gets the biggest share of about 25 to 30 percent of the 60 percent assigned to the private sector. The shares of the remaining firms are determined by the competitiveness of their offered prices, relative to that of the winning bidder. That is, the second-best offer gets the second highest share and so on to the highest bidder.

Terms of Tenders:

1. Shipping Schedule:

   a. The total quantity is normally divided into several shipments depending on the quantity of each specific tender as well as the type of commodity;

   b. The vessel on which the cargo is shipped must not be over the age of 15 years; otherwise, the shipper (exporter) must bear any excess insurance premium charged;

   c. Demurrage charges must be defined in the offer;

   d. Shipment must be by chartered vessel or by conference line on full liner terms.

2. Delivery:

   a. Port of discharge - Hodeidah/ Ras Al Kateeb, Y.A.R.;

   b. Each shipment should be delivered according to the specified dates in the tender;

   c. Average daily unloading rate - specified - 750 MT/day;

   d. Discharge for bulk grain should be made directly to the grain silos;

   e. Penalty for delay - for every day of delay beyond the specified delivery date a penalty of U.S. $5,000 is charged the supplier;

   f. Berthing - a specified time is required for the notice to berth.

3. Loading Port: This must be specified in the offer.

4. Validity of the Offer: The offers must be valid for at least 72 hours from the tender closing date.

5. Tender Closing Date: At the announcement of each tender, the closing date is specified, and a period of at least one week is normally given, before such a closing date, in order for the bidders to obtain their offers.

6. Price: The offered prices are normally requested to be on a C&F basis. It is preferable, however, to break down the price into the FOB price and the freight costs.

7. Terms of Payment: Payments are made through a direct, irrevocable and confirmed letter of credit for the total amount in favor of the exporter.

8. Bid Bonds and Performance Bonds: In all tenders, "bond guarantees" are required to accompany all offers.

   a. Bid Bond: A bid bond of 5 percent is required to accompany the offer. The validity of this bid bond must be for at least one week from the tender closing date.

   b. Performance Bond: The exporter who wins this bid is required to raise the bid bond from 5 percent to a performance bond of 10 percent on the total C & F value of the tender. This performance bond must specify the issuing bank, the bond guarantee number, and the date of issuance of the bond.

9. Sales Contract: Upon notification of the winner, the winning firm is required to send a representative to sign a formal contract of sales with the Ministry of Supply and Trade.

Annex E

Major Food Processing Industries Operating in 1986

Processor	Products	Licensed Brands	Remarks
1. National Dairy Co. Ltd. Taiz, YAR	-Reconstituted UHT Milk	-	Part of the Hayel Saeed Anam Group. Estimated capacity for dairy products 20,000,000 liters annually.
	-Yoghurt	-	
	-Milk Flavored Drinks	-	
	-Evaporated Milk	Dutch Baby	
	-Canned Vegetables	-	License from Holland.
2. Yemen Company for Ghee and Soap Industry Taiz, YAR	-Vegetable Oils	-	Part of the Hayel Saeed Anam Group. Estimated 1986 output 65,000 MT.
	-Ghee	-	
	-Canned Butter	-	
3. Bilqis Biscuit & Confectionary Co., Taiz, YAR	-Biscuits	-	Estimated output:
	-Wafers	-	-Biscuits & Wafers 6MT/shift
	-Hard Candies	-	-Candies 4MT/shift
4. Fardoos Bottling Plant Co. Taiz, YAR	-Concentrated Juice	Sunquik	License from Holland
	-Squash	-	
	-Ribena	Ribena	License from Unilever
5. Red Sea Flour Mill Hodeidah, YAR	-Wheat Flour	-	Utilizes input of 520 MT every 24 hours. Plans to expand capacity to 1,400 MT/24 hrs.
6. Abdallah Qaeed Seif Co. Hodeidah, YAR	-Vimto Drink	Vimto	License from UK. Estimated capacity 350,000 cases/year of 12-750 m. bottles.
7. Yemen Co. for Milk & Juice Manufacturing (Yemany) Hodeidah, YAR	-Reconstituted UHT Milk	-	Belongs to Thabet Brothers Group. Estimated annual capacity 15,000,000 liters.
	-Yoghurt & Buttermilk	-	
	-Ice Cream	-	
	-Fruit Flavored Drinks (Juices)	-	
8. National Company for Manufacturing Oil & Ghee Hodeidah, YAR	-Ghee	-	Part of Thabet Brotners Group. Estimated capacity per shift 15,000 MT.
	-Vegetable & Corn Oil	-	
9. United Company for Industry & Frozens (NANA) Hodeidah, YAR	-Reconstituted UHT Milk	-	Estimated capacity 10,000,000 liters annually.
	-Yoghurt	-	
	-Ice Cream	-	
	-Fruit Drinks (Juices)	Rauch	Licensed from Austria.
10. Yemen Company for Industry & Commerce (YCIF) Taiz, YAR	-Biscuits	-	Part of Hayel Saeed Anam Group. Produces around 60 varieties of biscuits. Estimated output 1986 is 61,000 MT working 3 shifts a day.
	-Wafers	-	
	-Candies	-	
	-Infant Biscuits	Buitoni	
	-Tahini	-	
	-Pasta	Buitoni	

Processor	Products	Licensed Brands	Remarks
11. Yemen Snack Food Manufacturing Co. Sana'a, YAR	-Potato Chips	Noaman	Licensed from Childrens' TV Program, "Iftah Ya Simsim." Estimated capacity 140 MT/shift.
12. Al Thawra Industrial Complex Sana'a, YAR	-Vegetable Oil -Ghee -Margarine	- - -	Estimated capacity: -Vegetable oil 100MT/shift -Ghee & Margarine 5MT/hr.
13. Yemen Beverages & Industrial Co. Sana'a, YAR	-Soft Drinks -Fruit Drinks (Juices)	Seven Up -	Seven Up is produced under license. Capacity for soft drinks estimated at 2.6 million cases.
14. Yemen General Grain Corp. Bakeries -Sana'a -Taiz	-Sliced Bread -Rooty -Buns	- - -	A public corporation having two bakeries located in Sana'a and Taiz. Each bakery produces 5 MT/day of bread.
15. Dirhem Industrial Company Hodeidah, YAR	-Soft Drinks -Canned Juices	Sinalco -	Licensed from West Germany. Total capacity 182 million liters annually.
16. Military Economic Corp. Bajil Vegetable Processing Plant Bajil, YAR	-Tomato Paste -Canned Vegetables	- -	Estimated capacity 29,000 MT/year
17. Yemen Bottling Industry Taiz, YAR	-Soft Drinks -Bottled Water (Soha)	Coca Cola -	Produced under license. Also produces orange drink. Super capacity 1,400,000 cases annually.
18. Yemen Company for Beverages Industries Sana'a, YAR	-Soft Drinks	Pepsi Cola	Under license. Produces orange flavor Mirinda. Capacity 1,900,000 cases annually.
19. Hodeidah Bottling Company Hodeidah, YAR	-Soft Drinks	Canada Dry	Under license. Produces three flavors: orange, cola and lime. Capacity 3,300,000 cases annually.
20. National Beverages Bottling Co. Sana'a, YAR	-Soft Drinks	Canada Dry	Under license producing three flavors: orange, cola and lime. Capacity 5.5 million cases per annum.
21. Arwa Mineral Water Co. (Shamlan) Sana'a, YAR	-Bottled Water	-	Produces 1.5 liter and 0.75 liter bottled water. Annual capacity of 55 million liters.

Processor	Products	Licensed Brands	Remarks
22. Al Nahdein Mineral Water Co. (Hadda) Sana'a, YAR	-Bottled Water	-	Produces 1.5 liter and 0.75 liter bottled water. Annual capacity of 25 million liters.
23. Azal Industrial Development Co. Ltd.	-Bottled Water	-	Annual capacity of 25,000,000 liters.
24. Maren Mineral Water Co. Al Jarrahiya, YAR	-Bottled Water	-	Annual capacity of 25,000,000 liters.
25. Katen Brothers Trade and Industrial Co. Ltd. Sana'a, YAR	-Macaroni -Spaghetti	- -	Capacity unknown.
26. Sana'a Food Industrial Co. Sana'a, YAR	-Corn Puffs -Candy Bars	- -	Capacity unknown.

Source: Ministry of Economy, Supply and Trade Records and Survey Data.

GLOSSARY OF TERMS

asid - sorghum porridge
bamia - okra and okra-containing dishes
bint-al-sahn - type of bread served with butter and honey
cerelac - brand name in common usage for weaning food of cereal
dhal - any food item where legume is the predominant ingredient
EEC - European Economic Community
fattir - type of bread
fattah - bread and soured milk dish
fassoulia - dish of white beans cooked with tomatoes, onions, garlic, etc.
ful - dish of dark beans cooked with tomatoes, onions, garlic, possibly ground meat, etc.
ghee - clarified butter
gm - gram
GDP - Gross Domestic Product
hamidha - condiment
hanid - roast meat
haqeen - buttermilk drink
hareesh - wheat porridge
hilba - both fenugreek seed and fenugreek-seed containing dishes
humus - sesame paste and garbanzo mixture
jahin - type of bread
kedam - type of bread
khameer - doughnut-type breakfast food
khubz - type of bread
kider - type of bread
kubana - type of bread
lahuh - type of spongy bread
madid - type of gruel
mahallabia - dessert of milk and cornflour
mahshee - stuffed vegetables
makhbaze - an implement for flattening bread dough before baking it on the side of the tannur
maluj - type of bread
maraq - meat soup
mazghool - type of coffee
mg - milligram
ml - milliliter
mushabak - type of dessert
mutabbaq - pancake-like food
nashuf - type of gruel
OPIC - Overseas Private Investment Corporation
PETS - Poultry Extension Technical Services
qishr - coffee made of the husks of the coffee bean
Ramadan - Muslim religious month of fasting
rashush - type of bread
ruti - type of bread

sabaya - type of bread served with butter and honey
sahaweq - condiment
samak - fish
samn - clarified butter
selta - stew made with hilba
shabisa - gruel
shafut - bread and soured milk dish
shagur - type of porridge
shorba - type of soup
shurba - type of gruel
suq - market
susi - type of egg bread
tannur - cylindrical oven, khubz and maluj are baked on its side, cornbread, stews, etc. inside on the bottom
tawwa - cooking utensil; a flat disk used to prepare mainly Indian-style breads
USAID - United States Agency for International Development
vimto - grape-flavored soft drink
wazif - small salted dried fish
YARG - Yemen Arab Republic Government
YCIC - Yemen Company for Industry and Commerce
YGGC - Yemen General Grain Corporation
YR - Yemeni Rial (local currency, current exchange rate US $ = YR 11.86)

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