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SPECIAL PROGRAMME FOR THE INDUSTRIAL DEVELOPMENT
OF ASIA AND THE PACIFIC:
COUNTRY BRIEFS ON AGRO- AND FOOD-PROCESSING INDUSTRIES IN
THE LEAST DEVELOPED COUNTRIES IN THE ASIA AND THE PACIFIC*

Prepared by the
Area Programme Division
Department for Programme and Project Development

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INTRODUCTION

The Third General Conference of UNIDO of 1989 passed a resolution establishing a Special Programme for the Industrial Development of Asia and the Pacific. The first phase concentrated on agro-related metalworking industries and as a result UNIDO issued in January 1991 a separate document (PPD/R.47) consisting of country briefs on agro-related metalworking industries in the least developed countries (LDCs) in the Asia and Pacific Region. Same year the Industrial Development Board expanded the Programme to cover agro- and food-processing industries in the LDCs in the region. The Fourth General Conference of UNIDO in 1991 emphasized in its resolutions GC.4/Res.8 and 9 on this subsector as one of the key areas in the LDCs in this region endorsing also the particular role of this subsector in the industrial development in rural areas. This was highlighted in the Industrial Action Programme for the Least Developed Countries (GC.4/Res.10).

UNIDO accordingly launched a preparatory phase to identify and analyze the potential and constraints of agro- and food-processing industries in these countries with a view to providing the concerned governments an opportunity to decide on the priorities and critical interventions in terms of policies, investments and external assistance. This phase consisted of a series of fact finding and constraint identification missions to the countries in September - November 1992, an elaboration of comprehensive country briefs and a UNIDO/ESCAP Regional Workshop on Agro- and Food-Processing Industries in Asian and Pacific LDCs, held in Bangkok, Thailand, 24 - 27 November 1992 with the participation of nine LDCs from the region, namely: Bangladesh, Bhutan, Cambodia, Lao PDR, Maldives, Myanmar, Nepal, Western Samoa and Yemen.

A detailed separate document on the workshop was issued by UNIDO (PPD/R.59) which includes a number of critical areas of intervention and project concepts for further elaboration with local authorities. The Regional Workshop also agreed that reports on the development potential for food-processing industries together with proposals for technical cooperation interventions be prepared by UNIDO for each participating country for the consideration of the governments and related agencies like FAO to serve as a reference document for the establishment of priorities, elaboration of selected projects for external assistance and donor coordination. These documents were prepared on the basis of the preparatory activities described above, and completed with accumulated experience and data at UNIDO Headquarters and already submitted to the respective countries.

The present document contains the country briefs showing the status of agro and food-processing industries on each Asian and Pacific LDC which was drafted originally at UNIDO in 1991, but updated partly substantially on the basis of the information collected during the consultants' missions in September - November 1992 and during the regional workshop in November 1992, including the information presented in the country statements by each participant. The purpose of this document is to serve as a source of reference information and inspiration to donor and implementing agencies when developing projects and programmes in areas related to agro- and food-processing industries in the least developed countries in the Asia and the Pacific region.

AFGHANISTAN - Islamic State of Afghanistan

Summary of Constraints and Potential

Constraints:

- War damage
- Low level of human resources development
- Landlockedness
- No capital for rehabilitation
- Small internal markets

Potential:

- Large unexploited agricultural resources (especially fruit and livestock-based products)

1. Review of Development Constraints and Prospects

Industrial activities in Afghanistan are to a large extent based on domestic crops, and therefore the improvement of the performance of the agricultural sector is of crucial importance. Shortage of inputs has e.g. resulted in the closure of sugar factories. Increasing agricultural output including livestock will be a long-term task, its success depending on the cessation of hostilities, clearing of mines from large areas, reconstruction of rural road and irrigation infrastructure, the provision of efficient extension services to improve cropping methods, and the re-establishment of rural social structures. It would appear that, with a return to normal circumstances, there is a considerable potential for the expansion of crop production, rural population densities being as yet quite low in many areas, and modernization of cropping techniques is possible without necessarily damaging the fragile semi-arid environment.

In the food-processing industry, many obstacles are to be surmounted as well. Apart from war damage, ageing plants are also a problem as well as the destruction of physical infrastructure, the absence of specialized support services and the very serious lack of skilled human resources.

Before an expansion of the sub-sector can be contemplated (assuming that the required agricultural inputs will be available), it should be established which plants can be rehabilitated and which rehabilitation priorities should be set within the sub-sector. The rehabilitation issue has been taken up by UNIDO. Training at managerial and shop floor level would also need particular attention. The role and participation of women in this process requires special attention, although there are formidable cultural barriers to be surmounted. While the domestic market is rather limited as a consequence of the relatively small population and very low living standards, the revitalized food-processing industries would help to cover a larger part of the basic needs of the population and save foreign exchange now expended on imports. Key

food-processing industries for the domestic market would be sugar milling, flour milling, oil milling, dairy products and slaughterhouses. Many of these activities take place on a cottage scale. To raise health and nutritional standards, ways to improve the quantity and quality of their outputs should be investigated.

Afghanistan is a traditional exporter of dried fruit, much of it provided by small-scale and cottage-scale industries. Building on the traditional expertise, the range and quality of these products could probably be expanded. Meat products could be another possibility. While Afghanistan's resource endowment is rather similar to that of neighbouring countries, it does have the advantage of very low wage costs, which is of crucial importance in this labour-intensive industry. While better road/rail connections are essential for raising this landlocked country's export earnings, much could possibly be gained already in trade with countries outside the sub-region if agreements could be made about the reduction of administrative obstacles which transit through the neighbouring countries now faces.

2. Economic Performance

a. General Characteristics of the Economy

The economy of Afghanistan has suffered seriously as a consequence of many years of war. Reliable data are scarce, but GDP is estimated to have contracted by 1.3 - 2.6 per cent annually since 1978/79. The decline in recent years may have been stronger: according to official statistics, the 1989 GDP of Afs. 125 billion was two per cent lower than in 1987. Per capita income, according to the most recent available estimate, was US\$ 105 (constant 1978 prices) if the official exchange rate is used. However, at 1989 prices and free market conversion rates, the per capita income was only US\$ 69 (UNDP 1989).

Table 1 gives a breakdown of economic activities.

Table 1. Afghanistan GDP Shares, 1989

Sector	%	Public and Mixed Sector	Private Sector
GDP	100.0	18.4	81.6
Agriculture	57.4	0.2	99.8
Industry	22.8	44.1	55.9
Trade and Food Procurement	8.1	13.1	86.9
Transport and Communication	4.3	31.8	68.2
Construction	6.0	75.0	25.0
	1.4	18.0	82.0

Source: UNDP 1989

The shares of the various sub-sectors have hardly undergone any change since the mid-1980s. The agricultural sector is by far the most important sector, accounting for 57 per cent of GDP (other sources give shares ranging

from 45 to 63 per cent). The sector is also the most important source of foreign exchange and of employment, with an estimated two-thirds of the labour force in 1985/86 (EIU 1990a). It is followed by mining and manufacturing, with 23 per cent of GDP and 15 per cent of the labour force. The manufacturing sector by itself accounts for 12-14 per cent of GDP.

b. Agriculture, Fisheries and Manufacturing

Of a total cultivable area of some 15 million hectares, approximately one-third was cultivated before the war. The main crop is wheat, grown on approximately one-fourth of the cultivated area. Apart from wheat, a variety of other cereals is also grown. Other important crops are cotton, fruits, nuts and vegetables, and sugarbeet. While only a small part of the country can be cultivated as a consequence of the rugged terrain and harsh climate, much of it is suitable for extensive grazing, and the country had large numbers of livestock in the past. In 1978, there were some 25 million sheep and 3.6 million cattle.

Irrigation is quite common and has been an established practice for many centuries. The irrigated area may have been as much as two-thirds of the total cultivated area in the 1970s. Double cropping was practiced on about 1.4 million ha. In 1988 a total of 3.2 million ha. was reportedly under cultivation, of which 2.1 million ha. under irrigation. This is a drop in cultivated area by approximately one-fifth in comparison with 1987. Output also decreased, by 20 per cent as compared with 1987. A further drop of 2.5 per cent took place in 1989 (UNDP 1989). Total agricultural output (including livestock) may have decreased by close to 50 per cent since 1978 (EIU 1990). These figures illustrate the disruption caused by the war, which has resulted in mass exodus from certain areas and a destruction of local infrastructure. Farms are usually small, and most farming is subsistence-oriented, using traditional methods. Yields are low, also because of the harsh environment. In recent years, supplies of equipment and fertilizer have not been available in many parts of the country. Since the 1970s, various land reform and collectivization programmes have been carried out. These are not believed to have been successful (see e.g. UNOCA 1988).

Most manufacturing activities are small scale. Cottage industries are thought to employ some 200,000 people. In 1991 there are some 30 large-scale, modern public enterprises employing some 21,000 persons. There was no information on modern large-scale enterprises in the private sector. There were some 230 registered small industries in 1983, employing 14,000 workers (UNOCA 1988). The actual situation in 1993 is being reviewed under the UNDP Rehabilitation Strategy for Afghanistan, Technical Working Group on Industry coordinated by UNIDO.

The manufacturing sector mainly processes domestic raw materials. The modern sector produces, a.o., fertilizers, cement and textiles. The traditional sector produces, a.o., carpets, furniture, vegetable oil and dried fruit. There is no recent detailed overview of branch or sub-sector performance. Table 2 shows the output of a number of major industrial products during the first half of the 1980s. In terms of volume, cement, fertilizer, textiles and flour were the most important products. The textile industry's output decline is probably mainly due to the scarcity of agricultural supplies. Wheat flour production shows a surprising and unexplained increase (178,000MT in year 1990-91). In the 1988-1989 biennium, the output of

chemicals decreased by 10 per cent, of cement by three per cent and of concrete by 57 per cent. For the production of carpets and footwear an unquantified increase in production was noted (UNDP 1989). Raw material supply problems are exacerbated by damage to plant and ageing machinery, and a shortage of skilled staff. Such information as is available on MVA indicates that there has been a drastic change in the shares among the major branches. Between 1976 and 1985, the share of food products increased from 17 per cent to 43 per cent while the share of textiles declined from 53 per cent to two per cent. This is probably not so much due to a strong increase in the output of the food processing industries as to a dramatic decline of production in the textiles sub-sector and some less important industries.

Table 2. Afghanistan - Output of Selected Industrial Items ('000 tons unless otherwise indicated)

	1979/80	1981/82	1982/83	1983/84	1984/85
Cement	99	75	87	131	112
Fertilizer (urea)	106	108	113	125	121
Salt (unrefined)	68	37	..	..	..
Sugar (unrefined)	9	3	..	..	..
Wheat Flour	123	123	124	136	154
Vegetable Oil	10	7	..	..	..
Cotton Textiles (mn m)	63	43	..	..	..
Ginned Cotton	29	23	..	..	..
Rayon Textiles (mn m)	21	15	..	..	..
Woolen Textiles ('000 m)	401	245	277	285	320
Dried Fruits	47	57	45	65	52
Casing ('000 coils)	1,700	1,390	1,413	1,803	1,552

Sources: Five Year Development Plan (1979/80 - 1983/84); Asian Development Bank, Key Indicators of Developing Member Countries.

3. Food Processing Industries

a. The Raw Material Base

The present circumstances do not allow the collection of detailed information on agricultural production. There are various estimates, which are somewhat contradictory and the figures in Table 3 should be interpreted as showing orders of magnitude rather than giving an exact picture of annual output. The total amount of food grains harvested in 1986/87 was 3.1 million tons, a 29 per cent drop in comparison with 1978/79. As indicated above, there has been a further drop in production since 1986/87. The decline is not only visible in wheat, where production fell by 30 per cent during 1978/79 - 1986/87, but the output of all other cereals has declined as well. It was estimated in 1991 that the total wheat import requirement was 380,000 tons. A large-scale return of refugees would add to the requirement, as it would take some time for agricultural production to catch up (UNOCA 1991). In spite of the shortfall, there is no very serious shortage of essential food products, partly because so many people have left the country, partly because of large-scale aid provided by a number of donors.

Table 3. Afghanistan - Production of Principal Crops, 1978/79 - 1986/87

	1978/79	1982/83	1983/84	1984/85	1985/86	1986/87
Food Grains						
Wheat	2,813	2,391	2,306	2,194	2,081	1,997
Barley	325	276	266	254	240	230
Corn	780	663	639	608	577	554
Rice	428	364	350	334	317	304
Other Food Grains	36	30	30	28	27	25
Total	4,382	3,724	3,591	3,418	3,242	3,110
Fruits	824	809	790	762	740	760
Vegetables	766	802	790	763	736	746
Industrial Crops						
Cotton	132	45	50	68	55	64
Sugarbeet	73	20	16	26	5	5
Sugarcane	64	63	62	60	58	60
Oil Seeds	35	45	45	45	45	45

Source: UNCTAD, Country Presentation by the Government of Afghanistan

Horticulture has not been hit as seriously by the war as cereal production, although the main growing areas of fruit and vegetables (the East Central and Southern regions) appear to have been as badly hit by war as the others. The main industrial crops, cotton and sugarbeet, have been very badly affected, production dropping by 52 and 93 per cent, respectively, over 1978/79 - 1986/87. Sugarcane and oil seeds have done comparatively well. These relatively minor crops are possibly grown in areas less affected by the war.

There is no detailed information on the decrease of livestock. Much of it was slaughtered, killed in the fighting or taken to Pakistan by refugees. One positive effect is that some of the overgrazed rangeland has had time to recover.

The recovery of agricultural production will be a long-term issue. Mine clearance alone will take many years and meanwhile much of the land cannot be cultivated. Roads and irrigation systems have to be repaired, and extension and veterinary services, which were partly rudimentary in the first place, will have to be re-established and improved. Draft animals will have to be replaced (tractors cannot be used efficiently in most areas) and the supply of tools and inputs such as fertilizer, pesticides and seeds must be assured. Finally, the complex social systems which guided agricultural production will have to be re-established or adapted to changed circumstances, a workable system of land reform may have to be formulated and implemented.

Afghanistan is already receiving assistance to solve many of the above mentioned problems. The impact in some areas has been a doubling or trebling of agricultural output (see UNOCA 1991). But the conclusion must be that the raw material base for the food processing industry will remain modest for

years to come, and projects to rehabilitate or expand food processing will have to take account of that limiting factor.

b. Characteristics of the Sub-sector

There is virtually no information on the food processing industry. There is obviously a large cottage sector for domestic and local use, but there is almost no information on its size, performance and products. Grain milling and fruit drying are known to be important. As Table 2 shows, the production of dried fruit has been more or less stable during the first years of the 1980s. In the modern sector, the documentation mentions sugar mills, fruit/vegetable processing, flour mills, oil mills and bakeries. Numbers, size, employment and ownership are not known, except that the two sugar mills (one not yet operational) at Baghlan have a combined capacity of 37,000 tons/year. A number of modern units are located in the Kabul area, which constitutes a major market for food industry, and which is also the centre of an important cereal and fruit and vegetable growing area. Kandahar is the location of a larger fruit and vegetable canning industry. According to the Ministry of Planning the production figures for some agro-products in the year 1990-91 was as follows:

- Wheat flour: 178,000 MT;
- Bread and bakery products: 44,300 MT.
- Meat: 3,180 MT;
- Vegetable oil: 1,040 MT; and
- Salt: 24,000 MT.

The sub-sector probably uses little of its nominal capacity at the moment, and many units would be at a standstill (among them at least one sugar factory), as a consequence of the shortage of imports, transport problems, destruction and ageing of plants, lack of skilled personnel and unreliable energy supply. There is very little information on recent projects; most of the factories built during the 1980s seem to have been heavy industry projects. A fully computerized slaughterhouse in Herat, which was to export most of its products, was never operational. A UNDP/UNIDO project for the restructuring of the private sector included an assessment of rehabilitation needs in a number of food processing enterprises. This has, however, been superseded by subsequent events.

According to a recent unofficial observation mission to Afghanistan there are 26 dry fruit processing plants in the country. Seven of them are closed down and those which are working are using only one fifth of their capacity due to destroyed vineyards supplying raw material. The subsector used to be an important employer and hard currency income earner mainly with red raisins, but also with almonds, pistachios, apricots, plums, walnuts etc.

The same observer reports ten fruit juice plants of which three are closed and 34 registered sweet, and chocolate factories of which only three are working. Especially the latter subsector has previously been a significant employer to approximately 1,400 workers; now the figure is about 40. An almost equally dramatic decline can be observed in the number of operating sausage, macaroni and breadmaking plants: 21 of existing 32 are closed, and only one fifth of the former employees still have their jobs.

c. Trade in Food Products

Afghanistan's most important agro-based export products are fresh and dried fruit, of which the country exported US\$ 142.1 million in 1988/89, and US\$ 110.2 million in 1989/90. These exports (among which dried fruit predominates) constituted 33 per cent of total exports in the former year and 47 per cent in the latter (EIU 1990a). Food exports, like exports in general, have exhibited a downward trend throughout the decade. Apart from fruit, the country does not seem to export any other food, processed or otherwise, at present. The former USSR was the most important market for Afghanistan's exports. Pakistan and India also used to be important markets. Food products are among the country's major imports, but there are no details on quantified and product categories. Again, the former USSR was the dominant trade partner. Much food is imported under assistance programmes. The present situation with trading partners is not clear due to lack of reliable data.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

Until the late 1980s, there was a trend towards nationalizing enterprises. As Table 1 shows, this trend has been quite strong in industry (particularly the energy sub-sector) and in construction. In the late 1980s, a liberalization of the economy began to take place. This included the revision of Investment Law for Foreign and Domestic Investments and other relevant codes, the provision of tax concessions to private and mixed enterprises, and the abolition of the restrictions on ownership by foreign investors. The autonomy of the Chamber of Commerce was also strengthened and parts of the Government Procurement Manual that discriminated against private suppliers were amended. Regulations to allow private entrepreneurs to develop the mineral wealth of the country were also announced with the changes of government in 1992 and subsequent developments, no specific plans can be quoted for the development of the industrial sector.

With regard to the manufacturing sector, the current economic and social development plan for the period 1986/87 - 1990/91 attaches high priority to the utilization of domestic resources, export orientation, as well as import substitution in the country's industrial development. The improvement of product quality and production efficiency are also referred to as major objectives. The plan further spells out that private sector and manufacturing handicrafts should be promoted and that the establishment of co-operatives should be encouraged. The Government committed itself to providing the necessary infrastructure to facilitate domestic investments in light industries. Industrial output was to grow by 30 per cent during the five year period. Such information as is available suggests that this target was not achieved.

b. Relevant Government Agencies

There are two ministries dealing with the manufacturing sector: the Ministry of Mines and Industry, and the Ministry of Light Industry and Foodstuffs. The former mainly deals with basic industries such as fertilizer, heavy engineering, etc. There is a Central Office for the Development and Promotion of Private Investment (CODAPI) directly under the Prime Minister.

CODAPI, strengthened by a UNDP/UNIDO project for the reconstruction of the private sector, consisted in 1991 of the following substantive Departments:

- Feasibility Studies Department (10 staff, of whom 5 are engineer graduates);
- Investigation Department (2 staff);
- Technical Assistance Department (11 staff, of whom 3 are graduates);
- Planning Department (5 staff, of whom 3 are graduates).

The leadership of CODAPI was well established and has good links with the entrepreneurs. The volume of work is expected to grow considerably after the promulgation of the new liberal investment law. CODAPI will also be involved in new tasks like opportunity studies, the transfer of enterprises from the public to the private sector, and rehabilitation programmes. CODAPI has a shortage of expertise in business administration, management, marketing, data processing and international business law. Technical expertise in textiles and leather would also be needed. As yet, no action has been taken to strengthen the staff with food processing experts.

The Industrial Development Bank of Afghanistan (IDBA) is a specialized Government-owned development bank geared to providing medium and long term credits to the manufacturing sector, in particular to small and medium scale industries as well as handicrafts. It also runs an industrial serai in Kabul for such industries.

c. Physical Infrastructure

Afghanistan has some 17,000 kms of highways, of which 12,000 kms are all-weather roads. The primary road network links all major urban centres and agricultural production areas. The feeder road network, however, is sub-standard and constitutes a major bottleneck in the development of rural areas and the supply of domestic raw materials to the manufacturing sector. The protracted war has caused extensive damage to the road network. The UN and NGOs are involved in a number of road reconstruction projects. Afghanistan so far has no railways. Plans have been discussed to link Afghanistan to the rail network of the neighbouring countries, but all projects have been postponed. Such links could, a.o., improve the connection with the port of Karachi, and thus reduce the overseas trading costs of this landlocked country.

The telecommunications system was not very developed and apart from being damaged by war damages, much of it is outdated now. The country has abundant energy resources. Natural gas, however, was mainly exported to the former Soviet Union. There is as yet no domestic distribution network. Electricity is only available in urban areas. Many industries use coal as a source of energy. There are plans for a strong expansion of electricity supply, a.o., through a better utilization of available hydropower resources. Access to drinking water is limited, being only available in 39 per cent of the urban areas and 18 per cent of the rural areas.

The Industrial Development Bank of Afghanistan intends to erect two industrial serais (handicrafts centres) in Mazar-i-Sharif and Kabul in addition to one which is already operational in Kabul which will include about 210 handicraft production units with about 4,000 employees. A UNDP/UNIDO project has extended technical assistance to these units regarding production methods, product quality and design, as well as export promotion.

d. Industrial Services

Apart from the services provided by CODAPI, described above, there is no information on industrial services.

e. Human Resources

The overall literacy rate is about 10 per cent. The literacy rate for women is much lower: three per cent. The educational system has been very badly affected by the war. Vocational training has been improved in urban centres, but there are very few vocational training facilities in rural areas now. The number of university graduates has increased, but a large number have left the country. A large number of educational and vocational training projects has helped to raise educational standards in refugee camps across the border, in Pakistan and the Islamic Republic of Iran. The scope of such assistance in Afghanistan is still limited, but major expansion is planned. This includes management training courses and in Western Afghanistan - vocational training for the dairy industry. Women have traditionally had very little access to education and training. Hardship caused by the war and the loss of male family members, however, force Afghan women to take on new economic roles. UN agencies and NGOs are, therefore, providing an increasing range of training programmes and income-generation projects. In connection with the industrial serais project mentioned above, UNIDO is exploring the possibility of setting up special training facilities for women in the textile sector, in co-operation with the Afghan Women's Society. There was no information on the role of women in food processing, but UNFPA is planning a feasibility study on local production of weaning foods.

5. Related or Relevant Assistance Programmes

a. Country Specific

UNDP/UNIDO: Assistance to the Reconstruction of the Private Sector (1990 - 1992)

UNDP/UNIDO: Extension Services for Industrial Serais (1990 - 1994)

UNOCA: Vocational Training in Western Afghanistan (1990 - 1991)

b. Regional

UNIDO: Development and promotion of agro-related metalworking industries in Asian and Pacific LDCs (Phase I)

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EIU (b): Pakistan, Afghanistan Country Report No. 2/1990

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UNOCA: Operation Salam - Programme for 1991, n.p. 1991

BANGLADESH - People's Republic of Bangladesh

Summary of Constraints and Potential

Constraints:

- Poor integration of plans, policies and strategies
- Difficulty of introducing more productive cultivation methods
- Insufficient/poor raw material supply
- Scarcity of skilled human resources
- Depleted fish stocks
- Lack of knowhow in post harvesting, packaging, storing
- Lack of capital
- Undeveloped market/marketing knowledge

Potential:

- Large scale fruit and vegetable processing
- Export processing based on fish farming
- Domestic demand for better quality basic needs products

I. Review of Growth Constraints and Prospects

Food processing industries are highly labour intensive. This gives Bangladesh with its low wages a considerable comparative advantage. As the production of major agricultural products is not adequate to meet domestic requirements, a number of items are being imported representing altogether 21 per cent of the total imports of the country. Although most of the imported agricultural products are in grain form, there is apparent scope for import substitution in some selected processed products for which there is a local market. This relates particularly to dairy and meat products and jams, juices, squashes, etc. made of fruit and/or vegetables and provides an excellent potential for cottage and small scale processing in the rural areas.

While climate and soils in Bangladesh are favorable for growing a wide range of tropical crops, the raw material supply of the food industries on which information is available (these are the most important) constitutes a constraint on their further development. The small rice mills, the sugar mills, the tea industry and the fish processing industry all struggle with insufficient supplies; in the case of the sugar mills, the quality of the raw material supplied is insufficient as well.

There are various reasons for the slow rise in marketed output from the agricultural sector. First, land fragmentation is extreme and makes it more difficult to raise output by modern methods. There is hardly any virgin land on which modern cultivation methods could be introduced. Second, most of the farming is a mixture of subsistence and cash cropping, which means that the area devoted to cash crops on each farm is very small. Third, educational

levels are low and there is little knowledge of modern farming methods. Fourth, land tenure systems in many cases do not stimulate an intensification of production. Fragmentation and traditional farming methods would also mean that product quality is variable, which would have a negative influence on the productivity of processing plants. Finally, natural disasters have occurred with increasing frequency. These have affected output (although not, it would seem, in a major way), the amount of food marketed (there would be less of a surplus over family consumption), and the transport and storage infrastructure. In the case of sugar cane, the climate is not wholly suitable.

The introduction of improved methods and seeds, the increased use of fertilizer, etc., can help increase the growth rate of agricultural output, but further expansion of irrigation would also be needed, and the resulting reduction of groundwater levels is bound to cause salinization in coastal areas and aridity further inland. The negative impact of agricultural modernization on certain groups of farmers should also be taken into account.

In the case of cottage industries producing for local demand, such as rice mills, modernization would help raise nutritional standards. The women operating the mills should be more involved in the modernization process than so far. This would be one way to realize the Government's strategy (as formulated in the Fourth Five-Year Plan) to strengthen the role of women in manufacturing. A rapid growth of the industries serving the domestic market is not likely because the very low and slowly growing income level limits demand.

Overfishing has in recent years led to a shortage of fish for processing. While measures should be taken to prevent a further decline of stocks, the potential for fish farming could be further exploited. At present, some 100,000 ha. of brackish coastal waters are under shrimp culture, but the average yield is only 200 kg/ha. It is thought that through improved hatchery, feeding and harvesting techniques the yields of these waters can be raised to the levels of other Asian countries, i.e. 1,000-2,000 kg/ha. Cultivation in freshwater ponds could also be intensified, with a catch of up to 2,000 kg/ha. This could raise total shrimp production to 175,000-275,000 tons. Attention should be paid to possible consequences of intensified agricultural production for fish farming (salinization of freshwater ponds, excessive use of fertilizer). The vulnerability of the shrimp farms was demonstrated by their virtual destruction during the cyclone in May 1991, from which the coastal regions will take some time to recover.

Expanded fish cultivation should a.o. be the basis for increased processing for the domestic market to raise protein intake. In this context, the potential for expanding and improving traditional processing should be studied. Again the crucial role played by women in this cottage industry should be given full attention.

Other issues are to be solved as well to allow a more rapid growth of the food-processing subsector. These include:

- Improvements in transport infrastructure and energy supply;
- Improvements in technical education, especially for women;
- More attention to R & D and higher level education specifically focussing on food-processing technology;
- Better credit supply, especially for the smaller units;
- Rationalization of the production structure in some of the major

- industries;
- Investigating the potential for new products and markets.

Some of the major industries are not competitive with imports or in danger of losing their competitive edge in export markets. An example of the former is the sugar industry, which produces sugar at more than twice the world price. A thorough investigation of the industry's long-term viability seems called for. As things are at present, the question could be asked whether farmers could not grow more profitable cash crops for the food industry than sugar cane.

An example of the latter is fish processing, which is losing export market shares to industries of other Asian countries. Some of the shrimp plants are probably no longer viable, in the others the quality of production should be improved, new markets should be investigated, and measures to increase shrimp farming while retaining output quality should be taken soon. This could ensure the long-term position of the fish processing industry as a major foreign exchange earner. While further study might reveal a potential in fruit and vegetable processing or meat processing, there is no alternative to fish products exports in the short-to-medium term - the formerly important tea industry is stagnating despite rehabilitation efforts, and it has very strong competitors in the sub-region (India, Sri Lanka).

So far the export of processed fruit, vegetables, meat or dairy products have been negligible. However, studies have provided evidence of the feasibility of the development fruit processing industries such as for pineapple concentrate, fruit juices and tomato paste particularly in the Middle East. The vast and expanding world trade in processed fruits and vegetables provides a potentially important market of Bangladesh exports. However, they need to be competitively priced and satisfy quality control standards and delivery schedules to gain acceptance. This suggests that processing facilities for export will need to be large scale, well managed and have reliable suppliers of uniform quality raw fruit and vegetable inputs.

The easy perishability of the types of fruit and vegetables cultivated in Bangladesh pose particular requirements to farmers and post harvest treatment and storage. Farmers have sufficient knowledge of neither the potential and techniques of new horticultural products, nor of efficient cultivation of known products. The quality of produce available for markets or processing also depends on the quality of seeds, plant disease control and the availability of agricultural inputs such as fertilizers and tools. Bacterial and fungal diseases occasionally attack horticultural crops and their control requires special spray programmes.

The key factors contributing to the constraints at the level of fresh fruit and vegetables are insufficient training facilities for farmers, limited financial resources for improving and diversifying horticultural products, and the low level of integration, i.e. lack of associations or cooperatives, of farmers.

There is a serious shortage of suitable breed animals for milk and meat production coupled with a shortage of animal feed in Bangladesh. Development of better breeds is essential. Losses in production due to diseases and deaths of animals are substantial. The milk yield of local breed cows is only 2-3 litres per day and the carcass weight of slaughtered cattle will under 100 kg.

Poor handling and transport methods of milk result from unorganized collection and cooling. The low level of integration and absence of cooperatives and farmers' associations as identified for the supply of fruit and vegetables also contributes to these constraints related to products based on livestock.

The Bangladesh Standards and Testing Institution (BSTI) is in the process of upgrading the facilities for setting up standards and providing certification and testing of processed food at the national level. Most enterprises do not, however, have sufficient facilities for quality testing at the plant level for processed fruit and vegetables, milk, fish and shrimps. In order to enhance consumer protection in the domestic markets and reach regular quality standards for exported products, such regional or enterprise level facilities will be essential in the future, if this industrial subsector is to develop. Also the quality of process water used in food processing enterprises affects the quality and health standards of the product for domestic use and exports. Standards and technology for the enforcement of minimum process water standards have so far not been established in Bangladesh.

Particularly for export-oriented food processing industries appropriate packaging is essential and affects the shelf life and market access of the products considerably. The growth of the food processing industry in Bangladesh is impaired due to the non-availability of suitable containers. The glass containers available in the country are not suitable for processing industries. Most of the packaging materials have to be imported. The most important containers used food processing are tin plate, glass and flexible packing materials. The tin container has recently replaced glass containers for the commercial processing of fruit. Owing to its tensile strength, durability, suitability for transportation and other related advantages tin plate containers are preferred. Suitable tin plate containers are not available in the country. It is generally imported in finished form. The Bangladesh Can Company, previously known as Hashmi Can Company, which used to make sanitary cans for use by the local canning industry is not presently operational.

Obsolete or not suitable technology and low capacity utilization in existing food processing facilities, be they based on fruit and vegetables, milk, fish or shrimps, appears to be a constraint inherent throughout the subsector. Aided projects have mostly resulted in turn-key plants without appreciation of the desired need for technology transfer and developed very little local capabilities in designing, fabrication, modification or improvement of imported technology. This is coupled with limited human resources resulting from limited training facilities in appropriate food technologies and management in Bangladesh. As far as unskilled labour is concerned, enterprises usually do not face major constraints in numbers. At the levels of skilled workers such as mechanics, electricians, laboratory technicians as well as managers, there are insufficient numbers of adequately trained nationals.

As much as there is a lack of financial capacity in the private sector to invest in industries, there is a lack of entrepreneurial skills. Particularly in rural areas, most potential entrepreneurs do not have the necessary experience in business management and preparation of bankable investment projects. The lack of tradition in entrepreneurship in processing industries also discourages new entrants in this field. Foreign investment in

this area has been very limited, although recent liberalization, one-window policy and vigorous promotional programmes have paved the way for an increased involvement of foreign capital in the industrial sector in Bangladesh.

There are a number of research and development as well as industrial support service institutions in Bangladesh. It has been observed, however, that the effective linkages between those institutions and industrial enterprises are very weak resulting in limited transfer of technology particularly at the cottage and small industry scale. R & D and extension programmes (such as trouble shooting, managerial services, upgrading of industrial skills, repair and maintenance, etc.) are developed at higher levels but they seldom reach the end user at the village level.

Basic capabilities for the preparation of pre-investment and feasibility studies are available in Bangladesh. In view of the low capacity utilization of existing industries, investment in new capacity is in most cases not interesting to potential investors. Upgrading the existing capacities and investing in some specific product lines would, however, provide investment opportunities for which there is presently insufficient knowledge. Many of the constraints described above relate to the availability of organized analyzed information to enable the present owner or the potential investor/joint venture partner to take a final decision in allocating resources in areas such as fruit processing, dairy plant and shrimp & processing.

The desirable regional distribution of industrial development in Bangladesh has natural limits in the shortage of electric supply necessary for processing industries. The virtual absence of telecommunications in some rural areas as well as undeveloped transport network further pose an obstacle to regional industrial development irrespective of the availability of fresh raw materials in some areas.

The very low purchasing power coupled with dietary habits limit the scope for domestic consumption of processed food in Bangladesh. Processed food is generally consumed by the more affluent sections of the urban population and the foreign community. Because of the relatively abundant availability of fresh fruit, vegetables and fish in Bangladesh, the consumption of processed products has relatively small development potential in the local markets. Dairy products are likely to catch a larger segment of the domestic markets.

There is an apparently limited awareness of consumer requirements in Bangladesh. Marketing systems are not developed particularly in the export markets for processed fruit, fish & shrimps and dairy products. In developing industries with a strong dependence on export markets, knowledge and understanding of market conditions, distribution channels, standards applied in different countries, port and health regulations and local tastes are determining factors affecting the marketability of products. Availability of such information for entrepreneurs is limited in Bangladesh presenting an obstacle in making realistic estimates for the feasibility of upgraded or new production lines. Links with existing databases and the improvement of local capabilities in obtaining such required information are essential for the development of export oriented industries.

2. Economic Performance

a. General Characteristics of the Economy

With a per capita GDP of US\$ 190, Bangladesh is among the poorest countries in the world. In real terms, per capita income has increased by at most one per cent annually during the second half of the 1980s (EIU 1990). Natural disasters (cyclones combined with floods; droughts) have occurred several times during recent years have had a noticeable impact on economic growth.

Agriculture is the most important sector of the economy. It accounted for 37.6 per cent of GDP in 1988/89 (including forestry, animal husbandry and fisheries), and employed two-thirds of the labour force. Other important sectors are transport, storage and communications; professional and miscellaneous services; and manufacturing. In 1988/89, these accounted for 12.3, 10.3 and 9.9 per cent of GDP, respectively.

The GDP share of the agricultural sector has decreased during the 1980s, with per capita output of crops more or less stagnant. Services have been the most dynamic sector of the economy. The share of manufacturing in GDP rose slightly between 1984/85 and 1986/87, but by 1988/89, it was back at its 1984/85 level.

b. Agriculture, Fisheries and Manufacturing

Agriculture, fisheries and manufacturing are closely related in Bangladesh. Agriculture and fisheries provide at least two-thirds of the raw material requirements of manufacturing. Food and beverages industries process almost exclusively domestic raw materials. On the other hand, the industrial sector is a relatively important supplier of inputs (such as fertilizer) and agricultural equipment (UNIDO 1991).

With fertile alluvial soils and a monsoon climate usually bringing heavy rainfall, intensive cultivation of a wide range of tropical crops is possible. Multiple cropping is common. Irrigated land accounts for 16 per cent of all cultivated land, and has expanded strongly during the 1980s. There are however signs that groundwater levels are declining rapidly as a consequence of the extensive well-drilling for irrigation purposes. With much of the country barely above sea and river level, extensive flooding has on several occasions during the past decade destroyed large parts of the crops.

The total cropped area was 8.9 million ha in 1986/87, of which one half was under double or triple cropping. This effectively raised the cropped area to 14.1 million ha (EIU 1990). As a consequence of the very high population pressure (Bangladesh has about 740 inhabitants/sq.km.), there is very little virgin land left. Most of the farms are smaller than 1 ha, and the number of small farms is increasing rapidly, as land is divided into ever smaller plots. The fragmentation of land makes it difficult to use various modern cultivation methods efficiently, and the poverty and lack of education of many farmers is another obstacle to the dissemination of these. Although the use of fertilizer and improved seed varieties has increased during the 1980s, yields fall short of attainable levels, and the per capita production of the major staples has barely increased during the 1980s. Crop figures are discussed in section 3a.

Fishing is a predominantly artisanal activity which after rapid growth until the mid-1980s has expanded only modestly in recent years. While Bangladesh has a large area of coastal and offshore waters with considerable fish stocks, inland fishing predominates, some 30 per cent of the total area of the country consisting of water. Inland fishing accounts for approximately 75 per cent of the annual catch. Fish cultivation has become common, and the inland waters also provide shrimps and frogs. Production figures for the sector will be found in section 3a.

With a 1986/87 MVA of approximately US\$ 1.3 billion, Bangladesh had the largest manufacturing sector in the UN category of LDCs. By 1988/89, MVA had risen to US\$ 1.4 billion. However, MVA per capita was relatively low: US\$ 13.5. As shown in table 1, both in the value added and value of gross output the food industries represent one fifth of the manufacturing sector.

Table 1. Share of Food Industries in the Value Added and Value of Gross Output of the Manufacturing Sector.

(Taka in Million)

Year	Value of Gross Output			Value Added		
	Manufact. Sector	Food Indust.	Share of Food Ind. (%)	Manufact. Sector	Food Indust.	Share of Food Ind. (%)
1985-86	121940	28835	23.7	46002	9493	20.6
1986-87	130189	31562	24.2	49496	10499	21.1
1987-88	142611	36318	25.5	53925	11450	21.2
1988-89	151839	35060	23.1	59798	11769	19.7
1989-90	162644	40371	24.8	64062	12965	20.2
			24.2 ====			20.6 ====

Source: Bangladesh Manufacturing Industries Survey, 1990.

The manufacturing sector employed about 2.5 million people in the mid-1980s, of which 0.5 million in medium- and large-scale industries, 0.4 million in small-scale industries, and the remainder in cottage industries. The participation rate of women in medium- and large scale processing was less than 3 per cent. The most important employer of women (as well as men) was the textiles industry. In the cottage industries, cereal milling is probably the most important female activity.

Textile manufacturing dominates the sector in terms of output, accounting for 34.5 per cent of the sector total in 1986/87. Other important sub-sectors were chemicals (21.6 per cent of total output), food products (11.8 per cent), iron and steel (11.5 per cent) and tobacco (10.8 per cent) (UNIDO 1989). Small-scale industry accounted for 43 per cent of MVA in 1988/89; the figure presumably includes cottage industries. There is no recent breakdown of small-scale activities. In 1981, food industries dominated in small-scale manufacturing, with 60 per cent of MVA in that sector. In the cottage industry sector, food processing accounted for 27 per cent of MVA in

1981, closely followed by wood processing and textiles and leather. The structure of the cottage industries is the most diversified, reflecting their key role in catering for a wide variety of local needs (Chr. Michelsen Institute 1986).

Manufacturing output has increased by an average of 2.2 per cent yearly during 1984/85-1988/89. Production has fluctuated strongly as a consequence of the natural disasters which have not only destroyed industrial crops, but have also led to widespread destruction of plant and infrastructure.

During 1980's strong growth has been recorded in the fisheries, fertilizer, cement and electrical machinery industries. Output in some industries is more or less stagnant: tea and tobacco processing, textiles, paper, paints, petroleum products and glass. A downward trend is visible in basic metals. The statistics conceal the expansion of the export-oriented garment industry (the stagnation in textiles seems predominantly due to the weak performance of large-scale cotton mills). Growth in fertilizer production has been stimulated by agricultural demand; growth in the electrical machinery industry is largely the consequence of the establishment of an EPZ at the port of Chittagong.

Until the mid-1980s, public enterprises dominated formal sector manufacturing, and in spite of a strong trend towards privatization, the public sector still dominates output with its many large-scale enterprises. The privatization programmes do not appear to have led to a conspicuous improvement of sector performance. Many privatized companies suffer from operational and financial problems, and some of the remaining public sector enterprises suffered losses throughout the Third Plan (1985-1990). The value added/gross output ratio for all industries decreased from 0.48 in 1973 to 0.34 in 1985, and performance is unlikely to have improved during the 1980s (UNIDO 1989). The Fourth Five Year Plan (1991-1995) notes an improvement in capacity utilization in some industries in the late 1980s (sugar, cement, fertilizer, chemicals), but it also indicates a series of growth constraints that have remained:

- Low domestic demand;
- Increasing costs and lack of essential imports;
- Increasing labour costs;
- Low labour productivity;
- Poor maintenance;
- Lack of finance for modernization and restructuring programmes;
- Inadequate R & D and information services.

3. Food Processing Industries

a. The Raw Material Base

Rice is the most important crop in Bangladesh (see Table 2), followed by sugarcane. While the production of almost all other crops has been stagnating or declining, that of rice has increased markedly during the 1980s, reaching 19 million tons in 1989/90. The increase is due to a continuous improvement in spring harvests. In spite of the increase in output, the Third Plan cereal target (20.7 million tons) was not quite reached, and per capita availability of food is at the same level as in the early 1980s. Livestock - on which almost no information is available - showed higher growth, with a 33

per cent increase in production since the early 1970s, but gains in recent years were very modest (EIU 1990). A slight decline in rice production was expected in 1990/91, and the natural disasters of the spring of 1991 have affected the 1991/92 crop.

Table 2: Bangladesh - Agricultural crop production
('000 tons & Tea in '000 lbs)

	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Rice	14,623	15,048	15,407	15,991	15,544	17,857
Wheat	1,464	1,042	1,091	1,048	1,022	0,890
Pulses	558	519	510	539	500	521
Oilseeds	484	469	438	448	....	....
Spices & condiments	294	291	289	305	304	....
Sugarcane	6,769	6,640	6,896	7,207	6,707	7,423
Tea	83,550	95,424	82,880	89,546	96,076	....
Potato	1,162	1,103	1,069	1,276	1,089	....
Sweet potato	683	612	548	558	544	....

Sources: Bangladesh Bureau of Statistics, Monthly Statistical Bulletin of Bangladesh; Bangladesh Bureau of Statistics, Statistical Yearbook of Bangladesh

Sugarcane production has fluctuated around 7,000 tons annually, and 95 per cent is provided by small farmers. Sugar cane cultivation is seldom a major preoccupation of the farmer. It usually alternates with another cash crop (usually jute), and sugar content (averaging 10 per cent) is among the lowest in the world. This is partly a consequence of climatological conditions, which are not optimal for sugar cane growing. But relatively low producer prices are also an obstacle to higher production, and although the sugar industry supervises and supports cane growing on about half the cultivated area, there are few signs of better performance.

Increasing agricultural production is a major preoccupation of the government. It has launched a "green revolution", providing heavy support in the form of irrigation facilities, fertilizer and improved seeds, but many obstacles remain: the extreme fragmentation of landholdings, very low educational levels and the prevalence of sharecropping systems discouraging productivity increases. Disruption of rural society is an additional problem: many small farmers who lack the financial resources and knowledge to fully participate in "green revolution" programmes have become impoverished.

Table 3 shows the increase in fish catch during 1983/84-1988/89. In marine fisheries the stocks are estimated at 264,000 to 373,000 MT of fish and 9,000 MT of shrimps per annum whereas the fish catch has increased rapidly from 95,000 MT p.a. in the mid-1970s to 232,000 MT in 1988-89 due to the development of a fleet of 70 trawlers and 5,000 mechanized boats specialized in fish or shrimp. Inland fisheries contribute approximately three quarters of the total fish catch in Bangladesh. There are two different categories of

inland fisheries: open inland waters (4.05 million ha with a catch of 442,000 MT p.a.) and closed waters (large ponds, "dhigis", ponds and tanks, covering 147,000 ha with a total estimated catch of 143,000 MT p.a.). The leasing of fisheries is a major source of revenue for the government, but is likely to promote overexploitation of resources. The New Fisheries Management Policy launched in 1986 has not had the desired effect. The financing of fisheries is done mostly through informal channels in the form of high interest short term loans whereas banks are reluctant to enter into this sector despite government incentives.

Table 3. Bangladesh - fish catch ('000 tons)

	Inland	Marine	Total
1983/84	577	174	751
1984/85	586	188	774
1985/86	587	207	794
1986/87	597	218	815
1987/88	598	229	827
1988/89	599	232	831

Source: Bangladesh Bureau of Statistics,
Statistical Yearbook of Bangladesh

Virtually all species are of some commercial importance. Major carps, large catfish and herring (*Hilsa ilisha*) are the commercially most valuable. The giant prawn (*Macrobrachium*) and several small shrimp species are widespread. Competition between rice and shrimp producers (including issues related to water regulation) can be observed. Aquaculture is traditional in coastal areas. Dykes or embankments along the banks of estuarine rivers allow shrimp fry and juveniles to enter and grow under natural conditions (20-50 kg/ha). Supplementary stocking with captured wild fry and juveniles was introduced in the mid-1980s which has resulted in an increase of yield to 200-300 kg/ha without supplementary feeding and 500 kg/kg with feeding in some improved farms. However, the average is estimated to be 190-200 kg/ha which is considered low compared to other Asian countries.

Surface land under shrimp culture (hatcheries for *P. Monodon* and *M. Rosenbergii* species) is around 100,000 ha with a production of approximately 20,000 MT. The production of freshwater prawn *M. Rosenbergii* ("Golda") is estimated at 44,000 MT (wild catch only). Projections for increased production based on shrimp and prawn culture are very optimistic, but recent developments in the marketability of the products have changed the trends considerably.

There is a shortage of land available for the production of large quantities of fruits and vegetables in Bangladesh. Most are seasonal and available only during the respective season of production. Fruits, such as mango, litchi, pineapple, jack fruit, banana, melon, etc. are available only during summer months. Vegetables such as cauliflower, cabbage, broccoli, carrot, tomato, etc. are available only during the winter season.

Potato is becoming a third staple crop in Bangladesh. It is grown during

the winter season and is therefore less susceptible to the monsoon rains and floods. The government is promoting potatoes as a third crop next to rice and wheat. To date the cold storage operation has been confined mainly to potatoes where nearly 40 percent of the annual output is kept in cold storage up to 7-8 months. Small quantities of tomato and cabbage are also stored for distribution during off season.

Tables 4 and 5 provide figures on the production of most important fruit and vegetables in 1980-1988.

Table 4. Production of vegetables in Bangladesh 1980-1988 (Thousand MT)

Item	1980- 1981	1981- 1982	1982- 1983	1983- 1984	1984- 1985	1985- 1986	1986- 1987	1987 1988
Pumpkin	57	59	62	62	59	63	64	67
Brinjal	175	182	181	179	168	167	162	164
Potato	983	1078	1131	1148	1141	1103	1069	1276
Patal	20	21	22	21	18	20	20	20
Jhingha	14	16	17	17	16	17	18	17
Karela	13	14	15	14	13	14	15	15
Arum	49	42	56	58	57	63	65	67
Cucumber	12	12	12	12	11	12	12	13
Cabbage	51	54	57	60	63	65	61	64
Cauliflower	46	51	51	56	59	59	59	58
Watergourd	40	44	46	47	49	51	50	60
Tomato	64	64	69	71	71	71	72	81
Radish	105	105	113	124	130	133	143	153
Beans	26	27	28	29	30	31	30	33
Other vegetables	111	129	134	138	135	119	119	124
Total	1766	1894	1994	2036	2020	1986	1960	2212

Source: Agriculture Statistics, B.B.S., 1990

Total cattle population in Bangladesh is estimated at 22 million (Agriculture census 1983-84). The number of cows in milk production was at that time about 3.5 million (only 6,000 farms with more than five cows), the sheep and goat population was 14.5 million and number of poultry 76 million. Annual milk production is estimated to be 1.0 million MT and beef production 405,000. Beef production accounts for 70 per cent of total meat production the rest being poultry (16 per cent), mutton (12 per cent) and buffalo (1-2 per cent). Egg production is estimated at 1.2 billion p.a.

Per capita consumption of meat is 4 kg and of milk 10 kg p.a. The livestock sector is an important part of the agricultural system in Bangladesh, the total contribution to the GDP is 11 per cent. Productivity is, however, very low. The milk yield of local breed cows is 2-3 litres/day and carcass weight of slaughtered cattle well under 100 kg. There is a shortage of cattle food. Development of better breeds is essential. Losses in production due to diseases and deaths of animals are substantial.

Table 5. Production of important fruits in Bangladesh (thousand MT)

Fruits	1980- 1981	1981- 1982	1982- 1983	1983- 1984	1984- 1985	1985- 1986	1986- 1987	1987- 1988
Banana	642	673	688	664	679	631	659	684
Mango	200	181	201	156	160	159	155	160
Pineapple	151	153	154	134	130	128	133	145
Jackfruit	201	204	205	208	218	229	235	254
Papaya	20	25	26	27	27	28	29	30
Melon	99	101	120	121	122	124	120	116
Orange	2	2	2	2	2	2	2	1
Guava	9	10	11	12	13	14	14	16
Citrus fruit	8	9	9	9	9	8	8	8
Other fruits	45	42	48	44	48	49	49	44

Note: other fruits include bel, shopeds, jamrul, etc.

Source: Agriculture Statistics, B.B.S., 1990

b. Characteristics of the Sub-sector

A study on manufacturing establishments, carried out in 1990, showed that in the private sector there are 16,633 manufacturing units in the country out of which the food processing sector comprises 5,576 units, around one third. Most of the food industries in Bangladesh are in the private sector with the exception of the 16 sugar mills under the Bangladesh Sugar and Food Industries Corporation (BSFIC) and 14 other miscellaneous units under BSFIC, Selyan Kalyan Sangstha and Bangladesh Freedom Fighters Welfare Trust.

Food processing industries are located in different parts of the country. Most of the sugar industries (accounting for more than half of all food processing industries value added) are located in the north as cane cultivation is prevalent there. Fruit and vegetable processing are concentrated around big cities. Rice mills are spread all over the country. Fish freezing units are mainly located in Chittagong, Cox's Bazaar and Khulna.

The share of food processing industries in total employment is the following (1990):

1. No. of persons employed by food processing industries employing 10 or more people	237,053
2. No. of persons employed by public sector food processing industries	24,987
3. No. of persons employed by food processing cottage industries	278,850
4. No. of persons employed by small-scale food processing industries employing less than 10 persons	416,400
Total	957,290

By far the most important industry in the food-processing sector is sugar milling, which accounted for 56 per cent of sub-sector output in 1986/87, as compared to 49 per cent in 1980/81. The next important industry is tea processing, with 19 per cent of sub-sector output in 1986/87, down from

21 per cent in 1980/81 (UNIDO 1989). Other important food industries are fish processing, vegetable oil milling, vegetable ghee making and non-alcoholic beverages, although none had an output share exceeding 10 per cent in the late 1980s. The fisheries branch has strengthened its position considerably in the late 1980s. Detailed information on employment in individual branches is scarce. The sugar mills employ about 3,000 people, and the fish processing plants about 5,000-6,000.

The figures above refer to medium- and large-scale industry. There is no recent information on small- and cottage-scale processing. In 1981, rice milling was the dominant small-scale activity, accounting for 35 per cent of small-scale MVA. Bakeries and flour mills accounted for 8 per cent and 6 per cent, respectively. Small-scale industries had a slightly higher MVA/fixed assets ratio than the larger industries (0.99 versus 0.95); the ratio for cottage industries was much lower (0.56). In the cottage sector, rice milling was also the most important activity, although it accounted for only 8 per cent of MVA - as indicated above, there is a much wider spread of activities among branches in the cottage industry than in other industries. Confectionery making, oil milling and gur making were also identified as major cottage industries (Chr. Michelsen Institute 1986). While there are no figures on traditional fish processing, this is known to be a widespread activity.

Both traditional rice milling and fish processing are activities involving a great number of women in rural areas. The introduction of small modern rice mills is having a strong negative impact on this traditional source of part-time income for women. With assistance of the Grameen Bank (see below), an unspecified number of women have acquired modern mills to set up their own operations. Overfishing (see above) has probably affected traditional fish preparation as well.

In 1989, the modern sugar industry consisted of sixteen mills, with two other mills under consideration. Total capacity of the existing mills was 20,000 tons of cane per day. The average mill capacity (1,200 t/day) is one of the lowest in the world. In 1984/85, the average capacity utilization was 45 per cent; this had increased to 57 per cent in 1988/89. There is no sugar refining capacity as yet, but a refinery is under construction at the Chittagong EPZ. Production peaked in 1981/82, with 202,168 tons of sugar. The Third Plan target was 225,000 tons by 1989/90, but actual production in that year was 185,000 tons (Fourth Five Year Plan). In that year, the country had to import 150,000 tons of sugar to meet domestic demand. One by-product of the mills is used by other food industries: molasses, which is an input for the distilleries.

Mills and the mill plantations belong to the Bangladesh Sugar and Food Industries Corporation (BSFIC), which is also involved in vegetable oil milling, cold storage and confectionery production). This parastatal made profits throughout the early 1980s, but over 1985-1989 the company registered a loss of Tk 645 million. Better performance was expected in 1989/90, with an estimated profit of Tk 295 million. While it is not known how strongly BSFICs performance depends on the sugar mills, there are various reasons why sugar milling is likely to have contributed to the company's weak performance in a number of years:

- In spite of the existence of mill plantations, 95 per cent of the sugar cane is purchased from small farmers. Sugarcane production problems have been outlined under 3.a. Moreover, much of the sugarcane produced by

farmers is consumed directly or used for gur (traditional sweetener) manufacturing (see below). Cane quality is bound to be uneven, given the large number of suppliers.

- The quality of much of the rural road system is such that cane delivery is seriously delayed, leading to loss of sugar content.
- Although technical details are not available, it is clear that milling equipment is not always adequate, with sugar recovery levels usually below 80 per cent; during the Third Plan, however, several projects were executed to improve mill yields.
- There is heavy competition from gur, consumption of which accounts for 2 kg/person/year (sugar: 3 kg). Free market retail prices for gur are lower than those for sugar.

The poor raw material base, the partly outdated equipment and the definitely sub-optimal size of the plants result in a high sugar price - the 1989 ex-works price was US\$ 650/ton. The world price (cif) was US\$ 330/ton in 1990. In order to protect the domestic industry, imported sugar is subject to high tariffs and taxes, resulting in a 1990 consumer price of US\$ 0.76/kg.

Bangladesh could theoretically be self-sufficient in sugar, if cane production for the mills could be improved, the mills be made more efficient, and if some milling capacity would be added. The Fourth Five Year Plan (1991-1995) proposes action in this area: milling capacity is to be increased by 4,500 tons, sugar yields by 13 per cent and mill recovery rates by 9 per cent. This is to result in 280,000 tons of sugar/year by 1994/95. Assuming that this is possible (the Third Plan targets were not met), then the question still remains whether the price of sugar will be more acceptable. It should also be pointed out that Bangladesh borders on a major sugar producer, India, and there are signs that significant amounts of cheap Indian sugar are imported illegally.

In contrast to sugar milling, modern fish processing is predominantly a private sector, small-to-medium scale activity catering for overseas markets. The implementation of the rural electrification programme is widening the scope and dimension of food processing activities including fish and shrimp processing. Freezing and cold storage facilities have sprung up in Chittagong and Khulna. There now at present some 95 processing plants (producing glazed blocks in plate or blast freezer, whole, deheaded, peeled, etc.) with a capacity utilization of no more than 13 percent. Several plants are closed and only 13 can reach full capacity utilization.

There are no fish canning factories in Bangladesh. Drying is a traditional method of fish preservation and is mainly utilized for small species. The process is mostly carried out by women. There is also fermented fish production (clay pots buried in the ground for 2-3 months during winter season).

High demand for fresh fish is limiting the processing sector and the situation is not likely to improve as overfishing is obvious for many species. Shrimps and prawns are, however, exported in large quantities in frozen form, having become the third biggest export item in Bangladesh after ready made garments and jute. The markets shares have been declining recently. In 1990-1991 water-based exports were:

Shrimps	US\$ 128 million (USA, Japan, Belgium, UK)
Frozen fish	US\$ 12 million (UK, USA, Hong Kong, Malaysia)
Froglegs	US\$ 2 million (USA)
Sharkfins and fishmaws	US\$ 1 million (Hong Kong, Singapore)
Dried fish	US\$ 1.6 million (Hong Kong, Oman, UK, UAE)
Salted and dehydrated fish	US\$ 4 million (Hong Kong, Japan, Singapore)
Other fish	US\$ 1 million
Crabs	US\$ 0.8 million (Singapore)
Tortoise and turtles	US\$ 0.1 million (Singapore, Japan)
Sea shell	few (Korea)
Total	US\$ 149 million, 9 % of total export.

Quality control of exported products is covered by the Department of Fisheries in own laboratories in Chittagong and Khulna and using the facilities of the University of Dhaka. The samples are taken by the inspectors on a random basis and tested for physical and biological quality. The rules were established in 1989 with the help of FAO to meet the highest international standards, but due to the old age on many of the plants, the gap has been difficult to bridge. Another important issue related to quality is the long transportation time from fishing/raising grounds to the factories (quality of ice, packaging).

A global approach to quality control is necessary for the future of the industry and the main issue in improving the export situation is the restructuring of the freezing plants rather than an increased supply of raw material. This should be managed by the Frozen Food Exporters Association to consolidate the position of Bangladesh in a quality-demanding market. The current situation with a strong competition among the processors to collect the shrimps is not conducive for this purpose as rejects of bad raw material appears rare.

Drying and dehydration of fruit and vegetables is virtually non-existent in Bangladesh though there is potential for its development. Canning and bottling constitute a much larger existing operation. At present the processing of fruit and vegetables is done on a small scale by a large number of cottage industries and on a moderate scale by a number of more structured companies. All rely on open market purchases of seasonal surpluses of fruit and vegetables. The present fruit and vegetable production is too low in volume and too high in price to support a greatly expanded canning industry.

The main current product lines are bottled jams, jellies, squashes, cordials, pickles, canned fruits and fruit juices, tomato concentrate and tomato ketchup. The fragmented nature of the present industry would make quality control for exports difficult. Some 30 companies have been registered as food-processing industries with sanctioned capacities ranging between 50 to 300 MT p.a. and three larger ones which show a very low rate of capacity utilization. The largest producer is the Multiple Fruit Juice Concentrate Plant at Kalur Gate in Chittagong Hills Tracts with a capacity to produce 1600 MT of pineapple juice concentrate and 1800 MT of tomato concentrate annually. The objective of the plant was to export concentrated orange, tomato, lemon, jackfruit, quava and banana pulp. This objective was not achieved and despite orders from a number of countries, production has come to a standstill. Also another larger scale plant, Vikrampur Fruits & Chemicals Co. at Tongi with a

sanctioned capacity of 727 MT, has been reported closed.

The technology used in food processing industries is old with outdated equipment. Most of the small-scale units use traditional production processes without much equipment or only with small hand operated tools such as kitchen knives, kitchen oven, pans, buckets and bowls. This affects both the productivity of the enterprises and the quality of products. The few small, medium and large enterprises using modern technology and equipment suffer from low productivity due to under-utilization of their rated production capacity.

The fruit and vegetable processing industry faces two distinctly separate markets, domestic and foreign. The local market for processed goods is extremely small. Domestic demand is severely restricted by the limited purchasing power of the vast majority of the population. The market for sauces and pickles is the largest followed by jams and jellies and a very small amount of canned goods. Most jams are presently imported from Bhutan. The export market is very small at present. There is practically not trade with India as both countries produce similar crops.

Industry, which uses milk or meat as raw material, exists still on a very limited scale. There is no meat processing industry; only one slaughterhouse in Dhaka. Three milk processing plants using fresh milk, Milk Vita (cooperative), Savar Dairy Farm (government) and Tulip Dairy (private) produce 8-9 million litres annually. The volume of processed milk is very small compared even to the volume of imported milk powder (60,000 MT). There is also a new plant producing recombined milk. Less than one per cent of the milk production in the country is if fact processed in an industrial scale.

Urban users are used to buying imported milk powder and recombining it at home. This is a result of several factors: cheap price of imported milk powder, inadequate supply of fresh milk and, sometimes, lack of confidence in the quality of fresh milk. Pasteurized milk is only available in Dhaka. Other milk products like butter, cheese, cream, ghee, ice cream and yoghurt are produced in small quantities mainly by Milk Vita and Tulip. Due to the very limited capacity of existing milk and meat industries, there is enormous potential to expand. Moreover, the largest producer, Milk Vita, cannot operate for much longer with its present old machinery. If that goes out of operation, the industrial base becomes extremely shallow.

When planning new processing facilities, e.g. the following aspects require attention:

- Development of dairy and beef herds;
- Increased feed production;
- Milk collection for farmers;
- Price incentives for farmers;
- Credit facilities; and
- Training in livestock farm management.

The national airline Biman operates a poultry farm with a small processing plant where 15,000 broilers/week are slaughtered. The plant is not mechanized. 80,000 eggs/week are produced. The farm has a feed mill using local wheat, rice polish, sesame oil cake, fish meal and wheat bran. Imported vitamins and other ingredients are added. Most of the fresh and processed products are used by the catering service of the airline.

c. Trade in Food Products

There are no complete statistics on trade in food products. Food, beverages and tobacco as a whole accounted for 21 per cent of total imports in 1988/89; in 1982/83 the share was still 17 per cent. Two-thirds of the imports consisted of cereals (another indication of the insufficiency of domestic production) which means that processed food is not a major import item. The share of food, beverages and tobacco in total exports was 18 per cent in 1987/88, a figure that has remained more or less stable during the 1980s (EIU 1990).

Some details on processed food exports are available. It is clear that processed fish is by far the most important category. It accounted for 77 per cent of all food export earnings in 1985/86, the only other important export item in the category being tea, the share of which has however gone down throughout the 1980s; in 1985/86, its share was 21 per cent (UNIDO 1989). The growth of fish export earnings has been declining. In 1984/85 earnings (in US dollar terms) grew by 235 per cent, but there is a rapid decrease of growth in later years. The increase was down to one per cent in 1988/89. In volume terms, there is a decline in exports most categories. Frozen shrimps account for the bulk of food export earnings.

It is not clear what the most important sources of processed food imports are. During 1988/89, the major export markets for shrimps were the EEC (44 per cent of exports), Japan (28 per cent) and the USA (26 per cent). These have been the main export destinations during most of the 1980s. The principal market for frog legs is the USA (89 per cent of exports). The EEC is the principal market for the other frozen fish products, but sizeable quantities are also exported to middle and higher income countries elsewhere in Asia. Special products such as shark fin go to a variety of high-income destinations. Bangladesh will have to make special efforts to retain its position in these high-income markets in the face of increasing competition from other Asian countries, which produce shrimp at a lower cost.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The Bangladesh government has been making various efforts to develop the industrial sector as it knows that industry is one of the key sectors which can help alleviate the nation's economic predicament, including poverty and unemployment. Since the early 1980s, the government has tried to create a new policy environment where rigorous investments would take place. The new policy was formally articulated by the announcement of the New Industrial Policy (NIP) of 1986. The main features of the new policy direction were liberalization of import provisions and investment regulations, divestiture of public enterprises, rationalization of incentive structure, steady exchange rate depreciation, and active industrial promotion through private sector participation and foreign investment. A new Industrial Policy 1991 has, i.a., the following objectives:

- Increase the contribution of the industrial sector to the GDP;
- Envisage greater thrust on the private sector (government's role from regulatory to promotional);
- Encourage labour-oriented industries for creating job opportunities;

- Encourage domestic and foreign private investment;
- Promote efficient import-substituting, export linkage and export-oriented industries;
- Increase productivity and improve standards and quality control;
- Especially encourage the development of small and cottage industries and agro-based and agro-supportive industries; and
- Encourage balanced industrial development throughout the country.

In order to achieve the objectives, the following strategies and policies will be emphasized:

- i) Efforts will be made to create a favourable socio-economic environment for attracting foreign investment.
- ii) In order to develop small and cottage industries, special financial infrastructural facilities will be provided.
- iii) The agriculture development policy will be in conformity with the industrial policy.
- iv) To encourage expansion of agro-based and agro-supporting industries, incentives applicable for small and cottage industries will also be provided for such industries.
- v) Technical and financial facilities will be provided to encourage the establishment and expansion of rural industrial enterprises that are based on agricultural raw materials and are labour-intensive.
- vi) Agricultural products processing industries will be encouraged for increasing value added.
- vii) Manufacture of agriculture supporting industries in the private sector will be encouraged.
- viii) Special financial, economic and infrastructural facilities will be provided for the establishment of export-oriented and export-linkage industries.
- ix) Comprehensive training programmes will be undertaken for improving management efficiency in the small and cottage industries subsector.
- x) To develop technical and professional capabilities in the country, the technical centres will be appropriately developed and, if necessary, the establishment of new centres will be encouraged.

b. Relevant Government Agencies

The Ministry of Agriculture is responsible for policies and plans related to horticulture and supervises a number of R & D and promotional institutions such as BARI and BARC (described below). The Ministry of Livestock and Fisheries carries out a similar function with regard to livestock and marine based resources. The Ministry of Industry is responsible for policies and plans for industrial development including the supervision of relevant institutions such as BSCIC and BSTI (described below).

The Bangladesh Sugar and Food Industries Corporation (BSFIC) under the Ministry of Industry operates mostly sugar mills and has no direct relevance to fruit and vegetable, dairy and meat and fish processing industries.

The Bangladesh Council of Scientific and Industrial Research runs an Institute of Food Science and Technology (IFST) in Dhaka aiming at increasing food production, reducing post-harvest loss of food and food products and improving the nutritional status of the population. The divisions of IFST include Technology of Plant Food Products, Technology of Animal Food Products,

Technology of Food Grains, Legumes and Oil Seeds, Microbiology, Biochemistry and Applied Nutrition, Food Science and Quality Control, and Industrial Development and Rural Technology including a pilot plant. The Institute reports having established seven food industries, developed 110 processes, leased out 42 processes and solved 2,500 industrial problems.

The Bangladesh Agricultural Research Institute (BARI) is the largest agricultural research institute in the country. Some five years ago a new section for post harvest and processing was created as several studies had indicated alarming losses of fruits and vegetables after harvest. This section could potentially be an important catalyst for the development of fruit and vegetable processing industries in the country provided it be upgraded (in terms of training and equipment) to perform meaningful work, organize training courses and carry out extension work.

c. Physical Infrastructure

There were 11,600 km of paved roads in Bangladesh in 1986. Given the size of the country, the density of the all-weather road network is low. The rural feeder road network is extensive, but little of it is fit for modern traffic. This is an impediment to the transport of agricultural raw materials. A large number of bridges has been constructed during the 1980s, but the Jamuna and Meghna rivers, which divide the country vertically, must still be crossed by ferry. A bridge across the Jamuna is being planned.

There are over 2,800 km of railways, but much of the rolling stock is obsolete and the larger part of the network is narrow gauge. The freight capacity of the network is therefore limited. Road transport is taking over from rail transport.

Some 60 per cent of the country's cargo is transported by ship. There were some 700 large cargo vessels and thousands of small traditional vessels in 1985/86. The shallowness of many of the inland waters, and the difficulties inherent in the construction of roads in low-lying water-logged areas ensures the continued importance of small ships, which account for half of the waterborne transport. Chittagong is the major seaport; there is also a number of large river ports. There is an EPZ at Chittagong, which is receiving marketing and promotion assistance from UNIDO. Another airport-based EPZ is being developed in Savar near Dhaka.

The telecommunications system is still rather undeveloped, with less than one in 600 Bangladeshis connected to the telephone network in 1985/86.

Electricity supply is still very limited, with only 1 per cent of the population connected to the network in spite of rapid expansion during the 1980s. Firewood remains the main source of energy for the rural population. Bangladesh does, however, have large natural gas resources, and 4.2 billion cu.m. were produced during 1988/89. Reserves are estimated at 370 billion cu.m. Most of the natural gas is used as a raw material for the fertilizer industry and as fuel for power stations. Only 12 per cent of the output was used as a source of energy by industrial and commercial units (EIU 1990). In short, only a few areas in the country have a modern energy supply network at the moment.

d. Industrial Services

The Bangladesh Agricultural Research Council (BARC) under the Ministry of Agriculture is responsible, i.a., for R & D and dissemination of agricultural machinery technologies.

The Board of Investment sanctions new investment licenses and promotes industrial investment in general. The Bangladesh Small and Cottage Industries Corporation (BSCIC) under the Ministry of Industry is an umbrella organization promoting entrepreneurship in small scale industries, among other things, in food processing industries. Similarly, the Micro Industries Development Assistance Society (MIDAS), which is a private organization, promotes and develops small enterprises to generate employment on self-sustainable basis through consultancies, studies, technical assistance, entrepreneurship development and information services.

The Bangladesh Standards and Testing Institute (BSTI), being presently strengthened through a UNDP/UNIDO technical cooperation project, has some capacity to establish standards and provide testing and quality certification services to food processing enterprises.

The Bangladesh Krishi Bank and the Agrani Bank provide loans to agro industries. The Grameen Bank is a major source of credit for cottage-scale food processing focusing on landless people and especially women. While the Bangladesh Shilpa Bank is empowered to approve loans to most industrial branches, enterprises have to address themselves to commercial banks for working capital loans.

There are some 45 local engineering consultancy firms and a number of them would be capable of rendering services to the subsector.

The Bangladesh Rural Advancement Committee (BRAC) is the largest NGO working for and with the rural poor in the country. BRAC mobilizes landless men and women in cooperative groups to undertake economic activities with the help of rural credit and training programmes.

e. Human Resources

According to the 1981 census, the labour force comprised 40 per cent of the population. As work in the household was excluded, the participation rate of women was extremely low: 4 per cent (as opposed to 73 per cent for men). During the 1980s, the participation rate of women doubled while that of men rose to 78 per cent (UN 1990). The rapid growth of the female participation rate is caused by the decline of rural activities which were largely the preserve of women (and which were not "visible" in statistics), forcing women to take up employment elsewhere. Many traditional women's activities are related to the production of agricultural raw materials and food processing: animal husbandry, fruit and vegetable growing, fish processing and the preparation of rice products and gur.

Literacy rates are low and constitute an obstacle to industrial development. Approximately two-thirds of the population is illiterate. As female participation rates in primary education are lower than the average for the whole population (49 per cent versus 59 per cent - EIU 1990), and as female participation in education only started to expand rapidly during the

1980s, it follows that the literacy rate for females must be much lower than for men. While detailed information is lacking, this would also mean that they would be confined to unskilled manufacturing jobs.

Enrolment in technical and vocational training was around 11,000 in 1986/87; the number of women was negligible. Enrolment in polytechnic institutes stood at 14,500 in that year, but drop-out rates are as high as 50 per cent. Some 10 per cent of the students were women; a special polytechnic institute for women was opened in 1986. Bangladesh has an Engineering and an Agricultural University. In 1986/87, enrolment was around 3,500 in each establishment; 7 per cent in each were women. Additionally, there are three B.Sc.-level technical colleges.

There is little specific training for the sub-sector. On-the-job training is provided in about 50 per cent of the larger factories, but it is unclear how many food processing establishments are included in this group. The Agricultural University provides a course in fish processing, and the Marine Fisheries Academy at Chittagong had 74 graduates in fish processing technology over the period 1973/74-1988/89. Part of the available training in other areas (engineering, control systems, refrigeration technology, etc.) would be useful for the food processing industry.

5. Related or Relevant Assistance Programmes

a. Country Specific

Asian Development Bank: Rural and agro-based credit (Agrani Bank) (1986-1991)

Asian Development Bank: Bangladesh Krishi Bank (1984-1991)

Germany: Grameen Bank Expansion Programme (1988-1991)

UNDP/UNIDO: Rice bran oil extraction plant (1987-1990)

UNDP/UNIDO: Foreign investment promotion assistance to the Bangladesh Export Processing Zone Authority (1990-1992)

UNDP/ILO: Cottage industries development (1988-1991)

UNDP/FAO: Co-operative dairy extension (1987-1991)

UNDP/UNIDO: Bangladesh Standards and Testing Institution (1992-1995)

b. Regional

UNIDO: US/RAS/92/072 Development and promotion of agro-related metalworking industries in Asian and Pacific LDCs (Phase I)

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BHUTAN - Kingdom of Bhutan

Summary of Constraints and Potential

Constraints:

- Poor integration of plans, policies and strategies
- Limited raw material base
- Very small domestic market
- Landlockedness
- Limited human resources
- Weak quality control and packaging technology
- Insufficient knowledge of investment opportunities
- Lack of marketing networks and skills

Potential:

- Variety of agro-ecological zones allows the production of special high-quality products; asparagus, mushrooms and citrus fruit having the highest potential

1. Review of Growth Constraints and Prospects

Bhutan faces certain limits with regard to expanding the raw material base for the food processing industries, as a consequence of its mountainous character. The mechanization potential of hill farming is limited, and overexploitation of steep slopes easily leads to erosion, with irreversible losses of soil. Raw materials are relatively costly because production costs on hill farms are relatively high. Internal markets are limited because of the small population and low incomes. Furthermore, the consumer requirements are not known. The landlockedness as well as the mountainous terrain of the country greatly increases transportation costs which also affects negatively to costs of trade with countries other than India or Bangladesh.

A factor affecting to most of the problems in Bhutan's food processing industry seems to be the poor integration of plans, policies and strategies. This has resulted, i.a., in weak support services, lack of credits and insufficient knowledge of investment opportunities.

This being said, there are several ways in which growth in the food processing industry could be stimulated:

- Agricultural productivity can be increased by the introduction of new techniques and crops that are adapted to local practices and agro-ecological conditions. To achieve this, the agricultural extension services would need further improvement; rural infrastructure should also be improved and educational standards raised;

- For the smaller processing units, assistance should be provided to upgrade their storage and distribution systems. One of the reasons for low capacity utilization in the small-scale units is the absence of satisfactory storage capacity to hold stocks of raw materials outside the cropping season;
- Industrial entrepreneurship conditions can be improved through technical education, the provision of training in basic management skills, facilitating access of small businessmen to credit, etc.
- To improve the competitiveness of Bhutanese products both at home and abroad, serious attention should be given to quality control and packaging. At present, all packaging is imported from India, and much of it seems to be of inferior quality. The feasibility of establishing a packaging materials industry in the border area, which could provide both the domestic and the Indian market with quality materials, could be explored.
- Given the modest raw material base and relatively costly production, mass production does not seem the best strategy. Instead, the wide variety in agro-ecological conditions could be explored to produce special products (such as asparagus, mushrooms and citrus fruit) for niche markets. This might allow a deeper penetration of high-income markets such as Japan and Singapore than at present, and reduce the dependence on India. This strategy would underline the need for quality control and quality packaging;
- The preparation of new projects would have to take notice of all the complexities involved in successfully operating an industrial unit in the Bhutanese environment. The report of project BHU/87/027 gives numerous examples of proposed projects which have failed to do so. This again points to the need to develop local consultancy capacity, or at least to increase the capacity of the Industries Division in the Department of Trade and Industry to monitor new projects;
- There is an urgent need for specialized labour, such as food technologists. The absolute number needed is fairly modest, and support from donor countries would probably be forthcoming. The report of project BHU/87/027 moreover points out that Indian scholarships are available for Bhutanese students for the relevant specializations. Special attention should be paid to an adequate representation of women on the courses;
- The water/sanitation infrastructure in many locations would have to be improved to allow the functioning of food processing industries on any but the most modest scale.

2. Economic Performance

a. General Characteristics of the Economy

Bhutan's per capita GDP was estimated at US\$ 425 in 1989. This probably underestimates the contribution of subsistence agriculture to rural incomes. Agriculture dominates the economy, accounting for approximately 50 per cent of GDP in 1989 and employing nearly 87 per cent of the economically active

population. Forestry production accounted for an additional 10.3 per cent of GDP in 1989. By 1997 the combined share of these two is expected to fall from 43 per cent to 41 per cent, meanwhile manufacturing would almost double from 7.2 per cent to 13.2 per cent during the same period.

The main GDP sector shares in 1989 and planned in 1997 are:

	<u>1989</u>	<u>1997</u>
Agriculture & livestock	33.1 %	30.9 %
Manufacturing	7.2 %	13.2 %
Community services	12.6 %	12.2 %
Forestry	10.3 %	9.9 %
Construction	8.6 %	8.1 %
Electricity	9.4 %	7.7 %

As a consequence of its geographical situation, Bhutan has close ties with India. The Bhutanese currency, the ngultrum, is pegged to the Indian rupee at par, prices move closely with those in India, there is free trade between the two countries and India usually provides 75-80 per cent of the annual development assistance.

b. Agriculture, Fisheries and Manufacturing

The agricultural sector is heavily dominated by production for subsistence. Bhutan is about two thirds self-sufficient in all cereals, being virtually self-sufficient in maize, barley, millet and buckwheat, but only 52 per cent in rice, 24 per cent in wheat, and 20 per cent in edible oils. To meet the food deficits, the last two are imported from India. Because unit production cost are substantially lower in India, imports of cereals are steadily displacing local produce. Horticultural crops (oranges, apples, potatoes, cardamom, ginger, chilies, vegetables and processed fruit products) are exported to India, Bangladesh, Singapore and Japan and the recent increases in these exports has resulted in a surplus in agricultural trade. Cattle are owned by 95 per cent of the rural households and are an integral element of the agricultural economy. There is also a number of Government livestock farms.

The land under cultivation (hectares) in 1991 was following accounting for 8 per cent of total land area:

Valley Cultivation	46,000
Terraced Cultivation	204,000
Unterraced Cultivation	304,000
Shifting Cultivation	75,000
Orchards	19,000

Total	648,000

The agricultural sector consists of 65,000 registered land holders with an average farm size of 1.5 hectares. Farm distribution is highly skewed: 45 per cent of farmers with less than 1 hectare cultivating 16 per cent of the total. Conversely 16 per cent of farmers with holdings more than 2.5 hectares, hold 42 per cent of the total area. Under existing legislation farm households may only plant an area of up to 10 hectares, excluding horticultural crops.

Farm size has been decreasing as farms are subdivided between children and many small farmers are unable to meet their food requirements.

Women in Bhutan constitute 48 per cent of the population and the majority are involved in agricultural production. The low level of literacy amongst women hinders their access to credit for agricultural production. The Ministry of Agriculture provides extension services with special emphasis on reaching women. However the majority of extension workers are men which restricts women's access for social reasons.

The latest statistics by major groups of industry are the following:

	Number of establishments
Mining and quarrying	11
Manufacturing industries	157
Food, beverages and tobacco	(38)
Textiles, wearing apparel, etc	(7)
Wood, wood products and furniture	(71)
Pulp, paper and printing	(11)
Chemicals, rubber and plastics	(20)
Non-metallic mineral products	(7)
Metal products and other manufact.	(3)
Repair services etc	24
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Total	192

(Source: Bhutan Industrial Census, 1989)

About half of the turnover was accounted for by a handful of plants: a cement factory, three distilleries, a fruit products factory, an engineering works, a turpentine factory and a veneer factory. These enterprises also accounted for some 45 per cent of industrial employment. Few of the remaining enterprises employed more than 20 persons.

3. Food Processing Industries

a. The Raw Material Base

Although the total cultivable surface is limited because of the mountainous nature of the country, those same mountains create a range of agro-ecological zones which permit a large variety of crops to be grown.

Table 1 gives estimates for the production of the major crops in 1988/89. Rice and maize are the two most important subsistence crops. Production of paddy rice increase by almost 25 per cent during 1981-1986, mainly because of the increase in irrigated wet land which took place under the Fifth (1981/82 - 1986/87) Plan. The increase in irrigated land appears to have been less than 60 per cent of the planned increase, which may be partly due to a cautiousness on the part of farmers to use the new potential, and to input supply difficulties (see World Bank 1988, p. 9). High-yielding varieties and fertilizing have only made a marginal impact, due to such constraints as cost, limited yield increases under local circumstances, taste preferences for

traditional varieties, and the fact that rice straw is a major cattle feed (high-yielding varieties have shorter stalks). Research now focuses on varieties which are closer to the traditional species.

Table 1. The area under and production of different crops 1988/89.

Crop	Area ('000 acre)	Yield (kg/acre)	Production ('000 MT)
Paddy	64.6	920	59.4
Maize	182.9	548	100.1
Buckwheat	32.6	330	10.7
Wheat	25.1	445	11.1
Barley	12.9	441	5.7
Millet	32.3	353	11.4
Mustard	17.3	300	5.2
Potato	10.4	2996	31.1
Cardamom	14.2	69	2.5
Sugarcane	1.0	-	0.7
Areanut	0.2	-	0.6
Apple	4.5	-	4.7
Orange	16.2	-	36.4
Other (1)	0.3	-	0.46
Other (2)	0.1	-	0.14

Other (1) includes subtropical fruits (pineapple, jackfruit, guava, coconut, litchi, mango).

Other (2) includes temperate fruits (peach, plum, pear).

Maize production has stagnated, being partially replaced by rice on wet land. Output may be underestimated as production on marginal land may not have been included. The introduction of new varieties has not been successful. Output gains for other cereals have been minimal. A recent source gives a total of only 61,000 tons of cereals produced in 1988 (UN 1990, p. 3). According to the same source, however, the country is still virtually self-sufficient in maize, barley, millet and buckwheat, and the low figure may be due to a different statistical methodology rather than to an actual reduction of food grain production.

Cash crop production has expanded considerably during the Fifth Plan. Potato production increased by 57 per cent during 1981-1986, and orange production by 66 per cent. Some of the minor cash crops also showed considerable increases. Estimates for 1988 indicate an orange production of 43,000 tons and an apple production of 5,200 tons. Production of apples and oranges will continue to increase rapidly since many orchards are immature.

While the value of potatoes is lower than that of tree crops, their advantage is that they can be integrated into the subsistence crop rotation, in contrast to tree crops. There is a certain shift from subsistence to cash crops in the regions which are relative close to the Indian market. The price fetched for some fruit products in export markets is apparently so high that the Bhutanese fruit processing industry has trouble in getting adequate supplies.

Livestock, especially cattle and pigs, has shown strong growth. A network of veterinary dispensaries has been set up to improve the health and thus the productivity of livestock. Cross-breeding is also undertaken to improve stock, but the harsh local conditions have limited its success. Improved feeding is also limited by local circumstances. The potential for promoting small livestock is now being explored, especially in the milder climate zones.

b. Characteristics of the Subsector

The classification of industries into large, medium, small and cottage industries is based on their investment as indicated below:

<u>Scale of industry</u>	<u>Investment excl. working capital</u>
Small scale service industry	Below Nu. 0.1 mn
Cottage	Nu. 0.1 - 0.5 mn
Small	Nu. 0.5 - 5.0 mn
Medium	Nu. 5.0 - 20.0 mn
Large	Nu. Above 20 mn

In 1992 there were 81 establishments in the agro-industrial sector collectively. Of these industries 10 were medium/large scale, 16 small scale and 55 cottage scale. Out of the ten medium/large agro-industries, three were fruit and vegetable processing plant (including Agro-industries Corporation starting production in 1993), three distilleries, and one each of flour mill, animal feed biscuits and dairy. The distilleries and the Bhutan Fruit Products Ltd. are the largest and employ about 50 per cent of the total employment in the agro-based public sector. A milk processing plant has been established in Phuntsoling under an FAO grant and can process 5,000 litres of milk per day produced from imported powdered milk and oil.

The small scale agro-industries are 15 in number and mainly involved in bakery products, vegetable oils, confectionery, etc. Among the registered manufacturing sector, cottage scale agro-industries rank the highest in number. This can be attributed to low investment and manpower requirements. This class of agro-industries comprises of grain mills, oil expelling units, bakeries, traditional tea, etc. These enterprises employ generally fewer than five persons.

The largest units are the Samchi Distillery and Bhutan Fruit Products Ltd. In the mid-1980s, these two together employed some 500 people and had a combined turnover of over 23 million Nu. Although statistical data on the subsector incomplete, it is safe to say that these two enterprises account for well over one-half of turnover and employment. The other two distilleries and the sugar factory are the only medium-size units in the subsector. A milk processing plant which is under construction and which is expected to process some 5000 liters/day should be added to the list of medium and large-scale food processing enterprises.

The majority of registered food processing firms is located in or near the border towns of Phuntsholing, Gayleghug and Samdrup Jongkhar, close to areas with the most favorable agro-ecological conditions, and close to Indian export markets and labour sources - most employees in the large firms are foreign, there being little interest in or need for factory work among

Bhutanese. A smaller secondary concentration of food processing industries is found in Thimphu and the region around the capital, which constitutes the largest urban market in Bhutan.

Public ownership in the subsector is concentrated in the fruit and vegetable processing, distilleries and sugar refining branches. The firms in the latter two are 100 per cent Government-owned. There is one private (cottage-scale) enterprise in the fruit and vegetable processing branch, and the Bhutan Fruit Products Ltd. is the sole joint venture. The Government's share in the latter firm is now only 10 per cent.

The small-scale and household enterprises usually rely on traditional, simple technologies, and mainly produce for the local market. The bulk of production, however, provided by the few modern medium and large-scale factories, is sold in the Indian market.

There is relatively little information about the products, capacity, problems and performance of individual enterprises. Most of the cottage industries only operate intermittently, and many of them are probably unec nomical from a modern business point of view. The following overview, which mainly focusses on the larger enterprises, is based on the report of project BHU/87/027.

The Bhutan Fruit Products Limited (Druk Brand) processing plant at Samchi was established by the Royal Government of Bhutan as an aid to the citrus farmers . The projects are diversified and are made from a wide range of raw materials, including mandarin orange, lemon, lime, apple, asparagus, peach, apricot, mango, strawberry, guava, pineapple, raspberry, corn, peas, beans and tomato. This well managed (all top and middle management is from India) and profitable company has grown substantially and has made a name for its products in India and more recently in Bangladesh. The company is now seriously considering setting up joint ventures in Dhaka and Calcutta. The existing plant in Samchi needs improvement and renovation.

Fruit and vegetable preservation and canning is usually done by thermal processing and chemical preservation methods, i.e. simple canning and bottling techniques. Dehydration, aseptic techniques, freezing and concentration methods are not used. Because of the old age of BFP factory and manual processing, output and quality are not optimal.

The other reasonably successful agro-industrial complex is a consortium of three distilleries in Samdrup Jongkhar, Gaylegphug and Samchi owned by the Army Welfare Committee with headquarters in Phuntsholing. Established in 1983, the distilleries are now actually acting as blending and bottling units. Rectified spirit (3.2 million liters annually, mostly molasses based and a small amount of grain spirit) is brought in from India and blended, fortified into rum, whisky, gin, vodka, etc. In one brand of whisky some imported Scotch is also said to be blended. Actual spirit distillation does not take place in Bhutan any more because the 1968 distillation unit, which has never worked satisfactorily, is now outdated and uneconomical. The alcoholic drinks have good markets in Bhutan as well as in India. The company has a technical collaboration agreement with Mohan Meakins Ltd. - one of the largest and oldest alcoholic drinkmakers in India, who oversee and control the management technically, and provided the distillation unit.

Similarly, to the distilleries, the only soft drinks company of Bhutan, the Dezano Beverages Limited - also brings in Thumbs Up (Cola), Goldspot (orange flavor), Limca (lime-lemon flavor) concentrates and Bisleri soda water chemicals from India, which are blended with local water and bottled. No local agro-horticultural raw materials are used as the products do not contain any fruit juices or pulp.

The Agro-Industries Development Project (AIDP), funded by the Danish aid agency DANIDA, is in the implementation stage and will be ending up with a large public sector unit. It is foreseen that 100 per cent production will be achieved in the fourth year producing the following amounts of processed foods:

- 500.000 cans of green asparagus
- 20.000 cans of mushrooms
- 184.650 cans of fruit preserves
- 271.430 jars of jams and marmalades
- 14.285 bottles of tomato ketchup
- 50.000 kg of dried chili
- 26.000 kg of fried fruit and vegetables
- 100.000 cans of orange juice

A new, modern juice plant in Bondey Farm, Paro, and a sophisticated cardamom dehydration plant in Bhur, Gaylegphug, have been imported from Japan, but for the last three seasons they have not been operated, as no qualified personnel is available to run and maintain them.

A 100 tons sugar cane/day Khandsari Sugar Factory was established in Gaylegphug in 1983 by the Army Welfare Committee with an idea to distill resulting molasses into spirit in their distillery. This Khandsari unit (1989 production: 400 MT of Khandsari sugar) has not performed well for some time. The sugar recovery is reported to be very low (6 per cent compared to 7.5 and 8.2 per cent in efficient well-run factories) and machinery is outdated. Technical manpower is brought in from India every season as local personnel does not have the required skills. It is reported that the management has decided to close this factory after the 1991 season as it has become uneconomical.

The Dralha Flour Mill in Phuntsholing is the only modern flour mill of Bhutan. It was established in 1988, and has a capacity of 60 MT per day. The wheat is supplied on a subsidized rate by the Food Corporation of Bhutan (FCB) and imported from India. In 1990 about 100 MT of wheat was procured locally for the first time. A major portion of miller products is sold in India. Wheatbran is also supplied to a local feed mixing plant, Karma Feeds. The local wheat was purchased at Nu. 3,500 per MT against Indian wheat price of Rs. 2,477 (at millgate in Phuntsholing). Out of 100 wheat the recovery of atta is 68 per cent, maida 9 per cent, suji 1 per cent and bran 22 per cent with selling price of atta: Nu. 2,966.67/ton, maida and suji: Nu. 3055.56/ton and bran: Nu. 1,500.00/ton (atta = wholemeal flour, maida = white flour, suji = semolina). The mill is running well and has not faced any serious problem yet, but since the wheat is subsidized, its commercial viability is in question.

The other flour mills are cottage-scale. They generate intermittently, depending on the availability of crops, and their capacity utilization is probably no more than 25 per cent. The machines, usually Indian, are moreover inefficient, and cannot produce more than one or two tons of wheat/day.

The recovery rate of rice from the rice hullers is said to be between 55 per cent and 60 per cent. The husk is not separated from the grain which has to be winnowed out afterwards, adding to labour requirements. About 30 per cent to 40 per cent of the grains are broken. The machines are inefficient and only suitable for village use when no other, better quality rice supplies are available.

Most vegetable oil processing mills are also very small and use crude technologies. The three slightly larger oil expelling plants in Phuntsholing, Gaylegphug and Sarbhang process about 100 MT a year; the rest only process up to 15 MT a year. The average recovery rate is 32 per cent. An efficient expeller would yield, on average, 35 to 37 per cent from mustard seed.

Under the Department of Animal Husbandry (DAH) of the Ministry of Agriculture there, a UNDP/FAO assisted Pork Processing Plant in Wangchutaba near Thimphu was established in 1986. Pigs cannot be processed now due to breakdown in chilling and refrigeration units (burnt compressors) and to the absence of sheep casing, which must be imported. The compressors were burnt more than two years ago and could not be repaired or replaced locally. One of the weighing balances was also reported broken down. The plant does not have any laboratory for quality control checks, and at the time of visit, the whole plant floors, wash tables, basins and machines were found very dirty and in unhygienic condition. Another problem is the pig supply - there was never a reliable source, even when the plant functioned.

c. Trade in Food Products

In value terms, food products do not constitute Bhutan's major category of exports. Out of total export earnings of 1,072.6 Nu in 1988/89, at most one-fourth (trade figures are not fully consistent) was provided by food and food products. Although exports to countries other than India consist almost exclusively of food and food products, exports to India - the major trading partner - mainly consist of wood, mineral products and (to an increasing degree) electricity. The share of food and food products in total imports (1,817.9 Nu. in 1988/89) was probably no more than one-sixth.

Processed food accounted for some 25 per cent of exports of food and food products; figures for imports are incomplete, but suggest that processed food dominated in the food and food products category. In sum, the trade balance for food products is negative, the country being predominantly an exporter of unprocessed food and an importer of processed food.

India is by far the most important purchaser of processed food: it absorbs virtually all of the exports. Trade with India takes place in rupees. The only other destination of processed food exports of any significance is Bangladesh, which pays in convertible currency. Agricultural exports are becoming more diversified - there was a more than ten-fold increase in such exports to countries other than India during 1987-1989, and the range of products purchased by these countries expanded considerably - but the share of processed food in exports to the other countries is as yet very small, being no more than 6 per cent in 1989. Processed exports consisted mainly of beverages and fruit and vegetable products. The range of imports was much wider, and included beverages, spirits, vegetable oils and fats, flour, sugar and sugar products, dairy and bakery products, and fruit and vegetable

products (not listed in the table). A number of imports, such as spirits, serve as inputs for the Bhutanese food products industry.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The overall objectives of the Seventh (1992/93-1997/98) Plan are:

- Self-reliance;
- Sustainability;
- Efficiency and private sector development;
- Participation and decentralization;
- Development of human resources;
- Regionally balanced development.

Within these the objectives for the agricultural sector are:

- Sustainable development of arable production to enable self sufficiency in food production;
- Improvements in the incomes, living and nutrition standards of the rural population;
- Sustainable utilization of natural resources.

The objectives for the manufacturing and trading are to:

- Increase in revenue generation;
- Increase the share of the manufacturing sector in GDP from 7 per cent in 1989 to 13 per cent by 1997;
- Increase the output of retail and wholesale trade, hotels and restaurant in GDP from Nu 268.8 m in 1989 to Nu 325 in 1997;
- Improve the trade balance by increasing exports both to India and third countries;
- Substitute imports through domestic manufacturing;
- Increase foreign currency earning through tourism.

Agro-based industries have a high priority. Given the limited entrepreneurial capabilities in the country and the Government's desire to keep foreign ownership restricted, medium and large-scale projects are to be set up in the public sector. On a case-by-case basis, minority participation essential agro-industries by foreigners will be allowed. Foreign co-operation on technical issues and transfer of technologies that are appropriate in the Bhutanese context are preferred to financial involvement. Domestic private ownership is to be stimulated through the sale of shares, and eventually, the public sector enterprises are to be handed over to private entrepreneurs or managers.

A number of support measures are proposed. These include tariffs to protect infant industries, tax and duty concessions, and assistance to industrial enterprises in the acquisition of loans, technologies, inputs etc. Training programmes are foreseen, a.o. to reduce the shortage of local management capabilities. Measures taken to boost the productivity of the agricultural sector are not only intended to improve the domestic supply of food, but also the raw material base of the manufacturing sector.

To maximize developmental spread effects, new agro-industries are to be located closer to raw material sources than the present units which are heavily concentrated in the border towns.

b. Relevant Government Agencies

The Planning Commission is charged with the formulation of Bhutan's development plans. The government agencies responsible for individual sectors provide inputs for the planning process. Over the past years, a decentralization process has led to increased participation of "zonal" (i.e. regional) and local communities in the development process. At all of these levels, however, there is a serious shortage of specialists. Bhutan has received UNIDO assistance in industrial planning and monitoring under project BHU/87/027 referred to above.

The Industries Division in the Department consists of the following sections:

- Planning and Programming;
- Programme and Project Monitoring;
- Project Development, Appraisal and Promotion;
- Industrial Estate Development.

In addition, a Business Opportunities and Information Centre operates under the Department. There are four Regional Trade and Industry agencies under the Department: one in Thimphu, the others in the border towns of Samdrup-Jongkhar, Gaylegphug and Phuntsholing. Bhutanese entrepreneurs, contractors and industrialists have formed the Bhutan Chamber of Commerce and Industry (BCCI), with its secretariat in Thimphu. The business community in each town elects a member to the BCCI. The aim of the BCCI is to promote private sector business.

The Ministry of Agriculture provides support to farmers through three Departments of Agriculture, Animal Husbandry and Forestry. The Department of Agriculture includes 174 extension centres, five research stations, six seed and plant production farms, two training centres and two farm machinery centres. The Department of Animal Husbandry includes, i.a., 11 livestock farms and one milk processing plant.

c. Physical Infrastructure

Bhutan has a network of 2,316 km of motorable roads, connecting all main valleys and economic and administrative centres. The network is up to the needs of the country, and is connected in several places with the Indian road network. Trade with overseas partners however is rendered difficult by Bhutan's landlocked position - the port of Calcutta is some 800 kms. away. There is no interconnected telecommunications network yet, but all main centres are expected to be linked by 1993. International telex facilities exist in Thimphu and Phuntsholing. Fax machines were introduced in 1991 for public use in five post offices.

With the commissioning of the Chhukha power project, Bhutan has become an energy exporter. Electricity rates were halved in 1988, and the country could attract energy-intensive industries in the future. Water supply is a

problem in rural areas, but it has been much improved in urban centres in recent years. Apparently, no modern sewerage systems exist yet. The Government has established industrial estates at Phuntsholing, Gayleghug, Samdrup Jongkhar and Gedu. Plans for additional estates at Pasakha and Nanglam have existed for some time; the status of these plans is not known.

d. Industrial Services

There is no special financial institution for industrial development. Loans are provided by the Bank of Bhutan (BoB) and the Royal Insurance Company of Bhutan (RCIB). The BoB provides project finance for up to 75 per cent of the investment capital needed, on the basis of a satisfactory feasibility study. The remaining amount has to be provided by the entrepreneur. Neither institution seems to be geared to dealing with small-scale enterprise, which will probably continue to dominate economic development for a long time to come. The shortcomings of the institutional infrastructure in the finance area are to be remedied by the Bhutan Development Finance Corporation (BDFC), set up in 1988. It focusses on private enterprises processing domestic resources, and will also provide technical assistance. The BDFC is supported by the Asian Development Bank.

There are no local consultancy or engineering services. It is not known whether local repair shops are capable of carrying out basic repair and maintenance for industry. Presumably, the sector is dependent on services provided by Indian companies.

e. Human Resources

Literacy rates are quite low in Bhutan, the average for women is 19 per cent and for men 45 per cent. With support from various donors, the educational system is being expanded and upgraded under the Seventh Plan. The priority sectors are agriculture with its allied sectors and trade and industry (including private sector). Together these two sectors form half of all allocations to HRD.

Until quite recently, the Bhutanese economy was almost wholly self-sufficient and agro-oriented. Modern, growth-oriented industrial entrepreneurship is still uncommon. Overall, there is a great lack of skilled personnel, and the country relies heavily on (Indian) expatriates. Even in traditional crafts, the level of skills appears low.

Technical education is provided by two centres, at Deothang and Kharbandi. According a World Bank study (World Bank 1988, p. 50-51), their capacity is not used efficiently, and the curriculum needs improvement. A mechanical engineering training course was to be introduced at Kharbandi under the Sixth Plan. This course would also be useful for the food processing industry. It is not known whether any skills specifically needed in the food processing industry are taught. UNIDO is involved in an integrated entrepreneurship development programme (see section 5), aiming a.o. at female entrepreneurs. The documentation contained no other reference to the role of women in technical/vocational training, or to their role in industry.

5. Related or Relevant Assistance Programmes

a. Country Specific

UNDP/UNIDO: BHU/87/027 Assistance in industrial planning and monitoring (1989-1991)

UNDP/UNIDO: BHU/88/001 Integrated industrial entrepreneurship development programme (main phase 1990-1992)

b. Regional

UNIDO: US/RAS/92/072 Development of agro-related metalworking industries in LDCs

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CAMBODIA**Summary of Constraints and Potential****Constraints**

- Non-existing industrial development policy
- Unskilled and insufficient (war) human resources
- Lack of industrial financing
- Inadequate infrastructural facilities

Potential

- Agriculture
- Fishery (inland and marine)

1. Review of Growth Constraints and Prospects

The industrial sector in Cambodia is small, highly dualistic (a small number of large formal enterprises contrasting with a vast number of informal cottage and micro industries), generally inefficient and operating with outdated equipment at low capacity utilization rates. This is very much the result of the political events of the 1970s causing the destruction of significant industrial capacities which had to be rehabilitated in subsequent years.

Today, Cambodia's industrial sector is highly fragmented with individual production units existing in isolation from each other. There is a serious lack of communication and exchange between the industrial companies. Beyond what has been administratively conceived by the central planning system, few exchanges seem to exist. So far public and private industries, large-scale and small-scale industries, urban and rural industries have been operating without substantial linkages. Enterprises themselves are not actively searching for new opportunities to exchange final products, parts and components, and services. It will be essential in the future to build up a more integrated industrial sector able to respond to changing market conditions and to generate mutually supporting impulses for technological and organizational improvements.

Also, economic linkages between agriculture and industry are very weak. Such linkages need to be substantially strengthened in view of the overall importance of a productive agricultural sector, its large need for equipment and other vital manufacturing inputs and great potentials for increased industrial processing of agricultural products.

The lack of any systematically conceived industrial policy is a serious development constraint. The current situation in Cambodia is characterized by an almost complete absence of any policy framework for and policy guidance of industrial development efforts. Among the most urgent tasks

in this respect is the putting into effect of an appropriate legal framework for industrial development. This would involve clearly defined material and intellectual property rights, a company establishment law, a modern taxation system, etc.

The lack of industrial financing is a serious impediment to industrial expansion and will soon require priority attention. Only one commercial bank exists in Cambodia which focusses on the provision of short-term credits. There is no source of long-term capital for industrial investments nor rural credit schemes for the benefit of small-scale enterprises in the various provinces. Moreover, there is no financial institution which could encourage investments through equity capital participation.

The physical infrastructure is not able to support Cambodia's rehabilitation and development. The inadequate transport network, dependence on foreign fuel and insufficient power supplies are some of the problems that need to be solved in this area.

Though Cambodia's educational and training system has had remarkable achievements in the 1980s, it is still not capable to cover areas like industrialization, economics and management. These skills are essential in a market economy to present and potential industrial decision-makers. A survey of key human resource bottlenecks and emerging skill requirements should be undertaken to design programmes for industrial skill development in the coming years.

2. Economic performance

a. General Characteristics of the Economy

Cambodia belongs to the poorest countries in the world with an estimated GNP per capita of around \$150 in 1990. The country has undergone a tragic history of civil war and socio-economic experiments in the 1970s which cut down production, incomes and standards of living to levels considerably below those attained in 1960s. It is only the second half of the 1980s that economic growth has again accelerated.

The Asian Development Bank, of which Cambodia is a member, lists 'not available' against most major economic indicators, but based on Net Material Product figures estimated by the Cambodian authorities, average annual growth between 1985-90 reached 8.0 per cent, with 10.0 per cent for 1989 and 1990.

b. Agriculture, Fisheries and Manufacturing

Agriculture plays the key role in the economy, with some 85 per cent of the population depending on agricultural activities for their livelihood. Official data put the share of agriculture in total NMP at 40 per cent in 1988, down from 46 per cent two years earlier.

Cambodia's agricultural sector virtually devastated at the end of 1970s, and starvation was averted only because of massive international relief. The sector has recovered some of the lost ground, but is still below the pre-1970 levels. The country is only approaching food self-sufficiency and its agricultural economy remains largely a subsistence economy.

Cambodia has about 4.5 million ha of arable land, of which approximately 2.7 million ha are considered reasonably productive. Some 2 million ha are planted to rice, while about 220,000 ha are devoted to the cultivation of subsidiary crops. About 630,000 ha serve as pasture. The trends show a consistent increase in total food production in the 1980s.

The share of industry in total NMP is reported to be 26 per cent in 1988, up from 21 per cent two years earlier. However, the industry is in a process of rapid and far-reaching transition and restructuring. Many of the larger companies are being closed down temporarily due to lack of essential raw materials and spare parts previously imported or due to the changes in ownership and/or management. At the same time, there is a growth of small private industrial activities on which virtually no information is available.

Most of the larger industrial enterprises come under the supervision of the Ministry of Industry: 53 establishments with a total labour force of approximately 8,000 workers. In addition, some state-owned industrial companies are controlled by other ministries. About 100 so-called regional industries employing approximately 3,000 workers are operated directly by various provincial departments of industry. The bulk of industrial establishments is accounted for by private cottage and small-scale industries, estimated by the Ministry of Industry to number around 42,000 at present and to provide employment to roughly 70,000 persons. The relative contribution of these cottage and small-scale industries to total industrial production is not precisely known, but the share is estimated to be in the range of some 40 per cent.

Among the industries under the Ministry of Industry, 43 per cent of the production in 1990 was in food processing, 25 per cent in textiles/garments, 16 per cent in chemical industries, 11 per cent in engineering, 5 per cent in various light industries and 1 per cent in construction materials.

3. Food processing industries

a. The Raw Material Base

Rice is the most important crop, accounting for over 80 per cent of total agricultural production. Some 85-90 per cent of all cultivated land is devoted to rice production. Rice production is mainly non-intensive, and yields, which average about 1-1.5 mt per hectare, are among the lowest in the world. This is the consequence of poor soil fertility, lack of fertilizers and pesticides and inadequate water management. Much of the rice crops are cultivated without fertilizer and irrigation. Up to 1989, the Soviet Union provided Cambodia with up to 50,000 mt of fertilizer annually. In 1989 it supplied only 10,000 mt and an additional 15,000 mt was imported from the convertible area. Fertilizer imports declined further to 20,000 mt in 1990 and to 15,000 mt in 1991. Cambodia could use up to 150,000 mt of fertilizer. Paddy production was 2.5 million mt in 1989, 2.4 million mt in 1990 and in 1991 2.3 million mt. The annual rice deficit is 30,000-100,000 mt. In September-October 1991, extensive flooding in the country inundated 300,000 ha of paddy fields, destroying 180,000 ha of paddy. With the rapid rate of increase of the population, the rice deficit is expected to increase to about 190,000 mt in 1992.

Draught animals are used widely in the cultivation of land. A typical rice farmer cultivates about 1.2 ha of land grows a single wet season crop. Rice fields are mainly rain-fed or flooded, with the latter being the case in one-third of the rice growing areas. The use of high yielding varieties is limited. Average yields are higher for the dry season crop, but approximately 85 per cent of the total annual rice output is accounted for by the wet season crop. Some 600,000 ha are still available for cultivation, but rural labour is limited.

The other crops grown in the country include rubber, maize, mungobean, soybean, sesame, tobacco, groundnut, coconut, vegetables jute and sugar cane. Cotton was also grown up to the late 1960s, but no suitable pesticide has been found to arrest infestation. Coconut is also grown, but is not processed into copra meal or cake or coconut oil. As regards rubber, the area planted totalled some 70,000 ha before 1970. Moreover, Cambodia had the highest average yield in the world and was highly competitive. In the 1970s, as much as 40,000 ha under rubber cultivation were lost. Today, the hectareage has gone up to about 50,000 ha, but is still short of the pre-war area. The Ministry of Agriculture estimates the potential area for rubber cultivation to be around 100,000 ha.

Fisheries play an important role in Cambodia - it is an important part of the Khmer diet and it is the major contributor to the foreign exchange earnings of the country. In the 1960s, the average total fish yield was 170,000 mt, including 120,000 mt from inland capture fishery, 45,000 mt from marine fishery and 5,800 mt from freshwater aquaculture. The subsector suffered a set-back in the 1970s, so that the fish catch amounted to only 20,000 mt in 1979. Fisheries recovered in the 1980s, but the current production level of 80,000-85,000 mt is still way below the pre-war level.

In 1988, fresh water fish production was 61,200 mt, while marine fish production was 15,900 mt. About one half of Cambodia's fish production comes from the Tonle Sap or the Great Lake, which is considered one of the world's largest and richest fishery resources. Compared with the production of fresh water fish in the 1960s, the 1988 catch was only about one half of the pre-war output. Moreover, the production of fresh water fish has been declining in the last few years. The reasons given for such decline include the annual variation in floodwaters, which adversely affect fish spawning and migration; deforestation of swamp and inundated forest lands, which destroyed major fish spawning habitats; sedimentation, which prevents a large proportion of fish fry from migrating the Mekong up the Tonle Sap River to the Great Lake; and the construction of irrigation canals during the second half of the 1970s without consideration of their impact on fishery resources.

Livestock husbandry in Cambodia is mainly characterized by small-scale production units. Most livestock products are derived from small subsistence farms. Livestock therefore represents an important source of family income. Most Khmer families keep a few cows, buffaloes, pigs, chickens and ducks providing much needed draught power, high quality food, regular cash income and gainful employment.

Although livestock numbers have reverted to pre-war levels, the output of animal products has not increased similarly. The destruction of infrastructure and the shortage of trained manpower constitute two of the most serious reasons for this. Based on available animal production numbers, the total annual production is around 76,000 tons, representing an availability

of close to 10 kg per capita. Despite government-imposed restrictions, unknown numbers of large ruminants are illegally traded to neighboring Thailand. Pork, beef and poultry meat all contribute to meat supplies on an equal basis.

Milk production is probably as low as 100 to 150 liters per lactating cow. Even at this low level, some milk is left for human consumption. Estimates suggest that between two or three liters of milk are available to rural and urban consumers. As in neighboring countries, the most popular milk product is sweetened condensed milk in metal tins manufactured in Phnom Penh or imported.

b. Characteristics of the subsector

In 1979 agricultural producers were organized into *krom samakki* or solidarity groups. These groups consisted of 12-15 families that cultivated 12-15 ha of land on a cooperative basis. The state retained the ownership of all land. Since the recognition of private economy and legislation governing property rights the importance of *krom samakki*s greatly declined and they have been used only as units of disseminating information on government policies.

In the first few years of reconstruction, no taxes were collected from farmers. Taxes were initially collected in the form of rice; starting in 1988 in cash. In 1989, the need to provide more incentives to producers, including price incentives, and to allow more freedom for private enterprise, such as allowing farmers to sell their produce as they see fit, were recognized.

The policy reforms in the agricultural sector have led to increased production throughout the country. Land security and freedom to sell production in the free market have provided incentives to farmers to invest in agricultural inputs and improve the productivity of the land they cultivate. In turn, this has led to a greater degree of food security.

In the fishery subsector, control over inland fishery resources was established by a law promulgated in 1987. This prescribes a closed season and regulation of fishery operations. Commercial fishing is carried out in more than 300 fishing "holdings" leased to fisheries groups for periods of two years at a time. Despite the continued improvements introduced in fishery regulations, however, catches are rising and some species are becoming scarce.

Thanks to the abundance of fish in inland waters, aquaculture has not had to develop into major proportions. There had previously been a traditional practice of fish-farming in cages or enclosures in the main rivers and it stands again at pre-war levels. However, integrated methods of fish farming have great potential in Cambodia. There are already two production centres (Chrang Cham Res and Thang Cham Res) which have cooperative arrangements with other centres that produce fingerlings. Aggregate output from aquaculture is planned to rise from the present 5.4 thousand tonnes to 10 thousand tonnes in 1995, half of it from the cage methods and the rest from nurseries.

Cambodian fishing boats are relatively small and work the inshore waters, offshore fishing being done by Thai boats under the agreement reached between the two countries in 1989. Nevertheless, Cambodian waters are under-fished and offer catches ten times greater than those obtainable in the overfished Thai waters; a major proportion of the Cambodian catch is sold at

sea to the Thai vessels. Sea fishing is destined to develop especially in the private sector, so that the catch is estimated to total 30 000 tons.

Given the markedly seasonal nature of inland fisheries, a highly developed traditional system of fish preservation and storage was established in the Mekong Basin and in Cambodia in particular. Some 40 per cent of the inland catch is preserved, in fermented form (15 per cent), salted and dried (12 per cent), smoked (5 per cent), or in the form of fish sauce (2 per cent). Fish conservation is partly an industrial undertaking and partly an activity carried on by families for their own consumption needs.

Some 60 per cent of the inland catch is sold fresh. The fishermen display their wares in watertight crates which they fill with water and take to the market themselves, since road transport by truck with ice or in refrigerated chambers is still a rarity. Several fish species of the inundated plain can survive in a small volume of water and are always sold live on the market.

c. Trade in Food Products

In recent years, international trade has been liberalized by allowing the private sector to engage in trading activities. Border trade has also expanded rapidly. Staff estimates place exports and imports in 1989 at about \$50 million and \$150 million, respectively. The principal exports are rubber (45,000 mt annually), timber (100,000 cu m), soybeans (35,000 mt), maize (30,000 mt), and fish/fish products (worth about \$500,000).

The main imports are food, fuel, fertilizers, raw materials, equipment, spare parts and consumer goods.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

Until 1990 the Cambodian economy was operating under the guidance of a Five-year Programme covering the years of 1986-90 with the stated objectives of increasing agricultural production, restoring the industrial capacity in selected ways including the development of the country's hydro-electric potential, expanding exports, consolidating state control of the major productive sectors, concentrating capital investments in certain key branches of the economy, and improving economic management. These policies have been modified in light of recent decisions to open up the economy to private capital. Since the foreign investment law was promulgated in 1989, the government has received applications for 250 investment projects and approved 55 of them.

The new administration under the Supreme National Council and the UN's Transitional Authority in Cambodia will review all existing policies and further amendments and liberalization are expected in the near future. However, it is likely that the present privatization policy will continue. The Second Five-year Plan confines itself to setting sectoral priorities and outlining related action requirements. In sectoral terms, the Plan accords top priority to the agricultural sector (30 per cent of state investment funds) and the rehabilitation of the country's physical infrastructure (15 per cent

of funds to electrical energy, 25 per cent to communication). The share of total state investment funds allocated to industry amounts to 10 per cent. Industry is expected, however, to grow at an above-average annual rate of 15 per cent and to increase its share in total production. Industry's major development contribution is seen in processing domestic natural resources and improving the population's supply with consumer goods. Heavy industries are not considered to possess comparative advantages in Cambodia and will therefore not be actively promoted.

b. Relevant Government Agencies

The Ministry of Industry assumes the leading role in industrial development. With privatization rapidly processing and the remaining public manufacturing enterprises accorded greater autonomy, the Ministry has been stripped of its traditional functions and is seeking to define its new role. The main emphasis in the future is to be on macro-guidance rather than micro-planning and on promotion of private industries rather than regulation of public ones.

The Ministry of Planning plays a new important role in connection with foreign investment approvals. It hosts the Secretariat of the newly established National Committee on Foreign Investment which undertakes a first screening of all investment proposals submitted by foreign investors. It then formulates recommendations for final decisions to be taken by the Council of Ministers.

The Ministry of Finance releases funds to all other ministries and has approval authority for expenditure proposals. It is also in charge of the taxation system and customs duties.

c. Physical Infrastructure

Cambodia's road network in 1990 consists of some 3,000 km of national roads, 3,100 km of provincial roads and about 28,000 km of local or tertiary roads. More than a half of the primary road network needs repair, rehabilitation or improvement. Also the ferry capacity is inadequate to handle even the current volume of traffic at major river crossings. The major constraints on the rehabilitation of the road network, including bridges and ferries are the lack of funds, mechanized equipment, fuel and spare parts and inadequate number of trained and experienced personnel.

There are two major ports in Cambodia, one at Phnom Penh and another at Sihanoukville. Both are state enterprises under the supervision of the Ministry of Transportation, Communications and Posts. The rehabilitation and expansion of Phnom Penh port has been proposed by the Phnom Penh Port Authority. Any major investment has to be considered in the context of an intermodal transport study covering the overall transport policy in the country. This is particularly important because of the increasing importance of Sihanoukville, which would divert much of the international traffic from Phnom Penh Port.

Inland waterways have been a traditional mode of transportation, particularly during the rainy season, when the roads become flooded or unpassable. Improved use of inland waterways depends critically on the water

level during the dry season and the availability of appropriate navigation aids to guide vessels through the navigable channels. Although the requirements for dredging are relatively large, the Dredging and Hydrography Division of the River Transport Company has only one dredger, which breaks down after two days continuous work.

A major problem hampering reconstruction and development efforts in Cambodia is the acute shortage of fuel to meet the country's basic needs. All fuel imports are obtained from Singapore, but due to the foreign currency, the imported quantities are much smaller than required. In view of total dependence on imported fuels, it is important to conduct geological investigations to verify the availability of commercially exploitable deposits of oil, gas and coal. In this regard, three major oil exploration projects have been approved by the Government.

Cambodia's electric power system is probably one of the most underdeveloped in the world. The average annual electricity consumption is only 26 kWh per capita (the comparable figure is 630 kWh per capita in Thailand). The problem is exacerbated by the shortage of fuel. The lack of inadequate and reliable supply of electricity is a critical constraint on the development activities in Cambodia.

d. Industrial Services

The financial sector consists of only two banks. The National Bank of Cambodia, controlled directly by the Council of Ministers, is the monetary authority and the government's depository bank and it also acts as development bank. The 'international arm' of the bank is the Foreign Trade Bank which holds the government's foreign exchange reserves, allocates foreign exchange to state-owned companies and is responsible for international settlements with foreign banks.

In 1991 the first joint venture in the banking sector was established under the name Commercial Bank of Cambodia with equity shares of 30 per cent held by Siam Commercial Bank of Thailand. The bank's services comprise savings deposits, loans, and opening of accounts in foreign currency and foreign currency loans, also to Cambodian nationals.

e. Human Resources

From a virtual collapse in the seventies the country's educational level has been rebuilt gradually to an impressive level. There is a limited number of industry-related technical training institutions which restarted their operations in the 1980's: the Russey-Keo Institute is a technical training school under the Ministry of Industry, the Soviet-Khmer Institute is a high-level technology education institute training engineers in five different faculties, the Toek Thla Institute is a vocational training institute involved in the training of skilled workers and technical teachers; and the Economic Science Institute provides university-level teaching in economics.

However, the present weak state of industrial training in Cambodia calls for major foreign assistance efforts at all levels. As a first step to be able to design effective national and supportive multilateral and bilateral programmes for industrial skill development in the coming years, it is suggested that a survey should be undertaken of key human resource bottlenecks

and emerging skill requirements in the context of further development and technological upgrading of the industrial sector and its institutional infrastructure.

5. Related or Relevant Assistance Programmes

a. Country Specific

DU/KAM/91/003 Training Programme for all Cambodians

b. Regional

Selected References

Asian Development Bank: Economic Report on Cambodia, 1991

FAO: Report of the FAO Mission to Cambodia: Assessment of the Agricultural Situation, Rome 1991

UNIDO: Promoting Industrial Development in Cambodia: Needs Assessment and Assistance Programme Responses (draft), Vienna 1992

KIRIBATI

Summary of Constraints and Potential

Constraints:

- Limited agricultural land
- Remoteness from overseas markets
- Small domestic market

Potential:

- Large fisheries resources
- Tuna freezing for export
- Special sea food products for export "niche" markets
- Better quality processed food for domestic market

1. Review of Growth Constraints and Prospects

With a small, scattered land surface, little fresh water and low soil fertility, Kiribati's potential for expanding agricultural output is limited; in the Gilbert Islands, population pressure is an additional problem. The raw material base for agro-processing is therefore narrow. Limited fresh water supplies also rule out certain industries, such as large-scale canning. The Northern Line Islands, to which Kiribati - the island with the largest land surface - belongs still have some unexploited land potential. Preserving the viability of the subsistence economy should however take precedence over promotion of growth in the cash economy. Improving preservation and processing methods of traditional crops should therefore remain an important industrial policy issue; it would also help to reduce the import bill. Some export market niches for non-traditional crops and their products may eventually be found. The possibilities of a wider range of coconut products should be explored. But the narrow resource base and its great similarity to that of other Pacific Island states make it unlikely that such export will ever play a major role.

While care must be taken that fisheries resources are not overexploited, there would be scope for expanding tuna fishing and fish farming. But apart from improving the freezing facilities, a large expansion of processing activities does not seem feasible. As in the case of agriculture, the focus would probably be on improving traditional processing methods. The scope for expanding the exports of products aiming at more specialized markets (processed shark fins and seaweed) is being explored.

The islands are scattered over an enormous ocean territory, and most of the islands are very remote from major markets. This means that transport costs weigh disproportionately heavily on economic activities. The Northern Line Islands are again more favoured, being located relatively close to the Hawaii Islands. There may be scope for improved organization and cost saving in shipping and air services, especially if technological change further

reduces operating costs. The most obvious benefits would be for small-scale processing activities located in Kirimati.

2. Economic Performance

a. General Characteristics of the Economy

Kiribati had an estimated per capita GDP of US\$ 470 in 1988, up from approximately US\$ 450 in 1982. GDP tends to fluctuate quite strongly with the level of copra production, the most important traded agricultural product. GDP is not, however, a satisfactory measure of the country's overall economic performance, because overseas investments, sales of fishing rights remittances of emigrant workers make a major contribution to the country's economy. The investments are based on the Revenue Equalization Reserve Fund (RERF), which was established to compensate for the loss of phosphate earnings - Kiribati was a major exporter of phosphate until 1979. The country also receives substantial amounts of foreign aid. Most development expenditure is covered by foreign aid. In 1988, per capita GNP was almost 50 per cent higher than GDP (UN 1990).

The services sector dominates the economy, with 62.8 per cent of GDP in 1988. Government services provided almost 40 per cent of the total of the sector. It is followed by agriculture and fisheries, with a 1988 share of 32.6 per cent. In years of low copra production, the contribution of agriculture declines sharply, the lowest figure for the 1980s being 23 per cent. The manufacturing sector is minuscule, contributing only 1.9 per cent to GDP in 1988, of which an estimated three-fourths was provided by cottage industries in the non-monetized sector (UN 1990).

b. Agriculture, Fisheries and Manufacturing

Agriculture and fisheries are characterized by subsistence production. Some three-quarters of the work force is still basically active outside the monetized sector, and even in good copra years, the share of subsistence farming and fishing in the primary sector has been estimated at 40 per cent. The available figures do not suggest a clear trend towards cash crop farming. The cultivation of coconuts is the predominant activity, but root crops, fruit and vegetables are also grown. On a limited scale, pigs and poultry are bred.

In the mid-1980's, only 10 per cent of those engaged in fishing were involved in the commercial sector. There has however been a considerable growth of large scale fishing, mainly by foreign license holders. This accounts for the increased share of fishing in GDP: from 6.2 per cent in 1982 it rose to 7.4 per cent in 1988. The main type of fish caught is tuna. Catch has occasionally fluctuated as a consequence of unusual weather conditions which causes the fish to migrate.

If basic processing activities such as copra making and fish freezing are excluded, the manufacturing sector is extremely small. During the mid-1980s, the largest industrial project was a biscuit plant employing 13 people. There is a number of micro-enterprises, mainly in the food-processing industry (see below); others produce simple basic needs goods such as soap, buckets and furniture. Handicrafts, smithery, motorcycle/bicycle assembly, a pilot solar salt plant and a coconut wood saw mill (suffering from technical

problems and overcapacity) complete the list of industrial activities.

3. Food Processing Industries

a. The Raw Material Base

With a land surface of 746 sq.km. divided over 33 atolls, soils mainly derived from coral with a low fertility, and limited fresh water resources, the potential for developing agriculture in Kiribati is limited. As indicated above, agricultural production revolves around the coconut palm, which provides food, drink, building material, string, etc. Copra production for export comes secondary to local consumption, and copra making, moreover, is hard work with market prices often allowing only a low margin for the producer. Copra production is therefore subject to strong fluctuations.

Attempts have been made to upgrade the coconut palm stock by replanting using improved planting methods. Replanting targets were initially set at 800-1600 ha/year, but this was found to be too optimistic, and the target was reduced to 200 ha/year. Progress has been slow, however, and by the mid-1980s, only 9 per cent of the groves in the Gilberts, the westernmost island group where most of the population lives, had been replanted. Research has also focussed on the introduction of exotic fruit and vegetables for niche markets. Recently, research has become more subsistence-oriented.

With an Exclusive Economic Zone (EEZ) of no less than 3 million sq.km. Kiribati disposes of considerable marine food resources. Apart from tuna, these include shark, shellfish and seaweed. Fish farming traditionally takes place in ponds on the islands, and mainly produces milkfish. According to the Sixth National Development Plan this activity has suffered from the presence of a predator introduced in the context of FAO projects. The Government is involved in the expansion of fish farming, but progress appears to be slow due to the nature of the soils, supply problems of fry, and predators.

b. Characteristics of the Subsector

The most important processing activity is copra making, which is solely carried out at the household level. Modern fish processing does not go beyond freezing - the amounts of fresh water needed for economically viable canning operations are quite simply not available. Most of the fish that will be marketed is caught by foreign vessels, and processed elsewhere. The freezing operations of the two local fishing companies, Te Mauri Ltd. (National Fish Company) and the Marine Export Division Kiribati are very modest, as the total sales for 1986 (recent data were not available) indicate: these amounted to only 1,680 m.t. (World Bank 1988). Neither company appears to be profitable.

In the mid-1980s, other food industries included, apart from the biscuit plant already referred to, the preparation of snacks, ice cream and confectionery, copra oil making and bakeries. The biscuit plant was in need of rehabilitation. Very few units employed more than five persons. A small-scale industry centre is to be set up on Tarawa with UK financing. It is expected that this centre will attract some food processing activities, such as the production of toddy for domestic and export markets.

c. Trade in Food Products

Total domestic exports of A\$ 3.4 million in 1991 (Table 1) indicates an increase of 13 per cent over the 1990 figure. The level is still far away from the boom earnings in 1988 and 1989. Of the two major domestic exports, copra and fish, the former did exhibit a notable improvement as fish exports continued its downward trend.

Table 1. Exports Value by Commodity, 1987 - 1991 (A\$'000)

Commodity	1987	1988	1989	1990	1991
Copra	1173	4203	3127	1023	2089
Handicrafts	3	...	4	3	1
Shark Fins	16	18	42	32	24
Fish	823	1606	2600	964	277
Seaweed	62	15	85	723	676
Pet Fish *)					336
Others	41	6	115	264	11
Domestic Exports	2118	5848	5973	3009	3414

*) Up to 1990 pet fish was included in 'Others' category.

Source: International Trade 1991

Copra export earnings in 1991 were A\$ 2.1 million, out of which 80 per cent were to Bangladesh. This was also the first year copra sales were made to Bangladesh, previously most copra sales were destined for Europe.

Two types of fish exports are made from Kiribati, edible fish and pet fish. In 1991, the latter earned more foreign revenue because of the disruption of the air service, the reason being that pet fish are usually small in size and do not need bulky containers like edible fish which consequently requires large aircraft.

Although seaweed recorded a slight decrease in exports to Denmark in 1991 vis a vis the 1990 exports, its foreign earnings, which constituted roughly 20 per cent of the total domestic exports value, continues to be an important source of income for many local people on the outer islands.

Australia continues to be the major source of imports and in 1991 it supplied Kiribati with merchandise worth A\$ 13.4 million equivalent to 40 per cent of the total imports to the country. Most of these are food items such as rice, flour and other basic consumer items.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The Sixth National Development Plan (1987-1991) aimed at, a.o., increased self-reliance and improved living conditions, diversification of the economy, the promotion of small-scale import substitution activities and of exports, better distribution of development efforts between locations and islands and safeguarding the environment. While in the past, infrastructural development was a major priority, the plan shifted its focus to the development of fisheries, agriculture and small-scale industry.

The sector objectives for fisheries are productivity and quality improvement in the artisanal sector, improving the viability of the national fishing enterprises, diversification of exports and preservation of the resource base. A number of training, extension, marketing, infrastructure research projects have been formulated on this basis.

For agriculture, import substitution and self reliance are the main objectives. Special efforts are to be made to improve the quality of livestock and crops; where applicable, new crops will be introduced. Extension services and research are to be improved, and commercialization of crops and livestock for the local non-rural market is to be stimulated. The feasibility of a modest fresh vegetable (heart of palm) export project is to be established.

For the food processing industries, the main objective will be to serve the domestic market. The development of the industry is mainly to be left to private enterprise, and foreign investment is welcomed. Projects include a small slaughterhouse (initially to be government-owned) to serve the market of South Tarawa, the largest urban centre in Kiribati, and a food processing and preservation centre which is to be set up at the new industrial estate to be built with UK assistance. Freezing facilities for fish are to be expanded, also on the more remote islands. The Plan also includes references to a possible rehabilitation of the biscuit plant, an integrated coconut products project and the establishment of small processing facilities on some of the outer islands.

b. Relevant Government Agencies

The National Planning Office (NPO) of the Ministry of Finance is responsible for the direction and co-ordination of development efforts. Its executive unit is the Development Co-ordinating Committee (DCC). Being short of qualified personnel, the NPO relies rather heavily on foreign experts provided by donor countries. In principle, all development projects must pass the NPO, but virtually all of these are financed by donors, and projects have in the past not always reflected Kiribati needs and objectives (cf. National Planning Office 1988). Under the Sixth Plan, the quality of local staff was to be upgraded and handling of administrative issues were to be improved, which should allow responsible officers to devote more time to actual development planning and the monitoring of progress of existing plans.

c. Physical Infrastructure

Improving the quality of inter-island transport is a key issue for

economic development. With small numbers of passengers and low freight tonnage (which moreover fluctuates strongly with the level of copra production), it is difficult to operate economically viable connections. Improvements under the present Plan mainly concern access to islands (reef blasting, navigational aids, etc.) to help lower transport costs. Some of the marine products of Kiribati are transported by air to Hawaii. As air transport is also available from Tarawa, more attention might be given to further exploring the potential for low-bulk/high-value processed food exports.

Round-the-clock power supply was only available at Tarawa in the late 1980s; under the Sixth Plan, power supply at Kirimati was to be improved. Industrial units using power equipment would often have to rely on generators. The country is totally dependent on imported energy sources. The water supply is limited, and this by itself would exclude the establishment of a number of industries.

d. Industrial Services

There are two banks, the Bank of Kiribati and the Development Bank of Kiribati. They are mainly active in South Tarawa, and local agents of the Bank of Kiribati on outlying islands have no loan-making authority. There are few loan requests for private productive investment. The Bank of Kiribati is to improve the flow of loans to small-scale business, especially in the field of resource exploitation and development, and it is to liaise closely with the industrial advisory project that was set up under the Sixth Plan with UNDP support.

e. Human Resources

A general problem in the past was the absence of a clear policy with regard to human resource development. This is being remedied under the present Plan. Primary education is widespread. The main problem is the supply of skilled technical, managerial and administrative personnel for the modern sector, and the provision of appropriate skills to the large number of students who will spend most of their working lives in the subsistence sector. The Tarawa Technical Institute provides instruction in a variety of technical and administrative skills, but the Institute is constrained by lack of finance. Some technical training courses (mainly fisheries-related) are provided by donor agencies. For higher skills, students must visit overseas institutions. There is no specialized training for the food processing industry.

Women's educational attainments at the basic level are not greatly different from those of men, but their participation at the higher levels, and particularly in technical education is much lower. The Sixth Plan did not address this issue. However, women constitute 25 per cent of the cash economy work force and almost half of the work force in the villages. Proper training could greatly enhance their contribution to economic development. This is of particular relevance for the subsistence economy. Given its long-term importance and the need to enhance its productivity, it is essential to facilitate women's work by improving water and sanitary facilities at the village level (as the present Plan intends to do) and to fully involve them in agricultural extension work, the dissemination of improved processing methods and the establishment of small-scale processing units.

5. Related or Relevant Assistance Programmes

a. Country Specific

UK (BDDP): South Tarawa Industrial Estate (1989-1993)

UNDP: Industrial Development Adviser (1987-1990)

b. Regional

UNDP/UNIDO: Small- and medium-scale industry and entrepreneurship development in the Pacific Islands (1988-1991)

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LAO - Lao People's Democratic Republic

Summary of Constraints and Potential

Constraints:

- Low productivity of agriculture
- Landlockedness
- Shortage of higher-level skills
- Lack of capital

Potential:

- Large unexplored agricultural potential; potential for mass production of a variety of tropical and sub-tropical food products

1. Review of Growth Constraints and Prospects

The Lao PDR has a vast agricultural potential. It could be exploited more extensively, providing the food processing industry with an excellent raw material base for long-term expansion. Apart from tropical crops, the country probably has a considerable potential for livestock farming and sweetwater fisheries, and for sub-tropical crops in its extensive highlands. Essential prerequisites for accelerated growth of the marketed surplus are - apart from increases in productivity through a.o. irrigation - an expansion of the road infrastructure and attractive prices for industrial crops (even after considerable increases, the purchasing price for coffee is only one-third of the export parity price - Livingstone 1991).

The internal market will remain very limited in the foreseeable future, given the low per capita incomes and the small population. Small units at the village or rural town level will often be a more efficient way of providing the population with essential food products than the present relatively large units established by the Government, given the often rudimentary transport network and the near absence of large concentrations of population. Future plans for expanding processing for domestic consumption should take account of the presence of cheap goods from Thailand's highly competitive industries. The very long border with Thailand makes it very difficult to control imports of these.

With regard to exports, the most obvious short-term potential is possibly in coffee exports. If the Lao PDR becomes a member of the International Coffee Organization, it will have its own quota (coffee is now exported under the Thai quota) and receive a higher price for its exports. To identify other viable food industries, more information would be needed on agricultural potential and foreign competitors and on markets (both in the sub-region and overseas) for possible new products.

To be able to exploit new export markets, the industry would need more

skilled manpower. Management, product development and marketing capacity would have to be vastly improved. It should be established whether the existing medium and large-scale enterprises can be modernized and their production re-oriented to serve export markets, or whether the emphasis should be on new units using the appropriate modern technologies. Transit through Vietnam and Thailand would also have to be improved.

2. Economic Performance

a. General Characteristics of the Economy

Since 1985, the Lao PDR has witnessed a transition from centrally controlled planning to a market-oriented economic system. In spite of the difficulties of the rapid transition (such as accelerated inflation, deterioration of the trade balance and shortage of financial resources) this transition has resulted in an average real GDP growth of 5 per cent per annum over the 1985-1989 period. In 1989, per capita GDP was around US\$ 180. Domestic savings are as yet very low, and the Government's development budget is very heavily dependent of foreign assistance.

The most important sector of the economy is agriculture, which accounted for 56.8 per cent of GDP in 1989, down from 61.2 per cent in 1985. The sector employed over 80 per cent of the labor force in 1986. Although agricultural production increased in real terms during 1984-1989 growth in the other sectors - especially services - has been more rapid, causing a relative decline of the share of agriculture. Services accounted for 25.6 per cent of GDP in 1989, up from 22.9 per cent in 1985, and accounted for most of the remaining employment. The industrial sector's share of GDP in 1989 was 15.7 per cent, marginally higher than the 1985 share of 15.4 per cent. Within industry, manufacturing is the most dynamic activity: the sector raised its contribution to GDP from 7.6 per cent in 1985 to 8.8 per cent in 1989.

b. Agriculture, Fisheries and Manufacturing

Of some 5 million ha suitable for cultivation, only 700,000 ha are actually being cultivated. An additional 750,000 ha are used for pasture, and 50,000 ha for raising freshwater fish. Irrigation has been expanding, but is still very uncommon. In 1988, Government-supported co-operatives accounted for 53 per cent of rural families and 52 per cent of all land under rice, the most important crop. There was also a number of state farms. The objective of these farm types was to diversify and expand/modernize production, but it appears that they were not successful, as subsistence farming remained predominant.

The reforms saw most of the co-operatives and almost all state farms disbanded by mid-1990, and the sector is once again characterized by family farming (EIU 1990). Subsidies were abolished, but access to credit has been improved. While this has stimulated output, further growth, especially of marketed output, will a.o. depend on improved rural infrastructure and extension services, and an increase in urban demand (which is rather limited in Laos) and export demand for fresh and processed agricultural products. Crop figures as well as figures on animal husbandry and fish catch will be discussed in section 3a.

The manufacturing sector is still dominated by public sector

enterprises or enterprises that are supervised by the government. Outright private ownership is so far largely confined, it would seem, to cottage industries. Cottage industries are distributed all over the country; larger-scale industry is heavily concentrated in and around the capital of Vientiane and the capitals of the southern provinces of Savannakhet, Saravane and Champassak. Public manufacturing enterprises under Vientiane municipality employed an average of 47 people in 1990, private enterprises employed 4 people on average (Livingstone 1991).

Total manufacturing employment is unknown. Employment in industries under the Ministries of Industry, Culture and Public Health was 3892 in 1989. Similar number might be employed in factories administered by the provinces and by other ministries. Although it is known that large numbers of women are involved in cottage-scale, there are no figures on industrial employment by gender. Nor is there any information on capital investment, but most of the existing public enterprises seem to suffer from overcapacity, the market for industrial products being very modest; equipment is generally obsolete (Livingstone 1991).

Output in the manufacturing industry is dominated by consumer goods. Of the activities supervised by the Ministry, cigarette manufacturing was the most important. It was followed by beverages, detergent, plywood, zinc products and pharmaceutical manufacturing. Production of all industries has tended to fluctuate strongly - the share of cigarette manufacturing, e.g., was 22.5 per cent in 1984 and 36.3 per cent in 1986. There would be various reasons for this: irregular input supply, equipment breakdowns, inadequate management and lack of skilled labor. A clear structural change trend cannot be discerned.

3. Food Processing Industries

a. The Raw Material Base

Rice is by far the most important crop grown in the Lao PDR, as Table 1 shows. According to that information, cultivated area and production were in 1991 considerably smaller compared to the previous year. However, the rice output continued to rise in irrigated areas so the irrigation potential should be better exploited. Tubers are another important food crop. The most important crop for food processing (excluding local rice milling) is sugar cane, the output of which has doubled since 1984 and quadrupled since 1982. In most cases, outputs are related to changes of the cultivated area. Exceptions are sugarcane, maize, vegetables and irrigated rice, where yields per hectare have risen (World Bank 1990). Production of fruits and vegetables, strong around Vientiane and in southern provinces, in 1991 was 51 thousand tons.

The number of livestock has risen during 1980's, partly as a result of government policies to improve nutritional standards through increased protein intake. Buffalo and cow herds showed the largest increase. Livestock numbers are: buffaloes 1.0, cattle 0.8, pigs 1.3 and poultry 7 million heads. These figures also reflect production for subsistence, since there is only one abattoir with very low throughput. There is no information on fish production.

Table 1. Production of Cultivated Areas (th. tons)

Items	1990	1991
Cereals	1776.52	1424.40
Rice	1491.50	1223.37
- Season Rice	1081.13	824.14
- Irrigated Rice	40.99	43.71
- Rais	369.38	337.53
Maize	66.56	68.58
Sweet Potatoes	218.46	132.08
Vegetables and Beans	53.51	51.23
Annual Industrial Crops	170.95	143.83
Mungbeans	2.61	2.11
Soyabean	4.21	5.51
Peanut	6.41	5.63
Tobacco	56.43	45.33
Cotton	4.93	4.75
Sugar Cane	96.36	80.50
Long-Life Industrial Crops	6.22	9.73
Coffee	5.20	8.02
Tea	1.62	1.71

b. Characteristics of the Sub-sector

According to available information it appears that the cottage establishments in the food processing sub-sector are overwhelmingly rice mills. Milling capacity in the country has been expanded through the provision of 24 small and medium-scale rice mills by multilateral aid agencies. There is, however, still a great demand for small village-level mills (estimated at 1,300) and medium-size mills (estimated at 100), mostly in the more remote areas where rice is still hand-pounded by women (Livingstone 1991). A forest product, cardamom, is also among the major food products, but output figures are not known. The most important larger-scale food processing industries were beverages, bread and confectionery, noodles and fish products. The beverages industry does not only dominate output in the sub-sector, but it is also the only industry showing conspicuous growth over the past decade. The output of the other industries decreased during 1980-1990. Growth has been quite spectacular in the brewery industry, where output (by volume) increased more than five-fold over the decade. International assistance has been provided to some as yet relatively minor industries (dairying, slaughtering, sugar milling). UNIDO has financed opportunity studies on, a.o., cassava, vegetable oil, sugar, and fruit and vegetable processing.

The other products manufactured are animal feed, edible oil and coffee. The performance of these industries leaves much to be desired. The state-owned animal feed factory produces only a fraction of its capacity (2 per cent) and cannot be economically viable. Only eight tonnes of roasted coffee was produced in 1990.

c. Trade in Food Products

Of total exports worth US\$ 58 million in 1988, coffee constituted 14 per cent and cardamom 15 per cent. Their contribution to export earnings is surpassed only by timber (26 per cent). Processing before export is rudimentary. There was no information on processed food imports. Unprocessed rice accounted for 5 per cent of total imports in 1988 - excluding possible deliveries under aid programmes). Coffee was until recently mainly exported to Eastern European countries.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The Second Five-Year Plan (1986-1990) emphasized the need to process domestic raw materials. Foreign investment was welcomed to increase investment and acquire modern technologies. Evidently, these policies have not been too successful. Public enterprise reform is a policy that has made a greater impact. Enterprises considered privatizable are being identified throughout the public sector. The Ministry of Industry and the Prefecture of Vientiane, who control a major share of the manufacturing enterprises, are leading the disengagement process.

b. Relevant Government Agencies

While the Ministry of Industry is the central agency for industrial development, the provinces and the Ministry of Agriculture are also involved in the manufacturing sector, as they supervise/own a number of factories.

c. Physical Infrastructure

In 1985, Lao PDR had only some 6,000 km of all-weather road. Expansion of the all-weather road network is essential for future development. There are road connections with some major Vietnamese harbours. Although the Lao PDR is landlocked, distances to Vietnamese ports are not very long, and the main constraints to overseas trade are likely to be time-consuming border formalities and lack of harbour facilities in Vietnam. Trade with and transit through Thailand is constrained by tariffs and other barriers imposed by the latter country.

Navigable rivers connect the country with Vietnam, Cambodia and Thailand and, eventually, with the sea. The government owned Water Transport Company had a fleet of 37 ships in 1987. The rivers mainly serve as domestic transport arteries at present.

The telecommunications network is still rather rudimentary. The country relies on wood for most of its energy, and the modern power network is largely restricted to the Vientiane prefecture. With international assistance, however, a major rural electrification programme is now being implemented. The country has a very large hydropower potential, estimated at 18,000 20,000 MW, but less than 1 per cent of this is exploited at present, and most of it is exported to Thailand. The country is heavily dependent on imported petroleum for power generation.

d. Industrial Services

No service institutions providing technical and other services to public and private sector industrial enterprises are adequately operational at present. Facilities for standardization, testing and quality control are also absent. The permanent office of the Foreign Investment Management Committee (FIMC) and the Chamber of Commerce and Industries are at their infant stages of development. They lack trained personnel and appropriate infrastructure framework to provide the adequate services required by the industry.

e. Human Resources

In 1989, the male literacy rate was 65 per cent, and the female literacy rate 35 per cent. Enrolment in primary schools was 85 per cent of the relevant age group in 1989; a breakdown by sex was not available (UNDP 1990). There is a very serious shortage of vocational, technical and managerial skills. With assistance from donor countries, efforts are being made to improve the required facilities. This includes, a.o., the establishment of a National Polytechnical Institute. Some of the donor projects are specifically designed to provide basic education and training to women. There is no evidence that specialized training for the sub-sector is or will be available.

5. Related or Relevant Assistance Programmes

a. Country Specific

FAO: Installation of mini-dairy (1988-1990)

Australia: Vientiane abattoir study (1989)

Netherlands: Sugar production study (1989)

IBRD: Industrial credit line (1989-1993)

b. Regional

UNIDO: Opportunity studies for small and medium-scale agro-industries in the Mekong area (1991)

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MALDIVES · Republic of Maldives

Summary of Constraints and Potential

Constraints:

- Limited land resources
- Limited inshore fish stock
- High costs connected with infrastructural facilities

Potential:

- Large reef/deep sea fish stock
- Sub-regional exports of traditional fish products
- Fish canning for export

I. Review of Growth Constraints and Prospects

Given the very limited land resources, development in the food processing industry will depend on the potential for fish processing. This potential is threatened in some ways: overcongestion, especially in and around Malé, has resulted in a major increase in waste disposal in coastal waters, and the inshore fish stock is also threatened by coral reef blasting for building materials. While the fresh water plant being built with Danish assistance will help to solve the drinking water problem, the future expansion of the food processing industry will have to take note of the fact that fresh water supply is an issue influencing the viability of projects.

In spite of the damage done to inshore waters, reef fish still represents an underexploited resource. The government believes that the catch can be significantly raised. There is a good market for such fish processed in the traditional way, especially in Sri Lanka, but new ways of processing could also be explored, as well as the market for hitherto unexplored species. There exists, e.g., a good edible lobster variety, but commercial exploitation would require lobster farming.

The EEZ offers great promise in the long term through exploitation of deep sea tuna stocks. This would require additional investments in vessels, processing capacity, training of local skilled personnel, etc. Expansion of the fish industry could have multiplier effects throughout the economy — the local small shipbuilders, e.g., could benefit. Ways should be sought to apply the present decentralized approach to economic development to fish processing where this approach is economically feasible. This could contribute to a better distribution of employment opportunities and incomes over the country. The upgrading of women's skills in fish processing should receive priority so that their position in the industry is strengthened or at least not weakened.

2. Economic Performance

a. General Performance of the Economy

The economy of the Maldives has exhibited strong though irregular growth during the 1980s. The average annual GDP growth rate during 1985-1991 was 9 per cent. All sectors contributed to economic growth, but growth was strongest in the tertiary sector, with an annual average of 10.6 per cent.

Services constitute the largest sector of the economy (see Table 1), accounting for 54 per cent of GDP in 1991, up from 44 per cent in 1981. Growth in the sector is spearheaded by tourism, which by itself accounted for 18.4 per cent of GDP in 1991. Agriculture and fisheries represented approximately one-fourth of GDP in 1991, and their share is slowly declining, but they are still important in providing employment. The manufacturing sector (including electricity) accounted for 5.8 per cent of GDP in 1991; if electricity is excluded, the contribution of the manufacturing sector was probably no more than 3 per cent.

Table 1. Gross Domestic Product by Sectors of Origin, 1990-91
(in per cent)

	1990	1991
Gross Domestic Product	100.0	100.0
Primary sector	26.0	25.6
Agriculture	9.0	8.6
Fisheries	15.2	15.1
Coral and mining	1.8	1.9
Secondary sector	14.4	14.5
Construction	8.7	8.7
Manufacturing	5.7	5.8
Tertiary sector	53.9	54.0
Distribution	17.2	17.5
Transport	5.9	5.9
Tourism	18.3	18.4
Real estate	4.2	4.2
Other services	5.7	5.8
Government administration	8.3	8.2

Source: Ministry of Planning and Environment

Per capita GDP was estimated at US\$ 662 in 1991. The GNP figure was only some 70 per cent of this, as a consequence of repatriated profits and wages of expatriate labour.

b. Agriculture, Fisheries and Manufacturing

Agriculture grew at only 2.5 per cent during the decade, and its share in GDP decreased from 19.7 per cent in 1982 to 8.6 per cent in 1991 due mainly to the relatively faster expansion of tourism, trade and fisheries sector. Coconut is by far the most important crop. The entire crop is consumed in the country. Other presently grown crops are green chilie, egg plant, pumpkin, water melon, cassava, yams, sweet potato, lime, maize, sorghum, mango, papaya, banana, guava, passionfruit, lufa, anona and breadfruit.

Fishing is far more important, although its contribution to GDP has declined somewhat over the years; its share stood at 15.1 per cent in 1991. The predominant catch is tuna. During the off season of tuna fishing, most fishermen will be engaged in catching reef species including sharks. Also lobsters, giant clams and sea cucumbers contribute to the country's economy through the fishing industry. In contrast to agriculture, the fisheries sector is a major foreign exchange earner.

Agriculture and manufacturing accounted for 21 per cent of employment in 1990; similarly fisheries accounted for 21 per cent. As in other small island countries, there is no sharp dividing line between employment in fishing and agriculture. Women play a major role in crop growing, and traditionally handle all fish processing (drying and salting).

The manufacturing sector, contributing a share of 6 per cent to GDP in 1991, consists of a government owned tuna canning factory, six garment factories producing entirely for export, a soft drinks bottling plant, and enterprises in Malé producing PVC pipes, rubber products, toilet soap, cement blocks, furniture and a small range of food products. There are also several well-equipped printing companies, a variety of atoll-based fish-processing enterprises and a boat building industry. In 1990, the employment in the manufacturing sector was 8,441, equivalent to 15 per cent of the total employed population and equally spread over men and women. However, only 25 per cent were "employed", the remainder being "own account" or "family" workers, pointing to the existence of part-time employment and low productivity in the "traditional" manufacturing sector. The size of the handicraft sector is closely related to the large tourist industry.

Except for fish, all inputs for manufacturing have to be imported resulting in low MVA. The figures for turnover per worker give an impression of the capital-intensity of the various operations, with beverages, printing and plastics standing out. Activities such as handicrafts and fish salting/drying are largely traditional micro/household operations. Canning and much of the garment production are relatively large scale, but labour-intensive activities.

3. Food Processing Industries

a. The Raw Material Base

The agricultural raw material base is poor. The country is composed of 1,190 very small islands with poor soils. The total cultivable area is 3,200 ha spread over 162 islands, of which only 33 have more than 100 hectares of land area. The population density is over 700/sq.km., which means that there is very heavy competition among various types of land use. Coconut is the

dominant crop, but as a consequence of ageing stock and increasing household consumption, copra-making has stopped. A variety of fruit and vegetables is grown for local consumption and for the tourist resorts, and it should be possible to introduce new high-value crops on a limited scale and to improve the yield of existing crops a.o. by coconut tree replanting. However, even if such measures would be successful the potential for agro-processing would remain limited.

With an EEZ covering 900,000 sq.km of the Indian Ocean, the most abundant resource of the Maldives is fish. There was a significant increase in output of the fisheries sector between 1980 and 1990. Total production rose from 34,600 mt in 1980 to 76,400 mt in 1990. The fish catch surpassed all targets set in the Second National Development Plan for the years 1988-1990. The bulk of the catch consists of skipjack tuna and a small amount of yellow fin tuna. Together, they averaged 86 per cent of total catch for the five years to 1989.

b. Characteristics of the Subsector

Until early 1970's the only production from tuna was Maldive fish, a hardened type of smoked and dried tuna, and the only export market was Sri Lanka. During 1971, the government decided to expand the production and explore better markets. A small cannery was built under joint venture with a Japanese firm on the island of Felivaru. In 1982 it was taken back by the government along with the collector vessels. The cannery has been upgraded to capacity of 100 MTS per day. Six new small collector freezer vessels and two larger ones for export have joined the fleet.

A large cold store and a port is now under construction in the South Maldives having 1,500 MTS capacity, and another coastal fisheries promotion project is under construction and should be completed by 1994.

Since there are no manufacturing industries, Maldives is totally dependent on imported products. Machineries, equipment and electronics are imported mainly from Japan, Europe and USA.

There are 39 small and private firms that are engaged in the export business of fish products. Since Maldives suffers from shortage of manpower, labour intensive sectors cannot run without foreign labour force. Also the vessels used at present are fairly old and unsuitable for all weather round the year.

At present there is no specialized quality control advisor in the Ministry for the export of tuna and reef fish products. An expert is immediately needed for fish quality control and as a training instructor under the fisheries extension programmes.

There is no substantial manufacture of agricultural implements in the country. Major imports are of farm implements and such items as wheelbarrows, hand shovels, bush knives and other hand tools. Small quantities of irrigation pumps and sprayers are imported from Sri Lanka, Singapore and Japan. Spares and maintenance for these items are available, but the environment causes rapid rusting and regular replacement.

There is no large scale agricultural business in the country. Two

small scale units with a total of 50 employees operate on an open field basis. Raw materials are imported from Sri Lanka, India and Singapore and also from specific agricultural islands. The quality and availability of seed stock is reasonable.

The remaining agricultural production is family based and used to supplement income from other activities. Field plots are very small in size and involve some five people of all ages and both sexes on an ad hoc basis.

Coir rope, woven mats and coconut palm thatch for roofing are all produced at the family level. Some foods like breadfruit chips, banana chips, taro chips and coconut oil are also processed on small scale or family level.

Poultry at present is a household activity where birds are reared in the backgardens. There is, however, a large poultry farm in one of the uninhabited islands with imported chicks and feed. The eggs and poultry meat produced in Maldives are not sufficient to meet the local demand. Several million eggs and substantial quantities of poultry meat are imported every year. The Ministry of Fisheries and Agriculture is proposing to offer attractive incentives to make the country self-sufficient in eggs and poultry meat.

Goats are found in small numbers in some islands. People are now realizing the need to rear goats, but it will take some time to promote goat rearing in view of lack of tradition and skills.

c. Trade in Food Products

Processed fish is the country's main export. In 1990 it accounted 72 per cent of all exports, valued at Rf. 363 million. Almost 24 per cent of fisheries exports went through the private sector, the balance being handled by the State Trading Organization. The export of frozen tuna increased in the 1980's through the deployment of 17 collection and 10 freezer vessels. Canned exports increased also significantly as a result of upgrading the daily capacity of the Felivaru cannery. In 1990, the United Kingdom was the main market for marine exports, followed by Thailand, Sri Lanka and Japan.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The three main objectives of the 1991-1993 national development plan are to:

- secure improvements in the living standards and quality of life of all Maldives;
- ensure that the benefits of development are shared more equitably among the population; and
- achieve greater self-reliance, which is essential for future growth.

The major objectives of the fisheries sector for the years 1991-1993 are to:

- increase fish production and export, and at the same time preserve

renewable fisheries resources;
 raise the income and living standards of the fishing population;
 develop and diversify the commercial catch of marine species, other than tuna;
 tap the fisheries potential of the EEZ; and
 give emphasis to the development of small scale industries.

In order to achieve these fisheries sectoral objectives, the strategies and policies during the Plan period will be to:

formulate a long term fisheries development plan up to the year 2000;
 accord priority to fisheries management;
 improve fishing technology and research capabilities;
 increase food supply and nutritional standards of island communities;
 facilitate the development of professional fisheries manpower required for rational fisheries management; and
 encourage private sector investments in the development of fisheries infrastructure and marketing.

The major objectives set for the agricultural sector of the plan period are to:

increase the value added component of the sector;
 increase the production and productivity of the agricultural sector;
 raise the income of producers involved in agricultural activities;
 contribute towards minimizing imports of vegetables and fruit;
 utilize more effectively uninhabited islands for agricultural production;
 encourage a rationalized land use programme in the rural sector;
 facilitate the supply of agricultural inputs;
 encourage and advise on the promotion and marketing of agricultural produce;
 increase the number of trained personnel in the sector; and
 develop an effective Agricultural Extension Service.

In order to achieve these agricultural sectoral objectives, strategies and policies during the Plan period will be to:

maintain and, where possible increase, the area devoted to crop production;
 provide intensive training to people engaged in agriculture;
 strengthen agricultural institutions, to enable them to respond more effectively to the expanding role of agriculture;
 improve nutritional levels throughout the country, through concerted efforts to increase the intake of vegetables and fruits;
 promote replanting of dwindling reserves of fuelwood and timber with appropriate tree species planted at strategic locations;
 establish and manage an agricultural research facility; and
 facilitate long-term agricultural development on uninhabited islands, through the appropriate revision of land tenure arrangements.

The Government's role in the development of the industrial sector has been growing. There have been some special programmes to assist small scale, and particularly cottage industries; a 1990 UNDP project provided support to handicrafts and cottage industries in the context of this policy orientation. The Government attempts to promote investment outside Malé to attain the

desired balance in economic development. This takes the form of, a.o., Industrial Promotion Zones (see under c). A study on industrial labour development was also initiated. The role of the private sector in industrial development is emphasized, and the Government has sought to create a favorable environment for both domestic and foreign investors through a liberal investment law and flexible regulations and incentive systems.

b. Relevant Government Agencies

During the Second National Development Plan, the Ministry of Fisheries and Agriculture (MOFA) was formed, to combine the activities of previous Ministry of Fisheries and Ministry of Agriculture.

MOFA is the authority responsible for the management and development of the sector. The Ministry of Trade and Industries provides licensing for the export of fishery products, as well as foreign fishing vessels within the EEZ. The State Trading Organization (STO), being the government's trading arm, handles all commercial aspects of fisheries. STO had monopoly control over collecting, freezing, canning and exporting tuna. During the second NDP, however, the Government withdrew STO's export monopoly for tuna products, permitting exports of maldivian fish, salted dried tuna and also shark liver oil by the private sector. The National Security Service undertakes maritime search and rescue operations, and operates a number of patrol boats, a fully equipped Dornier aircraft, and three land radar stations.

c. Physical Infrastructure

The government has made major efforts in the 1980s to improve international transport connections and telecommunications. The Government is contemplating the establishment of Industrial Promotion Zones which will be served by existing or planned airports. One Zone, at Gan, is already being used; it is a former British military base with good basic facilities. Another has been established at Laamu. The availability and quality of water has deteriorated as a consequence of increasing extraction rates. A desalinization plant was set up in 1991 with Danish assistance.

The Maldives Electricity Board (MEB) is responsible for the generation, supply and distribution of electric power in all islands. By 1988, each atoll had a limited electricity supply, provided by private individuals or communities. All commercial electricity is produced using petroleum-based products, which the country must import. Most large factories have their own generators.

Until recently, the Port of Malé was the only port where international cargo was handled. The port is working at full capacity. Arrivals are irregular, and there are severe problems resulting from deteriorated facilities, lack of space and inadequate office premises. Smooth operation is further hindered by insufficient trained personnel in key sectors, and inadequate maintenance, due to lack of spare parts. Most of the time, progress in deepening island harbours is behind schedule.

d. Industrial Services

The development of financial institutions in the Maldives is very recent. Apart from the Maldives Monetary Authority, there are five commercial banks. The Government wants to secure further improvement in the present liberal policies on current, capital and currency transactions, as well as to maintain a flexible exchange rate.

e. Human Resources

The fragmented character of the country is a major impediment to human resource development. The level of basic literacy is high (in 1991 over 98 per cent for age 10-45, with basic literacy of females and males the same) throughout the country, but higher education is very heavily concentrated in the capital Malé, and facilities are limited. There are five technical/vocational centres (four on outlying islands), but the country is heavily dependent on higher-level expatriate expertise. The Government intends to improve the educational system in outlying areas. Vocational training is supported by several donor agencies. There are apparently no specific training facilities for the food processing industry, but skills such as engine maintenance and boat building which are taught at the vocational centres would be indirectly useful for the industry.

The vocational centre graduation figures for women are lower than for men, according to a recent UN document, but the source does not contain any details. Their lack of formal skills threatens their position in the fish processing industry, which is going through a rapid process of modernization as a consequence of the expansion of tuna canning/freezing facilities.

The Projects and Extension Section of the Ministry of Fisheries and Agriculture conducts training courses under the fisheries extension programme throughout the country every year as a scheduled programme. The participants for these two-week courses are selected from the fisherfolk. The subjects are production of high quality Maldivian fish, salted dried fish and smoked fish, making hooks for tuna pole and line fishing and maintenance of fishing boat diesel engines.

5. Related or Relevant Assistance Programmes

a. Country Specific

UNIDO: Industrial promotion tour (1990)

UNIDO: Preparatory assistance to the Maldivian Traders' Association (1993)

UNDP/UNIDO: Development of management and business skills in Maldives (1993)

b. Regional

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MYANMAR - Union of Myanmar**Summary of Constraints and Prospects****Constraints:**

- low productivity of agriculture
- lack of higher-level skills
- lack of capital; unrealistic exchange rates

Potential:

- large unexplored agricultural and fisheries potential; potential for mass production
- low wages
- large exports markets in neighbouring countries

1. Review of Growth Constraints and Prospects

Myanmar could have a strong agricultural sector, creating a large and varied potential for the food processing industry. Past policies have however not sufficiently encouraged farmers to produce for the market, to diversify away from the standard food crops to new cash crops, or to significantly intensify animal husbandry. Although the liberalization measures of the past years represent a major step forward, there is evidently a serious shortage of essential inputs and equipment, and the supply of agricultural credit has stagnated. Fortunately, great progress has been made in basic education, and there is evidently a basic agricultural extension system, so that the transfer of know-how about new cultivation methods and crops could be less of a problem.

While international assistance can initially help to dynamize agriculture, it is essential that the country itself mobilizes the resources for modernization and long-term expansion - of the agricultural sector as well as downstream processing and other economic activities. Myanmar used to be a large exporter of rice, and with a range of appropriate measures (improvements of the trading infrastructure, a realistic exchange rate) exports of rice could be stimulated again. Other major crops, such as pulses, might follow suit. This would increase foreign exchange earnings. At the same time, ways should be found to increase domestic savings through fiscal reform.

The country is one of the few Asian LDCs with a potential for large-scale cash cropping and food processing, and the development of these activities should proceed in a way that is compatible with sustainable development. Myanmar so far has suffered little from soil erosion and air and water pollution thanks to strict conservation. Regulations and monitoring should be adapted to cope with future economic expansion. Measures to promote large-scale cash cropping should take account of the consequences that these activities may have on rural society - women, e.g., play a key role in sowing,

harvesting and animal husbandry, and without proper training in new techniques their contribution may be lost.

Marine resources also seem largely unexploited. While resources should be conserved, the catch along the 1,400 miles of coastline can certainly be increased. Special care should be taken to prevent pollution of coastal waters, as pearl culture is an important source of income.

If the measures to expand the raw material base are successful, an important condition for the long-delayed "take off" of the agro-based industrialization policy will be met. The freedom given to private enterprise is also a major step forward. But other issues must also be tackled. Apart from a radical improvement in the country's infrastructure, a comprehensive modernization programme of the food processing industry itself is needed. Most of the units are cottage scale. In most cases, their role would be to continue catering for local demand, at least in the short-to-medium term, and the main priority for the cottage industry could be the introduction of more hygienic and efficient processing methods/technologies.

An efficient, competitive medium-to-large scale sector however will also be needed, to cater for the urban and export markets. The available information suggests that its performance is far from satisfactory at the moment, and that the range of food products is very narrow. Equipment must be modernized, new products (such as those based on soybean identified in a recent UNIDO project) and markets must be identified, and a major effort must be made to train qualified managers and technicians. The potential for expansion into modern medium-scale processing among the many small and cottage-scale units should be exploited, and credit should be made available for this purpose.

While donor assistance can play an important support role, foreign involvement will be essential for the transfer of know-how and technology. The new, liberal foreign investment law is an important step forward in this respect, but other measures to attract foreign investors - e.g. through an investment promotion agency and investment promotion forums - would also be needed. To ensure that development of the sub-sector remains driven by domestic forces, measures should be taken to stimulate domestic entrepreneurship through the establishment of a favorable climate for domestic investment through, a.o., a new domestic investment law. These measures, as well as measures in the field of training should take particular consideration of the role of women. They tend to play a key role in traditional food processing, and they could make a major contribution to future growth of the sub-sector.

2. Economic Performance

a. General Characteristics of the Economy

After several years of decline caused by internal unrest and a shortage of essential imports, Myanmar's economy started recovering in 1989/90 in the wake of reforms. While still below the level of the mid 1980s, GDP (in constant 1985/86 prices) started rising to become Kt 50,902 million in 1991/92. Rapidly increasing inflation, however, is a threat to the progress made, and the supply of imported essential producer goods is still quite

insufficient. Per capita income (in constant 1985/86 prices) is around US\$ 200.

Over the years, there has been very little structural change in the economy of the country. Agriculture accounted for 38.3 per cent of GDP in 1991/92, and for two-thirds of the labour force (this excludes livestock and fisheries, whose contribution to GDP was 7.7 per cent). Trade came next, with 22.3 per cent. The manufacturing sector contributed 8.9 per cent to GDP.

1. Agriculture, Fisheries and Manufacturing

Agriculture is predominantly of a subsistence nature. Large-scale agriculture and modern cultivation methods are uncommon. Only 6 per cent of all arable land was cultivated mechanically in 1991/92. The Central Committee for Management of Cultivable, Fallow and Waste Land was formed for systematic management and effective and beneficial utilization of abundant resources of the Myanmar, not only for agriculture but also for multisectoral development activities in the economy, commencing from 1990-91. The Myanmar Agriculture Services supplied agricultural inputs and propagated farming techniques. For the enhancement of agricultural production, the state has been rendering supportive measures by providing fertilizers, pesticides and quality seeds, and introducing modern methods of cultivation to achieve higher yield and improved quality.

For effective and extensive utilization of abundant land resources in agriculture and livestock farming and related economic activities, "Fallow and Virgin Land Management Central Committee", was formed in 1991. With prescribed rights and responsibilities the Committee issues directives and guidance, sets rules and regulations, coordinates between agencies and provides necessary support to operate in line with Land Tenancy Act.

The Programme for Development of Border Area and National Races has been carried out to develop agricultural crops and cultivation of opium substitution crops in the frontier areas in eastern parts of the country, establishing model farms for disseminating agricultural techniques, distributing implements and inputs, disbursing loans and undertaking research work. Paddy, wheat, maize, groundnut, soya beans, sugar cane, sesamum and perennial crops like coffee, tea, orange, walnut lichees, lemon and grapefruit are cultivated as substitution crops of opium.

About 15 per cent of the country's total area is under cultivation. Since the beginning of the 1980s, the cultivated area has been stagnant, but it could be expanded to 26 per cent of the land area. The rest of the country is too mountainous, part of the forests cannot be cleared for environmental reasons, and part of them is reserved for the wood industry. Long term growth in the sector will thus to an extent depend on intensified cropping. Some 16 per cent of the agricultural land is now irrigated and under multiple crops, but this is lower than the 1984/85 peak of 18 per cent.

The geography of the country creates a wide range of agro-ecological conditions, and apart from tropical crops it is also possible to grow temperate crops. For transport reasons, however, tropical lowland crops represent the greatest potential for processing. Crops will be discussed more extensively under 3.a.

Animal husbandry seems to be largely integrated with subsistence farming, but modern animal husbandry methods are being propagated, with state farms serving as distribution centres for stock, etc. Modern fisheries have expanded considerably in recent years, but licensed vessels from Thailand do most of the offshore fishing. Aquaculture is taking place on a modest scale, supported by state hatcheries. In the fisheries sector, as in agriculture, the subsistence sector predominates. According to the provisional data for 1991/92, total meat production was 109.9 million viss (1 viss = 1.6 kg) and fish production was 471.1 million viss. Hence per capita meat and fish consumption was 2.64 viss and 10.91 viss respectively.

The manufacturing sector, which employed 1.1 million people in 1991/92, is heavily dominated by the food and beverages branch, which accounted for an estimated 79.3 per cent of gross manufacturing output in 1991/92 (see Table 1). Primary processing of industrial raw materials, mineral and petroleum products and clothing and wearing apparel accounted for 4.6 per cent, 4.6 per cent and 2.8 per cent of gross output.

Table 1. Gross output of the Manufacturing sector by Commodity Group
(At current prices)

Commodity Group	(Kyat million)			
	1988/89	1989/90	1990/91 (Provi- sional actual)	1991/92 (Provi- sional actual)
Food & beverages	25634	51484	53560	57113
Clothing & wearing apparel	1092	1529	1636	2006
Construction materials	967	1731	1884	2297
Personal goods	325	817	941	984
Household goods	224	324	339	348
Printing and publishing	155	400	427	459
Industrial raw materials	1460	2119	1927	3294
Mineral & petroleum products	1649	2827	2969	3347
Agricultural equipment	66	75	67	82
Machinery & equipment	31	31	15	20
Transport vehicles	494	593	537	497
Electrical goods	199	150	181	577
Miscellaneous	675	1131	926	996
Total	32971	63211	65409	72020

Source: Ministry of Planning and Finance 1992

Table 1 shows that, in gross output terms, the food and beverages industry has expanded significantly after 1988/89. The boost given to agricultural output by liberalization is one reason. Another reason would be that the industry is less dependent on imports than most others, and that it was therefore less affected by the external supply problems referred to above. Preliminary figures for a wide product range show a fairly general increase in manufacturing production in 1991/92.

Private ownership accounts for 94 per cent of all the 37,934 industrial units, co-operatives for 1.5 per cent and public enterprises for 4.5 per cent. The share of private enterprise is even higher in the consumer/light goods sector.

However, almost all large factories are in the public sector: few of the 35,548 private enterprises employ more than 10 persons. Half of the co-operatives employ less than 10 persons as well. In the cottage sector, large numbers of women are involved in textile production.

Many of Myanmar's industrial enterprises suffer from common problems: inferior technology, weak organization and management, and acute lack of imported spare parts and essential inputs as a consequence of scarce foreign exchange. Capacity utilization rates in the public sector decreased from 57 to 34 per cent between 1985/86 and 1988/89. The increase in production noted in 1989/90 could be partly due to a lifting of the ban on energy imports.

3. Food Processing Industries

a. The Raw Material Base

Rice is by far the most important food crop grown in Myanmar. Two-thirds of the crop consists of high-yielding varieties; their share has been going down since the early 1980s. This is in sharp contrast with the 1970s, when high-yielding varieties led a rapid growth of productivity in rice cultivation. The production of rice went down from 14.1 million tons in 1986/87 to 13.2 million tons in 1991/92. Of the irrigated area, about two thirds is rice land.

Other important food crops are pulses, groundnuts and sugar cane. The first two are mainly consumed directly. Sugar cane is at present the only important raw material for the food processing industry apart from rice. The production of sugar cane decreased by one third over the period 1986/87 1991/92. A range of other food crops, both tropical and temperate, is grown. Processing, if existent, is probably of minor importance.

There was a downward production trend for all the major crops during the second half of the 1980s. The negative trend for crops was also visible in the case of livestock and livestock products, although there was modest progress until 1988/89. After that the major crops turned to increase, but the livestock and livestock products not. The marine fish catch has consistently increased, the strongest increase being in inshore fishing (Table 2).

b. Characteristics of the Sub sector

Food processing is more heavily dominated by private enterprises than industry in general. It accounts for approximately three fourths of gross output in the sub sector. According to the provisional data for 1991/92, among the total of 17,726 food and beverages factories and establishments, 242 are state owned, 309 cooperatives and 17,175 private owned. Production value of the sector was 57,113 million Kyats.

The most important public sector activity is rice milling. Milling capacity in the country is estimated at 2,000 tonnes/hour. The public sector Myanmar Agricultural Produce Trading Corporation only owns 5 per cent of this,

and most paddy procured by the government is processed under contractual arrangements with private millers. The value of the Corporation's processing activities in 1988/89 has been provisionally put at Kt 1,014.9 million, down from Kt 1,839.5 million in 1985/86, but a clear improvement of the very low figure of Kt 665.7 million in 1987/88.

Table 2. Production of Fish by Nature of Fish.

	(Viss in Lakh ¹)			
	1988/89	1989/90	1990/91 (Provi- sional actual)	1991/92 (Provi- sional actual)
Fresh water fisheries	736	878	875	1116
Fish culture	33	40	39	253
Leasable fisheries	198	321	322	340
Open fisheries	259	265	262	269
Flood fisheries	246	252	252	254
Marine fisheries	3438	3587	3601	3595
On-shore fishing	1216	1255	1262	1273
In-shore fishing	1848	1907	1899	1921
Off-shore fishing	374	425	440	401
Total	4174	4465	4476	4711

Source: Ministry of Planning and Finance 1992

Mills using husk-fired steam boilers account for some 85 per cent of the available milling capacity. Half of these mills are over 50 years old. Low recovery rates, and insufficient maintenance and replacement are a cause for concern. Of the 900 publicly owned mills, 180 have been identified as possible candidates for rehabilitation. Privatization may not be a solution at this moment, as technical qualifications and financial resources for this type of industrial activity are in short supply.

Improved storage capacity and renovation of plants have received increasing attention in recent years. The country has received financial support from the IDA and the ADB for this purpose. Twenty mills with a capacity of 6 tonnes/hour are reported to be under construction or to have become operational recently.

Other public sector activities, 33 mills and factories under the Myanmar Foodstuff Industries (MFI), include sugar milling, beverages, cereal products, canning, coffee and tea processing and the preparation of various condiments. The ongoing projects are one sugar mill project by Japanese

¹1 viss = 1.6 kg; 1 lakh = 100,000

cooperation programme, Alcohol Plant No.(2) renovation project, renovation of the Tea Factory Project, machineries and equipment are supplied from Malaysia, etc. Overall production value of MFI jumped from Kyat 675.61 million in 1988/89 to Kyat 1172,19 million in 1990/91. The sales value in 1990/91 of MFI consists of the following:

	Kyats in million
Sugar Industry	273,40
Alcohol Industry	308,71
Wheat Industry	68,92
Tapioca Starch & Monosodium Glutamate Industry	7,45
Virginia Tobacco Industry	357.09
Preserved Food Industry	59,26
Soft Drink and Ice Industry	96,36
Total	1172,19

The fresh water aquaculture is already well developed. As the consumer prefers fresh fish (iced), the main improvements should be conducted in the distribution and retailing network. The brackishwater aquaculture has huge shrimp potential offering export of frozen shrimps.

c. Trade in Food Products

Agricultural, animal and marine products accounted for one third of total export earnings in 1990/91, but pulses and beans have become the main export products during the past few years (see Table 3). Fish and fish preparations are beginning to play a role in exports, especially to Asian countries. In addition to the traditional export of marine products, the Myanma Fishery Enterprise has allowed the private fishing trawlers to catch fish and sell them directly at the border area since 1989/90.

Imports of foodstuffs are usually unimportant, and mainly consist of rice when domestic harvests are low. In 1990/91, food imports accounted for just over 2 per cent of total imports.

Table 3. Exports of food products (Kyat in million).

	1988/89	1989/90	1990/91
Total Domestic Exports	2168.9	2834.1	3057.0
Rice and Broken Rice	53.7	266.3	172.1
Maize	0.6	11.5	12.7
Pulses and Beans	52.5	123.1	514.9
Animal Products	5.2	2.5	4.6
Marine Products	61.3	134.3	164.8

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The manufacturing sector was expected to emerge as the most dynamic sector of the economy under the Twenty-Year Long-Term Plan (1971/71-1990/91). This Plan, while holding on to the previous priority of self-reliant development based on public-sector investment, recognized the need for a greater degree of foreign trade and of private sector involvement. But apart from marginal changes, the country remained largely sealed off from the world market, and the industrial sector, being shielded from international competition, remained characterized by very low productivity. The export potential was not exploited, and even the local market was not properly catered for.

The Fifth Four-Year Plan earmarked 29 per cent of public investment outlay for processing and manufacturing. The long-term goal was to transform a rural economy into an agro-based industrial economy, but the Fifth Plan emphasized improved capacity utilization rather than new investment. Projects related to food processing in the public sector included:

- Rehabilitation of oil palm estates and provision of processing facilities as well as training;
- Establishment of a fish drying plant;
- Construction of a sardine canning plant;
- Rehabilitation of a wheat mill;
- Expanding sugar milling capacity;
- Construction of a new brewery;
- Establishment of a modern rice mill.

Only the latter project aimed specifically at export markets. All long-term plans were, however, abolished in 1988 in favour of annual plans. With regard to the industrial sector, these retain the previous emphasis on agro-processing. Other priorities are the expansion of export industries, a better geographical distribution of manufacturing, and rationalization of the structure of the sector. It appears that the above-mentioned projects - if not already completed - were abandoned under the new planning system. Processing and investment were provisionally allotted 18 per cent of public investment under the 1988/89 Plan; only the share of transport and communications was higher. There was one new sugar-milling and one distillery rehabilitation project.

In 1989, state monopolies in many industrial branches were abolished, and co-operatives as well as private entrepreneurs (both domestic and foreign) are free to engage in the production and trade of most industrial goods. Some industries continue to be reserved for the public sector, but food industries are not included among these. The sub-sector is also fully open to foreign investment now.

b. Relevant Government Agencies

In Myanmar, the Ministry of No. 1 Industry is responsible for consumer products and light manufacturing, with the exception of rice milling, which comes under the Ministry of Trade (Agriculture and Farm Produce Trade Corporation). Other Trade Corporations under the ministry also process food.

but on a very limited scale), and processing of milk, meat and fish under the Ministry of Livestock Breeding and fisheries. Pearl culture belongs to the Ministry of Mines.

The Industrial Planning Department of the Ministry is concerned with planning and implementation of new projects, monitoring of target achievement, procurement of raw materials, production and financial management and quality improvement. The functions of the Directorate of Regional Industrial Co-ordination and Inspection are being reviewed in the context of the policy to encourage private industry. Apart from technical inspection of all factories under the Ministry, the Directorate was charged with private enterprise registration and supervision, and raw material procurement for these.

The country's only industry-oriented R+D institute, the Central Research Organization (CRO), comes under the Ministry of No. 2 Industry. Its main functions are provision of information and technical advice, research on appropriate technologies, trouble-shooting in individual plants, establishment of standards and specifications, and repair and calibration of industrial instruments as well as testing services. Although the Ministry in question is concerned with heavy industries, the CRO has a food technology department which has worked on production processes for fruit juices, including the establishment of a pilot plant. UNIDO has formulated a project for the development of protein-rich food from beans and pulses by CRO. The Technical Services Unit of CRO provides industrial consultancy and technology transfer services.

c. Physical Infrastructure

Myanmar has some 15,000 km of all-weather roads. This is inadequate for a country of Myanmar's size, and little was done in the past to upgrade the network. Recently, improvements of the main north south arteries have been undertaken, and the feeder road network is also being extended. The railway network is 4,500 km long, and has suffered from shortage of modern rolling stock, but this is being remedied now. Rivers play a major role in north-south traffic, and there is also intensive coastal shipping in the southern part of the country. Yangon (Rangoon) is the only important sea harbour.

Myanmar has considerable energy resources (gas, oil, hydropower), but these are underexploited. Installed power capacity was provisionally put at 1,009 MW for 1988/89; hydropower and gas turbines accounted for most of the generated electricity. Industry accounted for 57 per cent of all energy consumed in 1987/88. In that year, 286 towns and 741 villages were connected to the power network. Secure energy supply is however not always available yet. Telecommunications are rudimentary, with only 1.6 telephones per 1,000 inhabitants in 1987.

d. Industrial Services

Apart from the services for manufacturing described under b., another institution directly associated with this industry is the Myanmar Economic Bank. This used to be the primary collector of deposits and the primary lender to public enterprises, both for investment and working capital. It is now mandated to lend to co-operative societies and private industries. A new

project promotion section is planned, with staff to be trained by the Asian Development Bank. A new investment and commercial bank is envisaged. This bank would cater for the needs of foreign investors and joint ventures.

e. Human Resources

The 1983 census (more recent figures were not available) estimated that 63 per cent of all males and 34 per cent of all females were part of the labour force; the differences in the figures are probably caused by the exclusion of household work from the statistics. Female participation in the labour force is slowly increasing. Manufacturing and trade employed a relatively higher percentage of the female labour force (13 and 18 per cent, respectively) than of the male labour force (7 and 8 per cent). With regard to manufacturing, the relatively high figure is possibly due to a strong female presence in traditional food processing and in the textile industry. As pointed out above, women play a key role in the cottage textile industries, but this is probably not reflected in the census.

The literacy rate is quite high. In 1983, the rate was 82 per cent for men and 71 per cent for women. All children of the relevant age group are now said to be enrolled in primary schools. Secondary and tertiary schooling have also made rapid progress, but there is a lack of vocational training and technical education facilities, at least for the private sector. In the late 1980s, existing industrial training institutions only catered for public sector enterprises, and trainees were committed to work for a minimum of five years in the public sector. In 1990-91 there were seven technical evening schools, 14 technical high schools, 10 technical institutes and one university-level technology institute, with a total enrolment of some 23,000 students.

The National Vocational Centre under the Ministry of Labour has conducted courses in cooperation with UNDP and ILO to train supervisors and foremen of industrial establishments. They would train in turn other workers in their respective organizations. The Centre has also courses for training officers in management.

In the state-owned sector of the industry there are refresher courses and in-plant training courses catered for the workers in fields like quality control analysis, maintenance services, machine operation, etc. Training programmes are conducted to improve production techniques, product quality and to promote efficiency among workers.

Constraints hampering the steady development of the private sector relate to credit facilities, manpower training capabilities, technical knowhow, industrial technology and its adaptation, etc. Entrepreneurship and technical knowhow has been imparted to private entrepreneurs by holding series of workshops by various ministries concerned.

5. Related or Relevant Assistance Programmes

a. Country Specific

Japan: Sugar mill project (1985-1991)

Australia: Mandalay dairy development project (1984-1990)

Australia: Mandalay dairy: technical advisory committee (1986-1990)

UNDP: Edible oil project support (1987-1992)

UNDP/UNIDO: Development of protein rich foods from beans and pulses (pipeline)

b. Regional

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NEPAL - Kingdom of Nepal

Summary of constraints and potential

Constraints

- Limited raw material base
- Limited domestic market
- Landlockedness
- Low level of human resource development

Potential

- Variety of agro-ecological zones allowing the production of special high-quality products for export

1. Review of Growth Constraints and Prospects

The principal constraints affecting the development of the food-processing industry in Nepal are;

- the limited availability of accessible raw materials;
- the lack of skilled and higher-level personnel;
- low competitiveness of products resulting from low quality standards;
- a small domestic market as a result of low per capita incomes;
- inadequate auxiliary infrastructure and industries (storage, packaging).

The raw material problem is caused by limited land resources and low yields. Government policies already stress increasing the areas under irrigation, and the provision of credit and inputs such as fertilizers, but actual delivery tends to be behind Plan targets. Only just over half of the fertilizer projected for winter crops was delivered for the 1991 winter crop (EIU 1/1991, p. 34). Stronger price incentives may also be needed to motivate farmers to produce a marketable surplus. Intensification of agricultural production will have to take account of the very fragile environment, and the prevailing agricultural system which is largely subsistence-oriented, and for which no alternatives are available in the short run. These factors would constitute additional limits to the surplus available for processing.

Much is being done to reduce the serious shortage of skilled and higher-level personnel, but extra efforts should be undertaken to ensure that the position of women - traditionally the most important food processors - is not further eroded as the industry modernizes, and that their representation in key positions in the industry (as entrepreneurs, managers and technicians) is strengthened. This would greatly enhance their contribution to the growth of the sub-sector. Special courses for the food processing industry would help to improve productivity and product quality.

Apart from higher-skilled personnel, the industry would also need

improved technologies to raise the quality of its output and to reduce waste. The latter would benefit from applying waste management procedures; with regard to effluents, the external environment would benefit as well. So far, these environmental considerations were not given much attention, but UNIDO has recently prepared draft environmental impact assessment guidelines for the Nepalese government and it is planned to continue assistance in this area in years to come. In some industries (dairying, fruit and vegetable processing), waste can be reduced and productivity enhanced through better transport and storage.

If the issue of product quality is tackled, food processing could increase its contribution to foreign exchange earnings. Moreover, food products that are of comparable quality to imports will help to realize the government's twin aims to provide for basic needs and to reduce import dependence. Recent export figures show that fruit and vegetable products as well as spices, certain dairy products and vegetable oils can be successful in foreign markets. While the country has a diversity of climatic zones allowing the cultivation of both temperate and (sub)tropical crops, the supply of raw materials will in most cases not be abundant. In addition to high transport costs to all countries outside the Indian subcontinent this suggests a niche strategy rather than a strategy based on mass production. Better packaging would help exports to be successful; the feasibility of creating such an auxiliary industry in Nepal versus imports of better quality packaging from India would have to be examined.

2. Economic performance

a. General Characteristics of the Economy

Nepal's per capita GNP in 1989/90 was US\$ 170. In 1988/89 the figure decreased temporarily from the previous year's US\$ 153 to US\$ 151 (see table 1). This was due to a conflict with India over trade and transit issues (see below), resulting in a temporary lack of essential imports and a drop in GDP growth to a level below population growth figures. Otherwise, GDP has displayed healthy growth, averaging 4.8 per cent annually in real terms (i.e. on the basis of 1974/75 prices) throughout the previous years of the decade.

The economy is dominated by agriculture, accounting for 56 per cent of GDP. The sector provides a livelihood for some 90 per cent of the economically active population. The next most important sector is services, with 25 per cent of GDP. The manufacturing sector is relatively small, contributing approximately 5.6 per cent of GDP. Its share has gradually increased from around 4 per cent in the early 1980s.

Nepal is a landlocked country with close links to India. Most of the country's trade is with India, trade and transit treaties facilitating the movement of goods between the two countries. There is free movement of labour, and the Nepali rupee is closely linked to the Indian rupee. In 1989, when the treaties had to be renewed, differences in views on a number of issues led to a closure of most border posts by India. This had a seriously negative impact on the economy. The vastly stronger economy of its neighbor limits Nepal's freedom of manoeuvre. However, the situation has normalized since and trade flows uninterruptedly.

Table 1. Economic Trends in Nepal for Selected Years.

Item/Year	1976/77	1981/82	1986/87	1987/88	1988/89	1989/90	Units
Nominal GDP/	17.30	31.00	59.20	68.90	78.30	88.70	Rs Billion
Real GDP							
at 1974/75 Prices	17.80	20.90	25.60	27.50	27.50	29.60	Rs Billion
Growth in Real GDP							
at 1974/75 Prices	3.00	3.30	4.10	7.40	-	7.6	%
Population	12.80	15.40	17.40	17.80	18.20	18.80	Million
Per Capita GDP							
at Current Price	1351.60	2066.70	3380.10	3852.30	4054.30	4815.00	Rs
Per capita GDP	108.90	167.00	157.00	174.00	168.00	170.00	US Dollars
Investment	2.80	5.30	12.90	14.70	17.20	16.10	Rs Billion
Total Domestic							
Consumption	14.90	27.90	51.90	60.80	70.6	80.50	Rs Billion
Exchange Rate	12.50	13.20	21.50	22.10	25.00	28.00	Rs/US\$
Exports FOB	1.20	1.50	3.00	4.10	4.20	5.20	Rs Billion
Imports CIF	2.00	4.90	10.90	13.90	16.30	18.40	Rs Billion
Trade Balance	-0.80	-3.40	-7.90	-9.80	-12.10	-13.20	Rs Billion
Change in Reserves	0.30	0.50	0.60	2.30	0.08	2.65	Rs Billion

Source: Ministry of Finance, Economic Survey 1990/91; Central Bureau of Statistics, Statistical Pocket Book, Nepal, 1990.

Note: 1/ The nominal GDP is at market prices.

b. Agriculture, Fisheries and Manufacturing

The agricultural sector is to a very large extent subsistence oriented. While the large variety of agro-ecological zones allows the cultivation of both temperate and subtropical crops, the mountainous character of the country limits the amount of land available for cultivation: only some 17 per cent of the total surface is cultivable, and virtually all of this area is now under exploitation. The rapid increase in population has led to overexploitation, deforestation of slopes and massive erosion. The potential for increasing productivity by modern methods is limited by topography, fragmented landholdings and the extreme alpine climate of higher altitudes. Only 25 per cent of the land is under irrigation, and output tends to fluctuate strongly on non-irrigated land. Approximately 28 per cent of agricultural production is estimated to be provided by livestock (buffaloes, yaks, goats).

Cereals are the main subsistence crop, and rice accounts for over 60 per cent of all cereal output (see Table 2). Maize and wheat are the other important cereals. Barley and millet are not grown in great quantities, but they are of great importance to the inhabitants of higher altitudes, as they can be cultivated under relatively extreme conditions.

The major cash crops are sugar cane, oil seeds, tobacco, jute and potatoes. They are cultivated on approximately 10 per cent of the available land. A wide range of fruit and vegetables is grown, but very little of this

takes place on a commercial basis. Table 3 shows the trends of production and productivity of the major cash crops. With the exception of sugar cane, the production of these crops does not show much dynamism.

Table 2. Trend in Production and Productivity of Major Cereal Crops, 1974/75 - 1999/2000

Crop	Actual Production and Productivity								Targeted Production and Productivity			
	1974/75		1979/80		1984/85		1989/90		1994/95		1999/2000	
	Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity
Paddy	2,452	1.98	2,360	1.84	2,709	1.97	3,389	2.37	4,218	3.00	5,396	3.50
Rice	827	1.81	576	1.31	820	1.42	1,201	1.60	1,300	2.00	1,750	2.50
Maize	142	1.14	119	0.97	124	0.93	225	1.10	138	1.02	145	1.06
Wheat	331	1.14	440	1.20	514	1.18	855	1.42	1,186	2.00	1,625	2.50
Barley	26	0.91	23	0.89	24	0.86	27	0.93	30	1.11	35	1.30

Source: FBT Sub-sector, Vol II, UNIDO, 1992.

Table 3. Trends of Production and Productivity of Major Crops, 1974/75 - 1999/2000

Crop	Actual Production and Productivity								Targets			
	1974/75		1979/80		1984/85		1989/90		1994/95		1999/2000	
	Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity	Production	Productivity
Oil Seeds	65.85	0.588	61.87	0.524	84.03	0.657	98.06	0.638	121	1.5	148	2.0
Tobacco	4.79	0.713	5.50	0.731	6.43	0.752	6.60	0.867	14	2.5	19	3.4
Sugarcane	251.43	16.541	385.07	17.175	408.26	23.356	988.30	31.375	1,582	35.0	2,773	40.0

Source: FBT Sub-sector Vol II, UNIDO, 1992.

During 1984/85-1988/89, growth of agricultural output improved somewhat, although (sugarcane excepted) it was still behind target growth rates of the Seventh (1985-1990) Plan. Apart from favorable weather, this was due to government efforts to extend irrigation and improve the supply of inputs and agricultural credit.

The major subsectors in MVA and manufacturing employment are food & beverages & tobacco, textiles & leather and chemical manufacturing (see Tables 4 and 5).

Table 4. Trends in Percentage Share of Manufacturing Value Added by Sub-sector, 1976/77 - 1989/90

Sub-sector Industry/Products	1976/77	1981/82	1986/87	1986/87	
				Formal	Formal
Food, Beverages & Tobacco	61.85	69.86	49.9%	39.64	36.38
Textiles and Leather	5.12	11.46	19.54	24.38	26.40
Chemical	3.77	5.73	19.00	23.61	21.50
Mechanical Engineering	1.84	2.37	5.01	5.66	6.18
Electrical and Electronics	NA	NA	1.16	1.43	1.41
Others	27.43	10.58	5.09	4.67	3.27
Total	100.00	100.00	99.75	99.19	95.14

Table 5. Trends in Percentage Shares of Manufacturing Employment by Sub-sector, 1976/77 - 1989/90

Sub-sector Industry, Products	1976/77	1981/82	1986/87		1989/90
			Formal	Formal	Formal
Food, Beverages & Tobacco	50.51	45.70	29.21	18.79	18.42
Textiles and Leather	7.62	17.63	23.37	27.09	30.19
Chemical	14.84	22.66	35.50	41.68	41.83
Mechanical Engineering	1.97	4.12	3.87	3.50	3.22
Electrical and Electronics	NA	NA	0.48	0.56	0.52
Others	25.06	9.89	7.48	5.44	5.01
Total	100.00	100.00	99.91	97.06	99.28

Textiles accounted for 26.4 per cent of value added and 30.2 per cent of employment in the sector in 1989/90. In contrast to the other sectors, it is also an important foreign exchange earner. The chemical industry is a larger employer than textiles, but value added is lower. The food, beverages and tobacco processing industries accounted for 36.4 per cent of MVA and 18.4 per cent of employment in the sector in 1989/90. MVA/worker in this subsector is considerably higher than in the textiles & leather or chemical industry. It is clear that food & beverage & tobacco processing industry has lost the dominant position it had at the beginning of the 1980s. This is mainly due to the growth of the textile industry and a general diversification of manufacturing activities.

The accompanying structural changes have been even more significant. With the establishment of many new industries, the share of traditional industries declined considerably. The resulting diversification of the industrial structure is exemplified by the decline of the contribution of value added of food & beverages & tobacco sub-sector in the manufacturing sector from 62 per cent to 50 per cent during the decade 1976/77 to 1986/87. During the same period, the share of textile & leather sub-sector went up from 5 per cent to 20 per cent and chemical sub-sector increased from 4 per cent to 19 per cent.

Notwithstanding the recent advances, the manufacturing sector is dominated by cottage scale industries. According to the Census of Manufacturing Establishments, 1986/87, 95 per cent of the total establishments would fall within the category of cottage industries (with an investment of less than Rs 700,000). The coverage of the Census, however, excludes cottage and village industries which do not utilize power. Over a long period, such cottage and village industries have constituted the only manufacturing base in the country, and even now, they are a significant contributor to industrial output and employment. These industries characterize household-based production activities mostly in rural areas, often carried out on a part-time basis in agricultural slack period and largely addressed to household consumption. Although their share in the manufacturing sector has sharply come down in recent years, it is estimated that they still provide employment to more than one million persons.

Most of the registered enterprises are located in the Central region, near the capital of Kathmandu or in the towns near the border with India. Proximity to major national and international markets and to Indian supply sources, and the good quality of the infrastructure in these areas, are major locational determinants. The cottage industries, which are less dependent on imports and mainly produce for the local market, are dispersed all over the country.

Over the last decade, there has been considerable direct investment by Government in public enterprises. Though small in number, the contribution of PEs is substantial; they accounted for 20 per cent of output and 29 per cent of value added of the manufacturing sector in 1986/87. Their overall performance has, however, remained less than satisfactory. Following the new industrial policy, privatization and restructuring of many of the PEs is underway. Over 96 per cent of enterprises continue to be in the private sector. Foreign investment has hitherto been slow and mainly in the field of consumer goods like beer, soft drinks and cigarettes.

Foreign investment was well-represented in textiles, wood products non-metallic minerals, accounting for 28, 20 and 17 per cent of total sub-sector investment, respectively, in the mid-1980s. Most investment is Indian, and foreign investment is concentrated in relatively large projects, capital investment being usually more than Rs 10 million (Department of Industries 1989). In food processing, foreign involvement is relatively limited, being restricted to a few (large) plants in beverages, snacks/confectionery, fruit processing and noodle making.

The Investment Forum organized by the government with UNDP/UNIDO assistance in December 1992 has provided a boost to accelerated foreign investment into Nepal.

3. Food Processing Industries

a. The Raw Material Base

As a whole, the food industries import few raw materials, but some individual industries are rather heavily dependent on them. Table 6 shows that all or almost all milk powder, barley and soybean oil supplies are imported. The large purchases of soya oil are another proof of the supply problems in the vegetable oils industry. Fruit canning also shows a high dependence on imported raw materials. The same is true for beer brewing and soft drinks.

Table 6. Nepal - Imported Inputs for the Food Industry and Source of Imports, 1988/89 (Rs 1,000)

Input	From India	From Third Country	Imports as % of Total Input Purchases
Milk powder	1,743	3,230	93
Vegetable ghee		4,789	17
Barley	16,814		100
Wheat flour	329		6
Sugar cane	1,920		9
Fruit	1,629		55
Sugar	146		3
Molasses	8,010		23
Mustard seed		3,087	7
Soybean oil		129,104	99

Source: Central Bureau of Statistics, 1990

Agricultural production trends of the past decade show that raw material supply could be a major constraint for the future development of the food processing industries. In spite of increasing investment in agriculture, production has not kept pace with population growth, leading to a reduction of surpluses for export and processing. The problem is compounded by lack of agricultural land and the fragmented landholdings, and by inadequate storage, transport and marketing. Post-harvest losses are high.

With regard to major raw materials, the supply situation in the remaining years of the decade can be evaluated as follows:

- There will probably be a shortage of rice and maize, even if measures to stimulate production under the Plan are all successful. The production of wheat, on the other hand, might grow sufficiently to meet both direct consumption and industrial needs.
- Sugarcane will probably continue to be in short supply. There may be further improvements in productivity and price incentives for farmers, but the problem of efficient transport would also need to be solved. Considerable investments are needed to reduce sugarcane yield losses due to the present transport systems.
- The production of milk is targeted to increase by 4 per cent annually to cover basic needs. The problem for the modern dairy industry is that most of the surplus will be processed domestically, and transport and storage issues would also have to be tackled.
- The deficit in oilseeds is likely to increase considerably, due to a growing disparity between demand and production. Special efforts will have to be made to increase productivity in this area.
- A better supply of fruit and vegetables has been noticed in areas where good transport is available. With continuing investment in rural infrastructure, this trend will probably continue. A strong growth of supply is probably not to be expected in view of the fact that large-scale production is practically impossible.

The contribution of each of the three subdivisions of the FBT sub-sector -- Food, Beverages and Tobacco -- to Manufacturing Value Added has undergone a substantial change between 1976/77 and 1989/90. While the share of food industries declined, that of beverages and tobacco grew steadily during this period (see Table 7).

b. Characteristics of the Sub-sector

In Table 8 is shown some of the performance indicators of food processing sub-sector. Table 9 compares the sub-sector to the other two sub sectors, and shows how they together form the composition of FBT Sub-sector.

The food processing industries are characterized by the predominance of cottage industries, which constituted over 90 per cent of the units in the subsector in 1986. The cottage units are mainly engaged in cereal milling, and there is little detailed information on them. The survey below focusses on the enterprises covered by the industrial census. It should be noted that the census contains no details on the breweries in the country, which are large-scale capital-intensive joint ventures.

Table 7. Trends of FBT Sub-sector's Share in Manufacturing Value Added (%), 1976/77 - 1989/90

Industry	Formal Sector Only						
	1976/77	1981/82	1986/87	1986/87	1987/88	1988/89	1989/90
Food	59.11	49.38	32.38	17.56	13.06	11.96	14.33
Beverages	0.73	0.73	2.85	3.59	6.74	5.58	5.89
Tobacco	2.01	19.75	14.71	18.49	18.64	15.55	16.16
Total	61.85	69.86	49.95	39.64	38.44	34.09	36.38

- Source: 1. Formal sector represents establishments employing more than 10 persons only.
 2. Since products covered in each Census and Annual Survey vary, the percentage share of manufacturing value added so presented should be treated as broadly indicative.
 3. Informations in this section has been drawn from FBT Sub-sector Vol II, UNIDO, January 1992.

Table 8. Performance Indicators of the Food Processing Sub sector, (1986/87)

NACE	Industry, Product	Gross Output		Gross Worker Hourly		Estimated Average		
		Rs '000	Rs	Es '000	Cost Rs	Output Worker	Plant Shifts*	
2110	Fair	115.00	59.84	8071	3827	2.34	25.10	1.42
2111	Fruits & Vegetables	170.00	56.27	640	410	1.50	26.05	0.96
2115	Oils and Fats	250.04	176.76	4997	2428	2.96	25.36	1.46
2116.1	Service Mills	250.22	478.43	51161	8080	4.33	25.56	0.22
2116.2	Grain Mill Products	132.46	122.75	20339	11640	1.80	68.62	1.04
2117	Bakeries	24.95	27.03	11123	5994	1.86	20.33	1.27
2118	Sugar	60.62	25.43	12161	10869	1.67	15.22	0.91
2119	Confectionery	55.32	26.97	1191	479	2.53	14.59	0.86
2121.1	Tea Processing	61.03	46.43	1980	1046	1.80	21.36	0.91
2121.2	Tea Packing	172.10	106.74	454	165	2.35	60.60	1.01
2121.3	Spices Grinding	72.66	74.33	404	158	2.56	28.69	0.77
2121.4	Tea Manufacturing	27.38	24.45	186	56	3.32	7.36	0.97
2121.5	Dalmoths Snacks	62.79	42.39	550	187	2.94	14.33	1.00
2122	Animal Feeds	276.77	238.04	1358	393	3.46	62.89	0.96

Source: FT, Sub sector Vol II, UNIDO, 1992.

- * This has been estimated on the basis of total worker hours and number of workers in each industry and assuming 300 working days in a year.

Cereal milling is prominent among the larger enterprises. The branch accounted for 18 per cent of MVA, 28 per cent of employment and 34 per cent of all establishments in the sub-sector in the subsector in 1988/89. In value added terms, the distilleries branch was more important, accounting for almost one-fourth of sub-sector MVA by itself. Other major industries in the sub-sector are dairy products, vegetable and animal oils and fats, bakery products, sugar refining and soft drinks.

With few exceptions, all branches have both traditional, usually small units and modern, large-scale units. Only the soft drinks branch has exclusively large, modern units; the 1988/89 level of fixed assets/worker - Rs 226.3 thousand - was among the highest in the Nepalese manufacturing sector. The role of traditional units is particularly strong in the grain milling, bakeries and sugar refining branches, which show levels of fixed

Table 9. Composition of the FBT Sub-sector, 1986/87

NSIC	Industry/Product	Number of Units	Operatives		Fixed Assets (Rs '000)	Gross Output (Rs '000)	Value Added (Rs '000)	Value Added		Percent Share of Sub-sector Value	
			Persons Employed	Contract Workers				Gross Output	Value Added/Employee (Rs '000)		
FOOD											
3112	Dairy	100	1953	1124	128749	225184	76069	0.339	0.590	38.94	3.39
3113	Fruits & Vegetables	6	224	178	22205	23072	6183	0.268	0.273	27.60	0.28
3115	Oils & Fats	120	1128	693	101549	429218	189772	0.442	1.868	169.23	8.46
3116.1	Service Mills	5726	15449	15449	501756	3965704	691273	0.179	1.377	44.75	30.82
3116.2	Grain Mill Products	404	6428	4654	439249	1429983	253509	0.177	0.577	39.44	11.30
3117	Bakery	91	2401	1808	91845	226782	62459	0.275	0.680	26.01	2.79
3118	Sugar	22	4537	3388	135376	276413	122904	0.440	0.908	27.09	5.43
3119	Confectionery	23	314	227	5008	17375	5634	0.324	1.125	17.94	0.25
3121.1	Tea Processing	11	693	476	57997	42292	12178	0.288	0.210	17.57	0.54
3121.2	Tea Packing	6	191	68	1683	27512	4087	0.149	2.428	40.46	0.18
3121.3	Spices grinding	29	161	85	7133	11752	4096	0.349	0.577	25.44	0.18
3121.4	Ice Manufacturing	8	50	24	5649	1369	707	0.516	0.125	14.14	0.03
3121.5	Dalmoth/Snacks	10	126	78	1039	7911	2453	0.310	2.361	19.47	0.11
3122.0	Animal Feeds	27	338	170	14029	93548	22433	0.240	1.599	66.37	1.00
BEVERAGES											
3131	Spirits	28	833	507	84495	144718	72832	0.503	0.862	87.43	3.25
3132	Wine	4	54	40	3433	1096	612	0.558	0.180	11.33	0.03
3133	Beer	2	318	318	36932	50673	16683	0.329	0.452	52.46	0.74
3134	Soft Drinks	3	480	363	84788	85499	38071	0.445	0.449	79.31	1.70
TOBACCO											
3141	Bidi	64	7049	6615	19815	89217	44960	0.504	2.269	6.38	2.00
3142	Cigarettes	2	1913	1913	151808	854207	615174	0.720	4.052	321.58	27.43
3149	Tobacco NEC	3	30	19	340	845	418	0.494	1.229	13.93	0.02
		6689	44580	38199	1894728	7904170	2242507	0.283	1.183	50.30	100
In '000 US Dollars					88332	368493	104546			2.34	100

Exchange Rate 1 US\$ = 21.45 Rs

Source: FBT Sub-sector Vol II, UNIDO, 1992.

assets per worker which are of the same order of magnitude as the 1988/89 sector average of Rs 40.4 thousand. In the dairy products, oils and fats and distilling industries, as well as in the less important canning industry, the role of modern enterprise is much more prominent, with fixed assets/worker a multiple of the overall sector average.

Productivity in the modern enterprises is a multiple of the sectoral MVA average (Rs 35.0 thousand per worker) as well, except for the dairy products figure, brought down sharply by the low productivity of the cottage units: the branch MVA/worker was Rp 53.5 thousand in 1988/89. In the more traditional food industry branches, MVA/worker tends to fluctuate around the sector average.

Wages are low, usually constituting less than 10 per cent of the production cost. Raw materials are the major cost category in most industries, typically accounting for over 60 per cent of production costs, although for many years price increases for most crops have remained below inflation rates. The next most important cost category is packaging, which generally has to be imported.

Some of the technology issues in the major branches can be summarized as following:

Traditional rice milling units use Indian-built Engleberg screw-type hullers without a separate hulling and polishing unit. Consequently, paddy is milled in a single operation, resulting in a high level of brokens and low recovery rates. The modern mills have Indian-made rubber roller machines based on modern technologies. The recovery rates are 65 per cent for raw rice, and 68 per cent for parboiled rice. Recovery rates in the traditional mills could be increased by using shellers, and the recovery rate in the modern sector could be raised further if the grains used were of consistent length - usually the rice milled is a farmer's marginal surplus consisting of mixed qualities.

Traditional wheat mills are superior to modern mills, with very high recovery rates for the plate mills and water/quern mills. The flour is also nutritionally superior, but it is less appropriate for further processing in the bakery industry. Modern roller mills have a recovery percentage for fine flour of 62-65 per cent; the rest is bran (22-24 per cent) and semolina (10 per cent). Traditional milling capacity can be improved by introducing power units and introducing more versatile and efficient hammer mills which could be produced locally.

Maize milling uses the same type of traditional mills; to the advantages listed under wheat milling should be added the low cost relative to modern roller mills. The latter also have a lower recovery-rate. The roller mills are mainly used to produce corn flakes; the market for such maize products is as yet very limited.

Traditional units in the sugar industry produce khandsari (brown sugar); the modern mills produce white sugar using the sulphitation process which has elsewhere been replaced by the more efficient carbonization process. The former process however is cheaper and less complex, and therefore probably more appropriate in the Nepalese context. The sugar recovery rate in both industries could be improved by the introduction of modern shredder and grooving machines.

With a few exceptions, all bakeries are traditional. The production process is suited to the domestic circumstances. The main problem is lack

of hygiene and quality control. The bakery products industry uses modern technologies.

- The modern plants in the dairy industry are public sector turnkey projects using up-to-date technologies. The traditional units use manual technologies. The main problems are again related to hygiene and quality control; there is also a lack of proper cold storage and transport, which results in a milk loss of 10-15 per cent.
- Traditional oil seed processing is usually combined with cereal milling. Expelling technology is very crude, and filtering or refining equipment is not commonly used. It is estimated that the introduction of reciprocating screens, pneumatic separators and pressure filters could increase recovery rates by at least 8 per cent. Oil refining units are modern, but they suffer from shortages of raw materials.
- In the beverages branch, there are several modern plants producing beer, soft drinks and liquor. The technologies used are of international standard, and product quality is satisfactory. Traditional manufacturing of soft drinks and liquor mostly takes place in cottage industries using crude technologies; there is little or no quality control.
- The spices industry is not among the largest, but it is an important foreign exchange earner. With few exceptions, spices are sun-dried. Improved drying methods would help to cut losses and increase the quality (and hence potential export earnings) of the products.
- The development of another potentially important foreign exchange earner, fruit and vegetable processing, will in the short run depend as much on infrastructural as on technological improvements: there is a lack of appropriate transport, grading and storage facilities. Another problem (also affecting other industries) is the supply of high quality packaging materials. At present, most of the units are cottage-scale, using crude technologies, and lacking quality control.

Capacity utilization is an important indicator of performance and efficiency. Table 10 shows the capacity utilization of selected FBT sub-sector products in 1989/90. This data do not suggest an effective use of installed capacity, involving large sums of capital investment including scarce foreign exchange. None of the product categories indicated in Table 10 exceeds a capacity utilization of 80 per cent.

In the absence of sufficient comparable data, it is difficult to gain a good impression of long-term trends in the sub-sector. Comparison with statistics for 1986/87 (see Central Bureau of Statistics 1988) shows that:

- MVA in the sub-sector rose by no more than 2.9 per cent annually, as compared to 14.0 per cent for the manufacturing sector as a whole;
- MVA went down in two major branches during the period: oil milling (-36 per cent) and sugar refining (-2 per cent); grain milling stagnated;
- MVA almost doubled in the fruit and vegetable canning industry, and trebled in distilling and soft drinks; there was a 44 per cent gain in bakery products;
- Employment in the sub-sector grew only marginally. It was cut back slightly in the grain milling and dairy products branches, and expanded

moderately elsewhere, with strong growth in the sugar and soft drinks branches.

Table 10. Capacity Utilization of Selected FBT Industries, 1989/90

Sub-sector Industries	Unit	Capacity	Production	Capacity Utilization (%)
Food, Beverages and Tobacco				
Dairy (Milk)	KL	42238	26000	64
Processed Fruits & Vegetables	MT	3474	2000	56
Vegetable Ghee	MT	36900	7862	21
Crude Vegetable Oil	KL	36000	15300	43
Rice Milling	000 MT	3573	1168	33
Flour Milling (Wheat)	000 MT	1626	444	27
Noodles	MT	2310	1647	76
Biscuits	MT	11680	4430	38
Sugar/Khandsari	MT	57270	31927	56
Tea	MT	2840	1393	49
Animal Feeds	MT	36810	9330	25
Liquor (Modern)	KL	16324	8773	42
Beer	KL	11500	6838	59
Soft Drinks	KL	25824	13248	51
Cigarettes	Mln Stk	9400	6317	67

Sources: Overview of Manufacturing Sector Nepal, Vol I, UNIDO, 1992.

Growth in the soft drinks branch is related to the increase in production capacity, which almost doubled. Similar strong increases in fixed assets in the sugar and oil milling industries were not matched by increasing MVA, mainly as a consequence of raw material supply problem (particularly of oil seeds). The shortage of inputs contributes to the low overall growth in the sub-sector, along with the large proportion of marginally productive traditional units.

The major food processing projects commissioned or under construction in 1988/89 represented 6 and 21 per cent of the total number of projects in manufacturing in that year. The great majority of industrial projects was in the chemicals, textiles and non-metallic minerals sub-sectors. Capital investment in food processing was roughly at the sector average, with the exception of the breweries. The relatively modest role of food processing in new investment confirms the fact that the sub-sector has lost its leading role in manufacturing.

c. Trade in Food Products

The FBT sub-sector as a whole has a relatively minor share in overall exports. There is some trade in food items, particularly with India, Nepal exporting mainly raw materials for animal feed preparations (like rice bran and oil cake), lentils, processed ghee, vegetable oils and spices. It is difficult to determine precisely the nature of exports from the food sub-sector since the trade statistics do not differentiate between processed and unprocessed items. As regards exports to other countries, which have

remained almost negligible till now, Nepal has yet to develop its full potential which exists mainly in certain specialized items such as tea and spices. On the whole, exports as a percentage of total domestic production has been less than 5 percent except for spices and oils and fats (see Table II).

Table 11. Ratio of Export to Domestic Production of the Selected FBT Sub-sector Products (Percentage), 1984/85 - 1988/89

NSIC	Industry/Product	1984/85	1985/86	1986/87	1987/88	1988/89
3115	Vegetable Oils & Fats (Crude & Refined)	10.20	23.27	16.87	18.62	11.82
3116	Grain Mill Products (Rice & Wheat)	3.93	0.12	0.04	0.007	0.009
3118	Sugar (Raw, Brown and Refined)	3.19	11.12	1.55	1.50	0.84
3121.1	Tea	4.25	2.66	1.08	1.71	3.72
3121.3	Spices (Dried and/or Ground)	33.06	36.52	31.08	25.40	22.38

Source: FBT Sub-sector Vol II, UNIDO, 1992.

The value of imports of FBT sub-sector products, though larger than the export value, is still not very high. This is partly due to the success achieved in import substitution. (In most food sector products, import substitution has achieved very high levels; for example, almost the entire demand of beer, soft drinks, alcoholic beverages and cigarettes is met through domestic production). In part, however, the low level of imports is also explained by the fact that by far the larger share of the nutritional needs of the Nepalese population is covered by unprocessed natural food articles, or by food entirely processed in the households. Nevertheless there are still considerable imports of both unprocessed and processed food products. There seem to be an even growing need for larger imports, reflecting the declining capability of Nepalese agriculture to produce enough food for its growing population. Currently the two large items of imports are sugar and vegetable oils. The production of milk also has to be supplemented through imports of skimmed milk powder and butter oil, particularly to maintain milk supplies in urban areas. Two other significant imports are tea and tobacco manufactures.

Overall the sub-sector tends to have a very low dependence on imports except oils and fats, sugar, tea and spices (see Table 12).

The major trading partner of Nepal is India. In 1988/89, India accounted more than 41 percent of imports in the FBT sub-sector and approximately 64 percent of exports from Nepal. In 1978/79, India had accounted for 90 percent of Nepal's imports and 50 percent of exports.

Other less important markets for Nepalese goods currently include: USA, West Germany, the UK, Hongkong, USSR, Singapore, Italy and Bangladesh.

There is a growing market for several of the FBT sub-sector products in the SAARC and South East Asian countries. However, Nepal's market share in these products is very small and generally accounts for less than 1 percent. The supply constraints among others are likely to be major obstacles to increasing exports of FBT products.

Table 12. Ratio of Imports to Product Consumption of the Selected FBT Sub sector Products (Percent), 1984/85 - 1988/89

NSIC	Industry/Product	1984/85	1985/86	1986/87	1987/88	1988/89
3115	Vegetable Oils & Fats (Crude & Refined)	28.92	24.59	33.50	47.47	31.52
3116	Grain Mill Products (Rice & Wheat)	0.22	0.38	0.72	0.16	0.04
3118	Sugar (Raw, Brown and Refined)	73.75	80.88	53.61	45.80	52.84
3121.1	Tea	57.39	51.47	48.83	37.81	49.69
3121.3	Spices (Dried and/or Ground)	41.75	46.62	35.02	39.95	43.36

Source: Medium to Long Term Industrial Plan, FBT Sub-sector Vol II, UNIDO, January 1992.

Apart from supply constraints, trade barriers across most developed countries is a major hindrance to the export of agro- industrial products and more particularly food products from developing countries including Nepal. As such export opportunities will generally be limited to a few speciality items.

List of Major Priority Product Groups for Domestic and Export Markets

Sub-sector	Major Items for Domestic Market	Major Items for Export Market
1. Food, Beverages and Tobacco	Processed Milk; Vegetable Oils; Grain Mill Products, Biscuits/Noodles; Sugar; Tea; Modern and Country Liquor, Beer; Soft Drinks; Cigarettes	Processed Fruits and Vegetables; Noodles; Tea; Spices; Animal Feeds; Modern Liquor

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The basic principles of the Eighth (1990-1995) Plan are:

- Increasing per capita income through accelerated economic growth;
- Developing human resources and increasing employment;
- Providing for basic needs;
- Increasing self-reliance in essential goods;
- Reducing regional development imbalances;
- Improving implementation and management of development measures;
- Protecting the environment.

With regard to sectors of the economy, agriculture is to receive top priority. This means increased efforts on the part of the government to improve irrigation, to facilitate the provision of credit and essential inputs, and to diffuse improved technologies.

If successful, the policy with regard to agriculture should improve the supply position of many industries. In fact, expanding agro-processing to increase foreign exchange earnings is one of the goals of industrial development under the Plan. Measures will focus on cottage, small and medium scale industries which are seen as having the greatest potential in the domestic context. On the whole, the Eighth Plan policy suggestions seem well in line with the overall priorities of the Plan and of the 1987 Industrial Policy. UNDP/UNIDO have provided assistance to the Nepalese Government in industrial planning and plan implementation.

His Majesty's Government announced a new Industrial Policy in 1992. Its objectives are:

- To increase the contribution of the industrial sector to the national economy through the enhancement of industrial production and productivity.
- To emphasize the development of the industries utilizing local resources and industries which are export oriented.
- To reduce the pressure of unemployment and under-employment in the agricultural sector through the development of labour intensive industries.
- To adopt appropriate policies conducive to industrialization for the balanced regional development of the country.

This policy relies on the principles of free market and competition, emphasized the development of small, cottage and agro-based industries and attempts to attract foreign investment in order to accelerate the transfer of advanced technology and efficient management. The strategies include further liberalization and simplification of procedures including the introduction of a one-window system, provision of additional incentives to entrepreneurs reinvesting their profits to own or ancillary industries, reserving cottage and small scale industries to Nepalese only, and measures to minimize the adverse effects to the environment.

b. Relevant Government Agencies

The Ministry of Industry is responsible for planning, monitoring, co-ordination and policy formulation with regard to the manufacturing sector. Administrative issues, policy execution and certain industrial activities are left to separate Departments, specialized agencies and a number of industrial sector enterprises. The Ministry proper has four divisions dealing with, respectively, industrial promotion, cottage industries, industrial planning and foreign investment promotion.

Of the individual departments and agencies, the Department of Industry (DOI) is charged with developing and implementing industrial policy. It also plans public enterprise activities and their incorporation in the Five-Year Plans. Other tasks include monitoring industrial development, maintaining a statistical information base, licensing and registration, and the drafting of recommendations for facilities and incentives.

The Industrial Promotion Board (composed of representatives of the Ministry, the DOI, the national bank, the Ministries of Finance and Commerce, the National Planning Commission and specialists) is a co-ordination mechanism for industrial policy, policy review and administration. It is also involved in the licensing of large-scale industrial projects.

The Department of Cottage and Village Industries (DCVI) carries out a wide range of support activities for the informal sector, including training, financing, technical advice and supply of equipment, appropriate technology for small industries, marketing and promotion and feasibility studies and pilot projects.

The Economic Services Centre (ESC) provides non-banking services for local and foreign entrepreneurs, including the dissemination of information on investment opportunities, procedures, etc. It also carries out feasibility studies and provides training.

The Nepal Bureau of Standards and Metrology (NBSM), established with UNDP/UNIDO assistance, tests industrial products. Certification marks are awarded to quality products. Such product quality guarantees are important for, e.g., penetrating export markets.

The Trade Promotion Centre under the Ministry of Commerce undertakes studies and disseminates information on export potential, and also undertakes export promotion activities. It has a permanent office in New York; an office in Frankfurt was under consideration.

A common characteristic of many of the agencies described above are their manifold tasks, and the shortage of qualified human resources with which these are to be carried out. There is a very marked lack of female higher-level management and experts.

c. Physical Infrastructure

All important places in Nepal are now accessible by road and air transport. The road network totalled 6,525 km in 1987/88. Kathmandu airport is being developed into an international airport, equipped with modern facilities. Telecommunications are now available in almost all districts and international connections have been much improved. Potable water supply is still a problem, being only available for 30 per cent of the population, but the situation is better in urban centres.

The country's energy needs are largely covered by wood, even in industry. Fuelwood is becoming increasingly scarce, which could influence the performance of small rural industries.

Modern energy supply, largely based on imported petroleum, is not always reliable. The most promising future source of energy is hydropower: the country is estimated to have a potential of over 80,000 MW which has only been marginally exploited so far. Under the Seventh Plan, close to 1,000 small scale hydropower projects were to be executed to improve local energy supplies. The construction of large hydropower projects including transmission systems would depend on external sources of finance and technology.

A number of industrial estates have been established near the larger urban centres. Under the Seventh Plan, Rs 100.3 million was allocated to the construction of these. The estates (12 in 1990) are managed by a public agency, the Industrial Districts Management Ltd, and at present house some 350 industrial units. UNIDO has assisted in examining the feasibility of an Export Processing Zone, which will be established near Kathmandu airport.

d. Industrial Services

The greater part of industrial credit is provided by commercial banks. In spite of its name, most NIDC (Nepal Industrial Development Corporation) lending is outside the industrial sector. NIDC is authorized to establish and participate in new industries; it also undertakes project analyses and guarantees loans by other banks. The Agricultural Development Bank also plays a modest role in financing industrial projects.

Little is known about other services related to the sector. The relevant government agencies have been described above. Nepal has a modest capacity for the production of food processing machinery (see UNIDO 1991, p. 159). The country has a number of private consultancy agencies, most of them located in Kathmandu. It is not known to which extent they are involved in the food processing industry. Testing facilities exist in some enterprises; there are also some private testing laboratories. The services provided are on the whole rudimentary.

The larger industrial enterprises are represented in the Federation of Nepalese Chambers of Commerce and Industry (FNCCI), currently being strengthened by UNDP/UNIDO in terms of institutional capabilities and by USAID in terms of quality control and extension services in agro-industries. There is a Women Entrepreneurs Association of Nepal (WEAN) which has launched a women's production and marketing co-operative.

e. Human Resources

Women constituted 20.4 per cent of the labour force in registered enterprises in 1988/89. Their share among technical workers was only 6.6 per cent. A UNIDO survey on female employment (UNIDO 1988a, p. 107) shows that less than 1 per cent of women in selected formal sector enterprises were in management positions. Female employment in manufacturing has almost doubled in the 1980s, but almost all of the increase has been in unskilled employment. Women constitute the majority of the labour force in cottage industries. Among managers and owners of registered enterprises they are severely underrepresented.

The participation rate of women in the food processing industries is much lower than the industrial average: 10.4 per cent of total employment in the sub-sector. Of the major industries, only grain milling shows an average for female participation that is close to the sector average. Women are overrepresented in two relatively unimportant industries: fruit and vegetable canning and confectionery. There were three female technical workers in the whole sub-sector, and a much greater proportion of women than men employed in the sub-sector is found in industries with a heavy traditional component (cereal milling, bakeries) (Central Bureau of Statistics 1990, p.12). Women, in short, are left behind in the modernization process in the sub-sector.

Another human resource issue worth noting is the heavy dependence on expatriate (mainly Indian) labour: in 1988/89, 15.5 per cent of the industrial labour force consisted of non-Nepalis; among technical workers in the sector, the percentage was 19.5 (Central Bureau of Statistics 1990, p. 12). This phenomenon is largely explained by the ease of cross-border movement, the presence of many Indian entrepreneurs and the greater availability of skilled personnel in India.

In spite of major efforts to increase the participation in education, the literacy rate stands at only 35 per cent. The female literacy rate is lower

than the national average, probably around 20 per cent.

There is a shortage of technical and, to a lesser extent, managerial personnel, and both training facilities and qualified personnel are heavily concentrated in the Kathmandu area. Women are seriously underrepresented in industry-related training and education: in 1985, only 123 out of 2,148 students enrolled in engineering courses at the higher education level were females. The UNDP/IDA cottage industry development programmes among others provide training in skills that can be used in traditional rural industries; in 1986, more than half of the participants in the courses (none of them focussing on food processing) were female (UNIDO 1988a, p. 20-24).

The Seventh Plan estimated the demand for engineering personnel (all levels) at 7,880 during the Plan period, of which the country would only be able to supply 4,800. There has been strong donor support in recent years for technical and managerial training, the total amount committed for this purpose as of 1989 being almost US\$ 60 million (UNDP 1990, p.116).

The Eighth Plan intends to improve the supply of qualified labour through, among others:

On-site training in a wide variety of basic skills by Labour Supply Centres. Training is to be provided to 4,740 persons, including 650 women.

At the Rani Vocational Centre, a one-year training programme is to provide basic industrial skills such as welding, machine repair and installation of electricity.

A new National Training Centre (vocational level) is to be set up.

As the Plan underlines the essential role of women in national development, extra efforts will be needed to ensure their full participation in the training programmes, and measures will have to be taken to ensure a better representation of women with the required skills among higher-level employees, and among managers and entrepreneurs.

5. Related or Relevant Assistance Programmes

a. Country Specific

UNDP/UNIDO: Establishment of an export processing zone in Nepal (1989 1990)

UNIDO: Expert on the integration of women in industrial development (1990)

UNDP/UNIDO: Assistance to the Nepal Bureau of Standards and (1987 1992)

UNDP/UNIDO: Assistance in industrial planning and plan implementation (1990 1992)

UNIDO: Environmental impact and risk (hazard) assessment guidelines: the case of Nepal (1989 1990)

UNDP/UNIDO: Integrated programme for the identification, formulation and promotion of industrial investment projects for Nepal (1991 1993)

UNDP/UNIDO: Strengthening the Federation of Nepalese Chambers and Commerce and Industry (FNCCI) (1992-1994)

UNDP/UNIDO: Women's Production and Marketing Cooperative (1993-1995)

b. Regional

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SAMOA - Independent State of Western Samoa

Summary of Constraints and Potential

Constraints:

- Small domestic market
- Remoteness from most export markets
- Expensive packaging material for fruits and vegetables

Potential:

- Unexploited agricultural and fisheries potential
- Agriculture: niche products
- Relocation of fish processing from American Samoa (canned fish for local market, exotic products for export)
- Trade agreements with New Zealand and Australia

1. Review of Growth Constraints and Prospects

Samoa's land resources are relatively plentiful, and the resource base for the food processing industry can be considerably expanded. Quite a few programmes are dealing with agricultural development (including livestock development). The heavy dependence on coconut is to be reduced. The country already produces a fairly wide range of other crops, and new crops can be introduced, although their impact on existing farming systems and the country's ecosystem should be taken into account. The consequences of the cyclone for agricultural production can be overcome in a few years.

One constraint is the low productivity and the risk minimization attitude in the smallholder sector, which is linked to the existence of an alternative source of cash in the form of remittances from the large number of Western Samoans abroad. In the plantation sector, weak management is a cause of low productivity. There is a lack of skilled human resources. These issues will also have to be addressed to ensure a strong raw material base.

Like other Pacific Island countries, Western Samoa suffers from its remoteness from major export markets, and although there is scope for import substitution in the field of food products, the domestic market, including the tourist market, is limited.

The foreign market for processed fruit juices, snacks and coconut is large, but apart from the transport problem - partly mitigated by the proximity of the market of American Samoa - there is also the problem that several other countries in the region have a very similar resource endowment. The limited land surface, moreover, sets limits to mass production of processed food. Niche products probably constitute a better strategy. This again makes special demands on quality control, product development, packaging, etc. - these production aspects are not well developed, among

others because the required human resources are lacking, and would need special attention.

With regard to fisheries, the main development potential is offshore; a better management of inshore fishing is required to reduce further damage to fish stocks and coral reefs. While present projects to stimulate fish farming and to modernize small-scale fishing should be continued, the scope for (controlled) industrial fishing should be explored. An opportunity for fish processing on an industrial scale is presented by the relocation of tuna processing, or at least part of it, from American Samoa, where US minimum wage legislation could reduce the attractiveness of the present operations. There is an export potential for exotic species and fillets of reef fish. There would also be a demand in Western Samoa's tourist centres. Locally canned fish could, finally, be substituted for much of the canned fish now imported.

Environmental legislation is in place, and the fragility of the environment is recognized by the government. New food industries should be monitored for excessive water consumption, which could cause salt water intrusion in subsoil supplies, and for proper effluent treatment, so as to prevent additional damage to coastal waters.

2. Economic Performance

a. General Characteristics of the Economy

The Western Samoan economy ended 1991 the Sixth Development Plan (DP6) period 23 per cent larger than it was 1987, in terms of Gross Domestic Product (GDP) at current prices, but 2.7 per cent smaller in constant-price terms. There would have been slight positive growth but Cyclone Ofa reduced GDP in 1990 by an estimated 5 per cent. The latest figures are not available, but the economy is suffering even more seriously from the consequences of Cyclone Val in 1991; damage estimates are at least WS\$ 600 million. Substantial recovery is expected within 2-3 years, but full recovery will take much longer. Implementation of the Seventh Development Plan 1992-1994 will be delayed because of reconstruction.

In 1987, agriculture, forestry and fisheries accounted for 34 per cent of GDP. Approximately one-half of this is contributed by subsistence activities. The services sector accounted for close to 50 per cent of GDP. The share of manufacturing was 13 per cent. Although the importance of the primary sector is declining (its GDP share contracted by 9 per cent over 1983-1989 and a further 9 per cent in cyclone-struck 1990), as much as 70 per cent of the population is still involved in primary sector activities.

b. Agriculture, Fisheries and Manufacturing

The DP6 period was characterized by falling production of most export crops. Only taro enjoyed a growing export volume. From 1986 to 1989 the following changes in commercial production took place:

Copra	-18%
Cocoa	-14%
Bananas	-56%
Passion fruit	-10%

In February 1990 Cyclone Ofa devastated large areas of agricultural and forestry land and destroyed more than half the commercial fishing fleet. Cocoa was the most affected crop. In the first nine months of 1990 the Cocoa Board bought only 30 tonnes of cocoa compared with an annual average of 560 tones during the preceding five years. Passion fruit production was reduced by 80 per cent in 1990 compared to 1989, copra by 65 per cent and bananas by 55 per cent.

Slight growth occurred in the subsistence sector, which was little affected by Cyclone Ofa. This was partly because the root crops and livestock which constitute the major part of subsistence production are inherently less vulnerable to hurricane damage than the tree crops which are the basis for most commercial agriculture and partly because when total production fell subsistence needs took precedence over commercial needs.

Table 1 shows the production of major industrial products in 1987-90.

Table 1. Production of major industrial products (WS\$'000 at current prices).

	1987	1988	1989	1990
Beer	8,902	8,279	7,866	8,708
Cigarettes	5,344	4,807	5,362	6,551
Timber	2,489*	1,397	5,084	3,662
Coconut Oil	8,367	10,843	7,829	3,442
Copra Meal	673	977	797	357
Coconut Cream	3,355*	3,875	5,093	5,576
Corned Meat	1,856	2,300	2,661	2,700
Soap	1,200	932	851	1,487
Matches	302	264	300	-
Paints	240	1,077	868	1,457
Total	32,728	33,295	34,499	32,795

Source: Trade Commerce and Industry (except for asterisked figures, which have been estimated by NPO).

Agricultural production prior to the cyclones was stagnant, although quite sufficient for domestic needs. Between 1982 and 1989, output grew by less than 4 per cent. The major food crop is taro, supplemented by several other root crops; taro is also exported. Coconut and banana are the major tree crops, with cocoa and passion fruit becoming important cash crops. While most Samoans are involved in mixed subsistence/cash crop smallholder production, there is a significant plantation sector in which the Western Samoa Trust Estates Corporation (WSTEC) is the main producer (coconuts, cocoa) as well as a commercial farming sector producing, among others, vegetables and beef cattle.

Subsistence fishing is generally practiced. Commercial fishing was only introduced in the 1970s, in the wake of the Village Fisheries Development Programme (VFDP). In 1988, the catch was estimated at only 3,000 tonnes. Even so, coastal areas are already showing signs of overfishing.

In 1991 there was activity in a new field: assembly of imported components into finished goods exclusively for export. One was making automotive harnesses from wile and parts imported from New Zealand; the other two were making ladies' underwear. Such industries rely on Western Samoa's low wages, the good reputation of her labour force and her access to Australian and New Zealand markets under the South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA).

3. Food Processing Industries

a. The Raw Material Base

With a landmass of 2,857 sq.km. and a 1992 population of 162,000, Western Samoa's land resources are relatively plentiful; the volcanic soils are fertile and rainfall is abundant. Land is, however being lost as a consequence of crude logging practices leading to erosion. Approximately 70 per cent of the land surface is considered suitable for cultivation and grazing.

Coconut is the dominant tree crop. The output of copra averaged 20,000 tons during the second half of the 1980s; actually, production levels are declining as a consequence of ageing stock and poor agricultural practices. Replacement of stock is now being undertaken, both in the subsistence sector and on WSTEC plantations. Due to cyclone Val there is no supply of ripe Samoan coconuts and the nuts are now being imported from Tonga.

The total area planted with cocoa is about 5,000 ha, with production declining from a potential 1,000 t/y to some 300 tons in 1988. A cocoa rehabilitation and expansion project intends to improve and expand production. Eventually, production is to reach 8,000 t/y. Other cash crops include coffee and a variety of tropical and subtropical fruit (bananas, passion fruit, citrus etc.)

Taro is the staple root and vegetable crop, supplemented by several other root crops. Output has risen strongly annually during 1983-1987; in 1988, output fell by some 18 per cent, but the country still produced a surplus for export. The 1990 cyclone caused serious damage to crops, but tree crops were on the whole more affected than root crops; the loss of export crops has been estimated at 50 per cent (see FAO/UNDP).

Pigs and poultry are the main livestock for domestic consumption. Cattle raising is becoming increasingly important. The herd is estimated at close to 20,000 head, with some 7,300 head grazing on WSTEC plantations.

Western Samoa's EEZ covers some 120,000 sq.km and is one of the smallest in the region. It is apparently well-stocked with tuna and other pelagic fish, but the actual potential is not yet known. Inshore waters have suffered from overfishing exacerbated by destructive fishing methods using explosives and poison. Fisheries also suffered a setback as a consequence of the 1990 cyclone. Experiments are being made with aquaculture. A giant clam farm is already operating on a commercial basis.

b. Characteristics of the Subsector

Copra processing is the most common activity, but in value terms the downstream processing of coconut (oil, meal, cream) is far more important. Copra smoking has been largely replaced by indirect heat (hot air) drying, which ensures a better product. As indicated above, copra production averaged 20,000 tons during the second half of the 1980s. Under the fisheries programme, local cold storage facilities have been set up. A brewery, a coconut oil mill and a meat canning factory are among the larger enterprises. The government-owned coconut oil mill is performing poorly (UN 1990). The 1990 production index for some major food products (1982 = 100) was:

Coconut oil: 49.6
 Beer: 102.0
 Coconut cream: 449.0
 Soft drinks: 196.
 Copra meal: 51.3
 Corned meat: 425.0
 (Source: Seventh Development Plan)

According to the Ministry of Labour and Employment there were 25 food-processing companies in July 1992, of which 12 were private.

Under a regional UNDP/UNIDO project, process demonstrations have been organized for fruit and coconuts, to inform local producers about the potential for expanding the range of products. The UNDP/UNIDO project is also exploring the possibility of making cheese from coconut milk.

In most respects the traditional system of agriculture, for both commercial and subsistence production, is basically sound and will continue to be supported. However, the long term decline in world prices for traditional export crops, together with the negative environmental implications of their substitution by taro grown on cleared upland forest plan as an export crop, demands a strategic response. The need for that response to be swift and accurate is emphasized by the primary sector's leading role in employment creation.

Above all, the returns to labour in the primary sector must be improved. This implies a shift towards more profitable crops, existing and new. Proposed new crops include vanilla, vi, lime, spices, chili, ginger and aloe vera. But for several reasons it would be a mistake to abandon copra and cocoa: they constitute an important part of the traditional diet, coconut trees are relatively resilient to cyclone damage, both provide the raw material for successful exports to specialized market and as tree crops they have an important conservation role.

Environmental damage, overfishing, malpractices and natural disaster have combined to destroy inshore fishing as a commercial activity. Steps have already been taken to establish deepwater fish aggregating devices (FADs) and to introduce a sail-assisted successor to the Alia catamaran designed to enable fishermen to make longer fishing trips over greater distances. Tuna is the main target species.

There is scope for increased exports of high-value fish by airfreight, but the principal focus of strategy in the fisheries sector will be to meet domestic needs. Re-stocking of the reef will be carried out in a long-term

effort to neutralize past damage and further support will be given to private aquaculture ventures. The feasibility of establishing a freshwater fishery in Afulilo Dam, and possibly elsewhere, will be investigated.

c. Trade in Food Products

The main export customers of Western Samoa in 1991 were New Zealand, Australia, American Samoa and USA. Although in recent years Germany had significantly increased its imports from the country to one fifth of the total exports, suddenly in 1991 the value was zero. While comparing the most important processed food exports in 1989 and 1991 (Table 2), it is easy to see the effect of the cyclones.

Table 2. Exports by Commodity (in Million Tala).

	1989	1991
Coconut oil	7.0	0.02
Coconut cream	5.1	5.3
Copra meal	0.6	-
Copra	3.2	-
Cocoa	2.1	0.006
Taro	5.8	6.9
Automotive wiring harnesses	-	2.8

Source: Central Bank of Western Samoa

Taro and cocoa only undergo very limited processing to allow overseas transport. A small quantity of frozen fish is also exported. The share of processed food in total exports is approximately 60 per cent. There has been temporary bans on food exports after the cyclones and export figures have been affected by the long-term effects of the cyclones. Efforts are being made to diversify exports away from the very heavy dependence on coconut products.

With regards to imports, the country imports large quantities of convenience foods, partly reflecting tourist demand, partly changed consumer preferences.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The government gives highest priority in the medium and long term to resource-based manufacturing, for the domestic and export markets. But to meet the immediate likelihood of a sharp drop in net emigration, combined with an influx of returning migrants, it has decided also to strongly encourage low-wage export processing industries to locate in Western Samoa.

The following policies are already in place or committed:

- Rationalization of incentives to industry through the consolidation of the Enterprises Incentives Act and the Industrial Free Zone Act into the

Enterprises Incentives and Export Promotion Act 1991.

- Aggressive attraction of low-wage export processing industries by offering incentives which are competitive with other host countries; the Minister of Finance undertook an international investment promotion mission early in 1992, specifically targeting such industries.
- Establishment of the Small Industries Center in Vaitele, to be expanded during the Seventh Plan period.
- Establishment of a unit trust to take up equity in industrial enterprises.

The unit trust will be set up under Treasury auspices as early as possible in the Plan period. As well as being an additional means of mobilizing domestic savings for investment it will also serve as a vehicle for the sale of government-owned shares to the public. As soon as it is set up it will be offered some or all of government's remaining shares in the Bank of Western Samoa and possibly other government-owned equity as a blue-chip foundation for its portfolio.

The government will continue to pursue its policy of commercialization, corporatisation and privatization. Since 1987 a total of 15 state-owned enterprises and activities have been wholly or largely disposed of. Where local investors are unable or unwilling to take up offered shares, foreign investors will be welcomed, preferably in partnership with local interests although 100 per cent foreign ownership is not ruled out.

b. Relevant Government Agencies

National development plans are prepared by the Department of Economic Planning. A Women's Advisory Committee has been set up to integrate women in development process. The Department of Trade, Commerce and Industry has the overall responsibility for guiding and monitoring industrial activities in Western Samoa.

The process of drawing up a National Environmental Management Strategy (NEMS) has just begun, with an inter-departmental task committee and technical assistance from the South Pacific Regional Environmental Programme (SPREP).

Western Samoa has a fortunate legacy from the colonial era in the large, undivided areas of land under the control of WSTEC. With the dissolution of WSTEC these lands will be kept undivided as far as possible, to enhance their value for commercial agriculture. The Samoa Land Corporation (SLC) has responsibility for the leasing of these lands in the best interests of the country. Its role will be extended to include the provision of support infrastructure for lessees, on a full-cost-recovery basis.

The Department of Agriculture, Forests and Fisheries (DAFF) is undergoing institutional strengthening at present, which will enhance its capabilities particularly in the fields of planning, project appraisal, research and extension. The testing, development, distribution extension support and marketing of new crops will be given the highest priority.

Past declarations of intent that rural communities will be more closely

involved in agricultural planning have had little effect. Community Information and Planning Systems (CIPSS) will be set in pilot villages during the Seventh Plan period in a new attempt to achieve more meaningful community involvement. Improved communication with growers on Savaii has already been achieved with the appointment in 1991 of a Deputy Director of Agriculture, Forests and Fisheries for the island.

c. Physical Infrastructure

Inter-island shipping is not a very important issue, as the country consists of two neighboring islands. In the field of road infrastructure good progress has been made, some 2000 km being in place now. All but the most remote villages have road connections. International sea and air connections are also adequate. The country has a modern telecommunications network, and virtually all Western Samoans have access to piped water. The greater part of the country's energy needs is met by hydropower. The fleet of small fishing boats is being upgraded.

d. Industrial Services

The Development Bank of Samoa is the key vehicle for facilitating the development of the private sector through the provision of credit. Industrial development is one of its priorities. Recently, a Small Industries Centre and an Export Processing Zone have been set up to stimulate light industries producing for the domestic and export markets.

e. Human Resources

Western Samoa has a literacy rate of almost 100 per cent, and even in 1981 30 per cent of the 15-19 age group was enrolled in secondary education. The participation rate of women is not known. Trade and technical education are increasingly being recognized as essential to meet the country's human resource needs. There is a considerable loss of skilled personnel as a consequence of emigration.

The available literature does not contain information on specific shortages of skills in the food processing industry, nor of the existence of specific training facilities for food processing or manufacturing in general. There is a technical institute which had 60 students in 1987. The University of Samoa also provides technical training. On-the-job training of graduates of these training institutes in industrial enterprises does not appear to have been successful. It is not clear whether the training facilities for the agricultural sector (which includes a home economics centre for women) provide processing skills which can be used in industry.

Women comprise 48 per cent of the labour force in the subsistence and cash economy. Specifically female economic activities are vegetable gardening and livestock raising (primarily chickens and pigs).

A regional ILO team commenced work in 1990 and will prepare a comprehensive national manpower plan for Western Samoa. This will entail projecting skill demands in the public and private sectors, both formal and informal. The plan will be completed by 1993 and will then form the basis for

a full review by government of policies and resource allocation with respect to human resource development.

5. Related or Relevant Assistance Programmes

a. Country Specific

b. Regional

FAO/UNIDO: Agriculture sector review and programming mission (1990)

UNDP/UNIDO: Small- and medium-scale industry and entrepreneurship development in the Pacific Islands (1988-1991)

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SOLOMON ISLANDS**Summary of Constraints and Potential****Constraints**

- Transport facilities
- Lack of investors
- Lack of skilled manpower at technical and managerial levels
- Land availability
- Infrastructure, especially electricity and water
- Support services

Potential

- Fisheries exploitation
- Forestry
- Animal feed production
- Food and beverage manufacturing

1. Review of Growth Constraints and Prospects

There are a number of clear constraints which would have to be addressed if industrial development is to take place. The Government's Programme of Action 1989-1993 focuses on these but in many cases the programme yet has to be translated into actions or projects since a considerable amount of groundwork has to be undertaken.

Ports and sea transport are indispensable to an island country. The Solomon has two international ports, Honiara and Noro, and has plans for a third in Malaita. Wharves and landing place provisions for inter-island trade are quite inadequate. Practically all industry sectors interviewed cited harbor facilities and shipping services as a major constraint to their operations. This is reflected in the Government Programme of Action which provides for wharf or harbor work in every province.

Investment finance for government, large industry and small producers is in short supply and difficult to obtain. The country is in a difficult liquidity situation and the present deficit is around SI\$35 million. The investment requirements for roads, ports and shipping alone are well over \$100 million U.S. The private sector needs are even larger, taken as a whole, nationwide and including artisanal industry. The government recognizes the problem, and is forming an Industrial Development Corporation and constructing legislation to attract and encourage investors. Senior government officials are looking at 'people's banks' and similar institutions abroad for guidance

Skilled manpower at technical and managerial level is scarce due to the small population and the relatively small proportions of the work force which have availed themselves of higher education or technical training. Existing programmes which are good, will have to be strengthened and extended to produce more trained manpower and womanpower.

Land availability is a problem for both industry and infrastructure. This is because of the complex nature of traditional ownership and conflict claims on property. The situation is hindering the development of ports and the establishment of factories.

Infrastructure, especially water and electricity supplies, housing and amenities, is cited as a serious constraint by enterprises in the provinces. This in turn can discourage workers from urban areas from taking employment in a distant plant.

Support services are a serious constraint to artisanal industries who rely on supplies of essential inputs and technical advice from extension services and agriculture of fishery centres. Progress is being made in this field but the task is enormous and it will take many years to complete.

Nevertheless the country does have valuable resources and could develop a flourishing economy by judicious exploitation and efficient management. These resources extend from large major items like fish and timber, down to small unique products like ngali nut and giant clams. The human resource is also good but needs training and development.

The major fishery resource, tuna, is the largest in the west Pacific, next to that of Papua New Guinea. As the world market is growing faster than production, this resource can only increase in value. Reef fish are a small but important resource, and the Solomon Islands are ideally suited for the culture of many species including giant clam, prawns, pearl oyster, seaweed and crocodile.

There is potential and urgent need for an animal feed mill to utilize the raw materials available from copra, palm kernel, rice and cassava processing, plus fish meal from the tuna factories to produce both cakes and pellets for feeding livestock, chickens and prawns, and also for export. This will involve both additional investment and considerable cooperation between the private sector and government.

Fruit and fruit juice canning may offer prospects for food processors as might the production of coconut cream, ngali nuts, soft drinks, dried fruits and chips. However, detailed feasibility studies would need to be undertaken as their commercial viability is by no means certain and single factors like energy costs, transport, market requirements and machinery costs could be critical.

There would appear to be room and opportunity for development of supporting industries like can manufacture, boatbuilding, carton and sacking manufacture, cold storage and service workshops. In some cases the establishment of a local supply of cans or packaging may have a significant impact on the viability of a processing plant.

The financial sector and service industries like management and education or training should not be overlooked. They will have to be developed

substantially if industrial growth of any consequence is to take place in the Solomon. They have therefore a considerable potential and are of critical importance.

2. Economic performance

a. General Characteristics of the Economy

Solomon Islands is predominantly agricultural, and its primary production accounts for 65-70 per cent of GDP. Real GDP increased by about 4-5 per cent in 1988 in the country and growth was expected to be of the same order of magnitude in 1989 and 1990. There have been large investments in the fishing industry. Agricultural production has revived in the wake of the 1986 cyclone Nuamu. The average GDP growth rate over the previous seven years was 2-5 per cent. With a population growth rate of about 3.5 per cent, GDP per capita has declined over the last ten years.

The trade deficit for 1989 was SI\$ 84.8 million compared to SI\$ 87.2 million in 1988 and SI\$ 37.4 million in 1987. The current deficits for three years were SI\$ 71 million, SI\$ 33.5 million and SI\$ 8.8 million respectively.

The short-term priority for the Solomon Islands government with the objective of internal and external financial stability calls for:

- restraint on expenditure by both provincial and central governments;
- reviewing the tax structure, including the possibility of widening the tax base to make the tax system more elastic;
- containing the level of capital expenditures to that available through aid or soft loans;
- ensuring that capital projects are carefully appraised in an attempt to ensure that they are economically and financially viable;
- close monitoring of the level of claims by the banking system on the public and private sectors;
- constraining wage settlements to within the annual variation in general price levels;
- avoiding appreciation of the real effective exchange rate of the Solomon Islands dollar.

Increased exploitation of forests and fisheries resources, a consequence of the government's policy of export diversification, have contributed significantly to export growth. Forest reserves are now being commercially exploited at a rate of 300,000 cubic meters per annum with an increasing proportion of exports of wood and sawn timber. International participation in exploiting the 200-mile fishing zone offshore has greatly increased exports of frozen and canned fish, mostly tuna. Fish has the largest share of exports amounting to US\$ 30.4 million among the total exports of US\$ 66.0 million in 1986. Rice and cocoa beans are new export crops and are making an increased contribution. The Solomon Islands economy will benefit from several promising projects: tuna fishing and the new Noro canning plant; forestry, particularly the Kolombangana timber scheme; palm oil; and a recovering copra industry will all boost GDP growth.

Inflow of foreign aid and private capital for direct investment have normally been large enough to offset the deficits of the current account. The balance of payments has been in overall surplus for the past three years as

normally been large enough to offset the deficits of the current account. The balance of payments has been in overall surplus for the past three years as a result of the inflow of Stabex funds from the EC.

b. Agriculture, Fisheries and Manufacturing

Agriculture, including forestry, livestock and fisheries, is the largest sector of the economy, accounting for over 50 per cent of GDP. About one third of the total number in formal employment were employed in agriculture, forestry and fishing. Between 35 and 40 percent of GDP is generated by subsistence agriculture (non-cash incomes).

In 1986 fishing and logging were the most important activities. Production of copra and palm oil reached their highest in 1984 but have since fallen due to the slump in world prices and the effects of a cyclone in 1986. Copra may recover somewhat, but declining world prices and growing non-market domestic consumption are likely to limit the strength of the rebound. Palm oil output is improving, but a full recovery is not expected before 1990 - 1991. Cocoa production was stable from 1983 to 1986, but has expanded considerably since 1981. In view of the extremely scattered distribution of the population the provisions for agricultural extension and support services are both difficult and costly.

Women have received little consideration in the agricultural sector, even though they are responsible for maintaining the food crop garden. There are no extension services provided to them simply because most extension activity is given through existing projects which are aimed at stimulating commercial agriculture and women are primarily in the subsistence sector.

The growth of the manufacturing sector in the last decade has primarily taken place in agro- and resources-based activities, such as fish canning, sawmilling, palm oil milling, etc. The manufacturing and construction provided employment for 3,065 people, 12.7 per cent of the total number in formal employment in 1986. The contribution to GDP was about 5 per cent.

Other manufacturing, all on a small scale, includes wickerwork furniture, articles in fiberglass, clothing, boat building, batteries, spices, tobacco and soft drinks. Investment in plants for fruit juice canning and milk reconstitution are being considered. Various handicraft items are sold for tourists and exported.

The government has promoted the establishment of domestic industries by providing the necessary infrastructure and incentive. In addition to Kukum industrial estate in Honiara, a new estate in Guadalcanal Province has been established for small scale industry. Further estates in Auki in Malaita and Noro-Munda in the Western Province are under review.

3. Food processing industries

a. The Raw Material Base

Copra is the major primary production in the country. About 70 per cent of the copra production comes from small holders and 30 per cent from plantations. All copra is marketed through the Solomon Islands Copra Marketing

Production of palm oil and kernels began in 1976 and increased rapidly. There is a plantation of around 40,000 hectares near Honiara. The largest plantation is on the Guadalcanal Plains and is operated by Solomon Islands Plantations Ltd. (SIPL), as a joint venture between the government, the Commonwealth Development Corporation and local land-owners. Palm oil and kernels production recovered encouragingly in 1988 and achieved production at 75 per cent of the level reached in 1985. There has been steady growth in cocoa production, of which 60 per cent is from the plantations.

Rice production has suffered various problems during the last few years. The government decided to close the rice research and growing farms in North Guadalcanal in 1987, effectively ending local rice production. Production of small-holders include, apart from fruit and vegetables for the domestic market, various spices such as ginger, turmeric, allspice and cinnamon for export, though the amounts involved are not large. Some tobacco is grown for local use and for export.

Livestock traditionally comprises chickens and pigs raised by smallholders with minimum management input. Pigs are used mainly to meet social obligations, while poultry is kept for home use. Cattle, goats and ducks have been introduced in recent years, but widespread adoption of these animals has met with some resistance. Cattle numbers have actually declined to about 14000 in 1987 from an estimated 24000 in 1976.

During the last ten years, the fisheries sector has developed strongly and the potential has been greatly enlarged by the declaration of the 200 mile economic and fisheries zone. The Solomon' 1.34-million-square-kilometer economic zone is one of the world's best tuna fishing grounds. The total catch in 1986 reached a record high of 48,800 tons and exports represented 47 per cent of total export earnings in 1988, which is the largest among the total exports. The potential maximum sustainable catch is estimated to be 80,000 tonnes per year. The main commercial species are skipjack, tuna, yellowfin, albacore and other types of tuna suitable for the raw fish market in Japan. In 1988, 85 per cent of the catch was simply frozen and exported whole.

With the many ethnic differences on the various islands of the Solomon, it is not surprising that there are considerable differences in approach to traditional fishing. Some coastal communities are restricted to inshore gathering or the use of small dugout canoes, whilst others have sailing canoes ranging further to sea. Over the past decade, commercial enterprise has developed a small, narrow, general purpose fiberglass dinghy of different lengths which have proved popular in some areas for fishing in calmer waters.

Solomon Islands has the largest industrial fishing fleet of the Forum Countries, through its open policy to foreign investment, joint venture and its national fishery development corporation. The tuna industry began in the 1970s in cooperation with a Japanese fishing organization, went on to a joint venture and a wholly owned Solomon Islands company. The industries, which expanded into canning as well as tuna export, did not do well at first. They appear to be improving slowly, but are still not yet viable. The National Fisheries Development Corporation (NFD) has recently sold out (completely) to a Canadian firm.

b. Characteristics of the subsector

The main manufacturing enterprises are the fish freezing, canning and smoking, and sawmilling factories. Solomon-Taiyo Ltd., a company jointly owned by the government and Taiyo Fisheries Co., Ltd (Japan), has shore bases and canning factories at Noro; where there is a cold store and fish smoking plant. The Noro plant has three times the capacity of Tulagi (300,000 case-a-year) and a second large cannery is to be decided. The Noro plant also has a fish meal processing facility. The plant at Tulagi has been handed over to the National Fisheries Development Company. National Fisheries Development Ltd. jointly owned by the government (75 per cent) and Solomon Taiyo Ltd (25 per cent), was created to encourage local involvement in the industry and to build small fishing boats. The first of the two trawlers being built for the company was delivered from Australia, early 1988; it is estimated that additional export earnings from the boats could total to SI\$ 16 million. The other relatively large scale factories are for production of copra and palm oil as well as kernel extraction.

c. Trade in Food Products

Since the fall in copra prices and the growth of the fishery sector, fish (tuna) have become the most important export earner representing 38 per cent of all exports in 1989. Other relevant exports were copra (18 per cent), palm oil and kernels (12 per cent) and cocoa (5 per cent). Main destinations were Japan, nearly 40 per cent, Thailand, United Kingdom, South Korea, Norway and USA.

The main imports in 1988 were plant and machinery, but also quite a large amount of food was imported representing 10 per cent of the total.

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

In its 1985-89 National Development Plan, the Solomon Islands government has outlined its national development objectives as follows.

To increase the levels of development activity, particularly in the rural sector.

To maximize the profitable utilization of the country's resources for the overall benefit of the population.

To broaden the economic base of the country to provide a more equitable and accessible health and education system.

Considering the several constraints at medium and long term outlook of the economy, the government priority is focused on:

Increasing investment in the development of human and natural resources, and supporting social and economic infrastructure;

Providing an environment and conditions to increase private sector investment and have active government involvement in strategic areas of the economy;

Encouraging people and communities to participate more directly in their own development.

The government, formed by Mr. Mamaloni in March 1989, has made policy statements that they plan to promote privatization of government owned assets, and wish to avoid further government involvement in the economy. The central government intends to dissolve some of its power to the provincial governments, giving them control over forestry, mining and land matters, and provide revenue base through license fees.

New emphasis is to be placed on rationalization of government investments, and encouragement of overseas investment by simplifying and bringing down level of taxation and increasing the incentives offered for investment. The government also wishes first to contain and then diminish its dependence on overseas aid. There is to be a major review of employment of non-nationals in the republic service and a concerted drive to achieve localization.

Industrial policy has not been developed to any major extent in the Solomon Islands and specific guidelines for industrial development had not been prepared, until the establishment of the Industrial Development Unit in 1985, whose primary responsibility is to promote Solomon Islands participation in industrial enterprises and in building up associated infrastructure and services.

Government encouragement of manufacturing so far has taken these forms:

- Fiscal incentives for selected enterprises (e.g. import duty concessions on capital goods and tax relief on profits);
- Equity participation in large-scale projects through the Government Shareholding Agency, and
- Limited additional lending to industry by the Solomon Islands Development Bank. In the past, the government's objectives in relation to the private sector were to promote participation of Solomon Islands in Business. The foreign Investment Act encouraged local participation in commercial operations, in the rural sector. The government itself promoted specific industrial development by participating as a shareholder in agro-processing ventures. Selective industrial planning was also carried out by the physical planning units of the central and provincial government.

b. Relevant Government Agencies

The Ministry of Agriculture and Lands (MAL), is administrated by a Permanent Secretary who is responsible to the Minister. The technical divisions extension, planning and livestock are responsible to an Under-Secretary.

The livestock division is headed by a chief veterinary officer, whose staff comprises one other veterinarian and 15 local support staff who are responsible for extension, animal health and quarantine, development research and farmer training.

The Livestock Development Authority (LDA) is a semi-autonomous organization headed by a general manager under the direction of a Board of Management. Its charter is to promote the production, transportation, processing and marketing of all livestock.

c. Physical Infrastructure

Electricity is available in several urban areas from six generating stations. The Asian Development Bank (ADB) is providing assistance in the development of electricity supplies. A loan of US\$ 4.21 million is to be used to upgrade the power supply to Honiara, and provide power for the new seaport of Noro. The ADB is to provide a further US\$ 350,000 for feasibility study and design of a hydroelectric scheme on the upper River Lungga, near Honiara.

d. Industrial Services

The financial system includes in addition to the central bank, the commercial banks, the Development Bank of the SI, a National Provident Fund, the Investment Corporation of the SI, the Provincial Development Unit and a growing number of credit unions. For all of these organizations the credit has been tight.

The internal markets are not very well developed. There is a central and some satellite markets in Honiara, but for the most part the markets do not serve the population centre very well. There is an Agricultural Information Unit in the Ministry of Agriculture and Land that broadcasts two programmes weekly with information on export crop prices. Nothing is presented to farmers on the internal marketing situation.

e. Human Resources

In 1988 the population was 305 000 and estimated GDB per capita 1223 SI\$. Education takes nearly 30 per cent of the government budget yet illiteracy rates remain high. Of all eligible children only 75 per cent enter primary school and only 60 per cent complete its education. Health services are good and birth rate is around 3.5 per cent a year.

To assist in defining the total requirements for technical assistance, the government in 1983 installed a manpower planning exercise for the public services, which aimed to assess the level of in-service and pre-service training that would have to be carried out. Technical assistance has focused on personnel training and development, but the major requirement now is for increased technical assistance personnel to implement development projects, trainers to conduct in-service training to upgrade existing staff and advisers to help to establish new functions within the government and its agencies.

5. Related or Relevant Assistance Programmes

a. Country Specific

- | | |
|---------------|--|
| SI/SOI/85/801 | Assistance to Food Processing Industry |
| SI/SOI/86/801 | Advisory Services on Assessment on Industrial Training Needs |
| SI/SOI/89/801 | Assistance in the Start-up of a Small-scale Garment Factory |

Factory

UC/SOI/87/024 Assessment on Production Unit of Basketware

b. Regional

AU/RAS/85/A04 Small and Medium Scale Industry

DP/RAS/86/075 and Entrepreneurship Development in the Pacific Island countries

Selected References

FAO/UNDP: South Pacific - Agricultural Sector Review and Programming Mission

TUVALU

Summary of Constraints and Potential

Constraints:

- Virtually no arable land
- Small domestic market
- Remoteness from export markets
- Complete infrastructure for modern industry not feasible

Potential:

- Improvements in local food processing

1. Review of Growth Constraints and Prospects

A major constraint to growth of the food processing industry in Tuvalu is the very limited amount of land available for agriculture and the low soil fertility. The domestic market moreover is very small, with a population of 9,000 living on many scattered islands. There is one relatively abundant resource, fish, which is mainly caught by foreign fishing vessels for processing elsewhere. Local processing for export is probably not feasible: industrial-quality water is hardly available, power is expensive, all other production inputs would have to be imported, and there is no indication that the fisheries resource endowment differs from that of countries which have a better location vis-a-vis major markets. There is possibly some scope for improving food processing methods at the local level to reduce the food import bill. The introduction of such methods should take account of community values and priorities. While these are always an important factor in projects focussing on traditional close-knit societies, they take on a special value in the present case where the survival of island communities may partly depend on preserving these communal values.

2. Economic Performance

a. General Characteristics of the Economy

In 1985, Tuvalu had a per capita GDP of US\$ 336, which represents a 15 per cent decrease in comparison with 1981 (UNDP 1990). Total GDP in 1985 was US\$ 20 million. National income is to a very large extent determined by aid receipts, which increased from US\$ 5 million in 1980 to US\$ 14 million in 1988. Remittances from Tuvalans working abroad and income from fishing licenses awarded to foreign companies also make a substantial contribution to national income.

Given the major role of foreign aid, it is not surprising that Government services are a dominant factor in the economy, averaging 45 per cent of GDP during 1981-1985. Trade, hotels and restaurants came second with 11 per cent in 1985. Agriculture, fishing and manufacturing accounted for 4.9, 6.0 and 2.2 per cent in that year (UN 1990).

b. Agriculture, Fisheries and Manufacturing

While according to the statistics, agriculture and fisheries do not contribute much to GDP, they are the predominant activity of the population. There is little production for the market. Coconuts constitute the major agricultural crop. Copra production is a function of farmers' cash needs, their harvest surplus and world market prices. The 1986 output was 240 tonnes. Commercial fishing is almost wholly in the hands of foreign ship owners (Tuvalu has an EEZ covering 1.3 million sq. km. of ocean), and the catch is neither marketed nor processed in Tuvalu. There is one Government ship involved in commercial fishing, and a cold storage/marketing centre on the capital island of Funafuti where some fish processing for local consumption takes place. There are some micro-enterprises in the garments, printing and wood processing industries. No other details on manufacturing activities are available.

3. Food Processing Industries

a. The Raw Material Base

Tuvalu's agricultural potential is very limited. The country's land surface (all atolls combined) is only 26 sq. km. Soils are derived from coral with a low fertility, and fresh water reserves are limited. Erosion from sea currents, cyclones (which have destroyed up to 90 per cent of all trees in the past) and very high population densities (the 1985 average was 347 persons per sq. km.) further limit the potential for agricultural development.

The EEZ holds ample fish stocks, and overfishing is apparently not a problem. It would however be important to know whether an assessment of the fish stocks in the EEZ has been made, which volume of fish may be caught under the licensing arrangements, and what the actual offtake is. It is known that reef and lagoon stocks in the most densely populated areas are being depleted by subsistence fishing. The situation is being monitored by the Department of Fisheries, but corrective measures have not been taken yet.

b. Characteristics of the Subsector

No information on food processing was available at the time of writing. There is obviously some household-scale copra making, and probably also fish conserving, but there is no indication of more sophisticated operations, except in a very limited way at the Funafuti cold storage centre.

c. Trade in Food Products

As Table 1 shows, the trade balance for food products has been consistently negative, even in years when a fish surplus and a relatively large copra surplus were exported. The figures indicate that Tuvalu is in no way capable of feeding its own population any longer, and is heavily dependent on costly imports from overseas suppliers. Even if one should take into account that the small expatriate community consumes a disproportionately high share of these imports, the share of per capita GDP spent on food imports is quite high, being almost 25 per cent (cf. UN 1990).

Table 1. TUVALU - Composition and Value of Trade in Food Products
('000 Australian \$)

Commodity	1980	1981	1982	1983	1984	1985	1986 Est.	1987 Est.
Imports Food, live animals, beverages and tobacco	1,165	904	788	973	1,130	1,223	1,477	1,904
Exports								
Copra	67	25	11	61	310	146	19	16
Fish	-	-	191	255	421	-	-	-

Source: UN 1990

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The Government's present Development Plan aims at greater coherence and a more equal distribution of development efforts and an improved trade balance. In the industrial sector, small-scale manufacturing is to receive special attention. The current (1988-1991) Plan's projects are to be wholly financed by foreign aid. The available information contained no details on special measures or projects for the food processing industry, with the exception of two aid projects implemented during the current plan: a project to cover the running costs of the Funafuti fish marketing and processing centre, and support to the Vaimoana oil co-operative.

b. Relevant Government Agencies

Development objectives are formulated by the Development Plan Steering

Committee (DPSC); these are translated in programmes and projects by the Office of Planning and Statistics (OPS). The Island Council on each of the islands is the main institution for implementing rural development. Donors co-ordinate programmes and projects with the government through Aid Co-ordination meetings. There is no information on a specific agency or Government officer dealing with food processing industries.

c. Physical Infrastructure

Transport is a great problem. The Government operates one vessel; the operation is heavily subsidized because of the low level of effective demand. Flight connections are infrequent and the payload of the planes is small. Electricity supply is very costly, as virtually all energy sources have to be imported (in recent years, some progress has been made in the field of solar energy). The water supply is very limited. These factors alone would rule out any but the most modest forms of agro-processing.

d. Industrial Services

There are two relevant institutions in the financial sphere: the National Bank of Tuvalu and the Business Development Advisory Bureau (BuDAB) At present, the National Bank does not have an effective strategy for development financing, let alone for financing industrial projects. The BuDAB provides business advice and concession loans to small enterprises. It receives UNIDO assistance.

e. Human Resources

Primary education is available and compulsory for all children, and about 30 per cent of the children in the 11-13 age group enter the secondary school every year. Training for skills that are useful at the village level available at community centres; for specialized industrial skills, students would have to travel abroad. There was no information on education and training opportunities for women, nor on their role in food processing, at the time of writing.

5. Related or Relevant Assistance Programmes

a. Country Specific

Australia: Fish Marketing and Processing Centre (1989-1991, US\$11,057)

ILO: Vaimoana Oil Co-operative (1988-1990, US\$7,870)

UNDP/UNIDO: Assistance to the Business Development Advisory Bureau (1990-1992, US\$ 36,250)

b. Regional

UNDP/UNIDO: Small- and medium-scale industry and entrepreneurship

development in the Pacific Islands (1988-1991, US\$ 821,475)

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VANUATU - Republic of Vanuatu**Summary of Constraints and Potential****Constraints:**

- Small internal market
- Remoteness from export markets
- Low level of human resource development

Potential:

- Untapped agricultural and fisheries potential
- Limited potential for exports of canned meat and special sea food products

1. Review of Growth Constraints and Prospects

Vanuatu suffers from similar constraints as other Pacific Island countries: a small, scattered population and land surface (and hence a limited supply of raw materials and a limited domestic market), remoteness from export markets and sources of supplies, and cyclones which are especially destructive to tree crops. To this should be added a level of human resource development which is well below that of other island states in the region. There is an acute lack of technical and managerial skills.

On the other hand, Vanuatu still has a favorable population/land ratio, and soils are relatively fertile. While the country will never be a major producer of agro-food products, there is an untapped potential which can be exploited, and the Government has shown that there is a political will to do so.

While efforts should continue to make copra production and processing more efficient, the potential for other products (such as coconut cream) should be explored. Better production and processing methods for traditional crops also deserve consideration. These would help to improve nutritional standards and reduce losses and food import bills. Improvements in the production process in the meat canning plants (much of the work is apparently carried out manually) could also help to reduce import bills and could make the country's canned meat more competitive in export markets. If new crops can be successfully introduced, these could help to diversify the range of products of the industry.

The fisheries potential is largely unexploited. An assessment of species could indicate other commercially interesting species besides the limited range now caught and processed on a very modest scale. Efforts to find a foreign partner to re start the SPFC tuna operation should continue. Parallel to these activities, the viability of new/expanded processing operations should be

explored. As the - admittedly limited - export success of shark fin and beche-de-mer shows, there is an export market for special fish products in such countries as Japan. Some quality products could also be marketed locally - the tourist industry is one potential buyer. A basic marketing network for fish products is already in place.

The expansion of processing and the related intensification of agricultural production should depend on an assessment of the environmental consequences. Overcropping and overfishing can do serious damage to the vulnerable island and marine ecosystems. Project proposals to expand the food processing industries should also take into account environmental issues such as water consumption and waste disposal. Where new crops are introduced to broaden the raw material base for processing, account should be taken of possible consequences for the ecosystem (new diseases may be introduced) and for the existing farming system - new crops may, for example, increase the workload of women, or may lead to a loss of their status if they are not provided with such new skills as are needed.

2. Economic Performance

a. General Characteristics of the Economy

After a period of stagnation in the mid-1980s (see Table 1), the Vanuatu economy registered strong economic growth in 1989 and 1990 (EIU 4/1990; EIU 1/1991); the documentation does not provide growth figures. The main sources of renewed growth were tourism and financial services (Vanuatu is successfully providing tax haven facilities), but increasing agricultural exports and the expanding manufacturing sector also contributed.

The Vanuatu economy is dominated by the services sector, which accounted for around two-thirds of GDP throughout the 1980s (see Table 1). Agriculture, forestry and fisheries accounted for 24 per cent of GDP in 1987, the sector's contribution having slightly declined during the 1980s. This was mainly a consequence of the weak performance of commercial agriculture. The small manufacturing sector has grown vigorously, increasing its GDP share from 3 per cent of GDP in 1983 to 5.4 per cent in 1987.

Per capita GDP was US\$ 499 in 1985, and has probably decreased somewhat in the second half of the 1980s, as population growth probably outstripped GDP growth. As in some other Pacific Island countries, GDP does not adequately reflect the economic welfare of the citizens because of the comparatively high level of transfer payments from abroad which contribute substantially to GNP. Per capita overseas development assistance in 1988, for example, amounted to US\$ 275 (UN 1990).

b. Agriculture, Fisheries and Manufacturing

The agricultural sector consists of a plantation sector and a mixed subsistence/cash crops smallholder sector. The smallholders constitute the great majority of the Vanuatu workforce - 80 per cent of the economically active rural population (that is, close to two-thirds of economically active population as a whole) is thought to be engaged in subsistence production. While only an

Table 1. VANUATU - GDP at Producer Prices (constant 1983 prices) by Industrial Origin, 1983 - 1987

Sector	GDP (VT millions)				
	1983	1984	1985	1986 _p	1987 _p
Agriculture, forestry and fishery	2,649	2,831	2,771	2,648	2,591
Plantations	246	259	239	252	251
Other commercial agriculture	598	515	543	318	152
Small holdings subsistence	786	922	827	902	865
Agriculture	974	1,006	1,044	1,065	1,096
Forestry	45	129	118	69	227
Industry	772	903	940	1,025	1,282
Manufacturing	311	419	466	466	583
Energy	158	191	192	190	180
Construction	303	293	282	368	514
Services	6,729	7,112	7,255	7,121	6,948
Trade, restaurant hotel	3,627	3,740	3,753	3,513	3,599
Transport and communications	757	808	770	741	762
Finance centre	819	772	967	1,128	1,087
Real estate, bus services	526	587	611	591	534
Government service	1,393	1,542	1,629	1,721	1,614
Community, social and personal service	72	72	74	76	76
Less: input, bank service charges	-465	-410	-543	-654	-727
GDP at (1983) producers' prices	10,150	10,846	10,966	10,751	10,821

Source: Statistics Office, NPSO
p = provisional

estimated 35 per cent of the farmers regularly sell their produce in the markets, virtually all of them are at least intermittently involved in the cash economy, and the smallholders account for some 75 per cent of the annual output of copra and cocoa, the country's major agricultural exports. Smallholding also accounts for approximately one-third of the country's livestock (mainly pigs and chickens); the extent of commercialization is unknown. It is estimated that women do 80 per cent of the work on subsistence crops, while the men take care of the cash crops.

There are 176 plantations, mostly concentrated on the islands of Espiritu Santo and Efate. The most important crops are coconut, cocoa and kava (a root crop used as the basis for the national drink; it is also a raw material for the pharmaceutical industry). Some coffee is also grown. The large-scale sector is the major breeder of cattle for the market.

Subsistence fishing is less important than in other Pacific Island countries, as a consequence of the abundance of fertile land. Most village fishing is now geared to marketing schemes. In contrast to actual fishing operations, fish trade also involves women. Large-scale commercial fishing (of tuna) was carried out by the South Pacific Fishing Co, Ltd (SPFC), a Japanese firm, but operations were abandoned in 1987. The equipment of the fishing base is still intact, and a foreign partner is sought by the present owner, the Government, to recommence activities.

Table 2. Key Characteristics of the Vanuatu Manufacturing Sector

Sub-Sector	Employment		Million Vatu Value Added	
	1988	1989	1988	1989
Food, Beverage and Tobacco	392	442	339	413
Wood and Wood Products	272	317	226	170
Textile Clothing and Leather	113	118	49	70
Fabricated Metal Products	43	69	24	36
Chemical, Rubber & Plastic Products	57	55	60	39
Paper and Paper Products	35	46	55	60
Other Handicrafts	53	62	28	54
Basic Metal	5	5	8	7
Total	1,032	1,200	832	924

Source: FAO/UNIDO South Pacific Agricultural Sector Review and Programming Mission - draft report.

As Table 2 shows, the manufacturing sector employed 1200 persons in 1989, a 16 per cent increase over 1988. The number of enterprises (almost all of them privately owned and small or micro-scale) rose from 61 in 1987 to 105 in 1989. There is no breakdown of employment or ownership by sex. The food, beverage and tobacco industry is the largest manufacturing branch, accounting for 36.8 per cent of employment and 44.7 per cent of MVA in 1989. The wood products industry and the textile, clothing and leather branch were second and third, with 26.4 and 9.8 per cent of employment, and 18.4 and 7.8 per cent of MVA, respectively. Considering its small size, the manufacturing sector is well diversified.

Productivity has lagged behind employment growth. MVA per worker was VT 770 in 1989, as opposed to VT 794 in 1984 (cf. UNIDO 1986). Of the main branches, only textiles registered an increase in productivity during the period (from VT 357 to VT 593). In the food industries, MVA per worker decreased from VT 1,085 to VT 934, and in the wood processing industry it decreased from VT 960 to VT 536.

Most of the larger industrial units are located in or near the capital, Port

Vila, on Efate island, or in Luganville on Espiritu Santo. But industrial employment in urban areas amounted to only 387 in 1984 (UN 1990), less than half of total manufacturing employment in that year. In terms of employment, micro-scale rural processing would seem to dominate the sector. Food and wood processing excepted, the sector is completely dependent on imported inputs. Most manufacturing is geared to domestic demand. There is some export of shell buttons, plastic containers and food products.

3. Food Processing Industries

a. The Raw Material Base

Vanuatu has a land area of 12,189 sq.km., of which 44 per cent are considered arable. Its soils, of volcanic origin, are relatively fertile. Water supply is sufficient. With a total 1989 population of 142,000, much of the agricultural potential is still unused. There are however some islands where population pressure is leading to a shortage of arable land. Cyclones occasionally do serious damage to forest resources and crops, especially to coconut trees.

Some 90,000 ha have been planted with coconuts. Cocoa is grown on 6,000 ha and kava on 4,000 ha. The 1989 output of copra was 24,092 tons, down by 19 per cent from 1988. Cocoa output in 1989 was 1,538 tons, double the amount of the previous year. The quality of the output has been much improved; most of it is now of export grade. No kava tonnage was available. Coffee is only grown in small quantities, the 1989 crop being 25 tonnes. The plantations are characterized by ageing stock, with over 60 per cent of the coconut palms being more than 50 years old, and 70 per cent of the cocoa trees over 30 years. Progress is being made with coconut replanting, but this is mainly in the smallholder sector. The share of higher quality copra in total production increased from 8 per cent in 1983 to 64 per cent in 1989. But the replanting and maturing of the improved coconut varieties is a time-consuming process, and this is a contributing factor to low output.

Root crops are the mainstay of the rural diet, and include yam, taro, cassava and sweet potato. In addition, vegetables and bananas are grown. About 65 per cent of the smallholder households have pigs (an average of two each), and some 80 per cent have chickens (13, on average). The plantations provide two-thirds of the beef cattle; detailed figures were not available at the time of writing.

The fisheries potential has not been much exploited so far. It is estimated that up to 10 thousand tons of tuna and one thousand tons of surplus reef fish could be harvested annually, with gross foreign currency earnings possibly exceeding US\$ 10 million (FAO/UNIDO 1990). The meat shells harvested for button manufacturing, etc., is consumed locally, but could also be processed.

b. Characteristics of the Subsector

Although detailed figures on production, ownership, etc., are not available, the documentation identifies a number of individual industries:

- Copra processing is probably the most widespread food processing activity. Most of the copra-making is done in the household, using the simple traditional method of smoking. Hot-air dried copra is also produced, and fetches a higher market price. The relative importance of the more sophisticated production method could not be deduced from the documentation.
- There are two large slaughterhouses, one on Espiritu Santo, for exports, and one on Efate, for the local market and some regional exports. There are several small canneries. It is not clear to what extent these are integrated with the slaughterhouses. The cold storage of the SPFC (see section 2) is now used to freeze beef for export.
- The local market for dairy products is partly covered by an integrated dairy farm/processing enterprise near Port Vila.
- Recently, a beer brewery, a joint venture with a Swedish firm, was opened at Port Vila.
- Other industries include cocoa drying; kava and coffee processing; confectionery, soft drinks and snack food making for the local market; artisanal-scale sea-food (shark fin, beche-de-mer - a type of sea cucumber) processing for export; and poultry.

A UNDP/UNIDO project is exploring the possibility of producing cheese from coconut milk.

c. Trade in Food Products

Vanuatu's most important buyers of food products are Belgium, France and the Netherlands. In recent years, Japan has also emerged as an important export destination, especially for beef products.

Food exports constituted 70-80 per cent of total exports until 1986 (see Table 3); most products undergo only rudimentary processing. Only canned meat represents a more advanced type of processing, but it does not contribute much to exports yet. With the end of SPCF's fishing activities and the decline of copra output, the share of food products in exports declined strongly, to approximately 40 per cent in 1988. The decrease in copra exports is partly explained by low prices, partly by low production.

Vanuatu imports mainly from Australia, New Zealand and Fiji. The Pacific rim countries Japan, New Caledonia and Hong Kong have also emerged as important suppliers.

Food, beverages and tobacco constitute the largest category of imports, accounting for 23-25 per cent of the total of imports in 1983-1988, with the exception of 1987 (see Table 4). In recent years, food imports have outstripped food exports. It is not known what the share of processed food in total food imports is, but in spite of its abundant raw material basis, Vanuatu's food processing industry is evidently not capable of fully satisfying demand.

Table 3. VANUATU - Total Exports and Food/Food Products Exports, 1980 - 1989,
VT Million

	Copra	Cocoa	Beef and Veal (canned)	Fish	Total food exports	Total exports*
1980	592	94	46	1,056	1,788	2,449
1981	1,070	117	49	826	2,062	2,831
1982	710	57	59	689	1,515	2,201
1983	1,308	183	51	795	2,337	2,940
1984	2,734	137	24	710	3,614	4,395
1985	1,392	133	1	761	2,287	3,252
1986	461	196	3	126	786	1,554
1987	719	207	250	-	1,176	1,820
1988	955	117	25	-	1,097	2,600e
1989	790e	260e	...	-	...	...

e = estimate

* may include minor categories of processed food exports not included elsewhere.

Sources: Statistics Office, NPSO; EIU, no.4/1990

Table 4. VANUATU - Food Imports and Total Imports, 1983 - 1990,
VT Million

	Food and Live Animals	Beverages and Tobacco	Total Food Imports	Total Imports
1983	1,023	269	1,292	5,229
1984	1,166	310	1,476	5,824
1985	1,210	295	1,505	6,385
1986	1,089	252	1,341	5,905
1987	1,022	204	1,226	7,450
1988	1,263	368	1,631	7,065

Source: Statistics Office, NPSO

While the growth of tourism and changing consumer preferences are likely to have contributed to demand for products which cannot be made locally, and while the manufacture of certain other food products may not be economically feasible given the limited market, a more extensive exploitation of the country's potential could possibly lead to a significant reduction of costly processed food imports.

4. Policy Framework and Support Infrastructure

a. Development policy orientations

Vanuatu is now implementing the Second National Development Plan (1987-1991). The long-term aim is to achieve a larger degree of economic self reliance (at the moment, for example, the development budget is wholly financed by donor agencies). Decentralization is another objective; this involves the transfer of certain responsibilities to Local Government Councils (LGCs), among others in the economic field. This could mean that local processing of crops could get more attention in the future - if the LGCs are provided with the required expertise. At the moment, there is no formulated industrialization policy, although the Government has declared that development of the manufacturing sector would be an important means of reducing dependence on raw material exports and volatile tourism earnings. The next Plan is expected to be more explicit about the role of domestic resource-based manufacturing.

b. Relevant Government Agencies

Industrial development is the responsibility of the Ministry of Trade, Commerce, Co-operatives, Industry and Energy, with the Department of Industry (DOI) as the directly responsible body. A UNDP/UNIDO project (see section 5) is, among others, helping to improve the capacity of the DOI to stimulate industrial development, with regard to policy making as well as support to actual industrialization projects. It is envisaged to provide Industrial Extension Officers to the LGCs. There is no special unit for the development of food industries.

c. Physical Infrastructure

As in other Pacific Island countries, transport is costly because of the long distances between islands, a small population and the remoteness from overseas markets and suppliers. The inter-island shipping services in particular seem to be unsatisfactory, with a lack of harbor facilities and qualified personnel. Of the two international ports, Luganville is being upgraded with ADB support, while funding for the improvement of facilities at Port Vila is being sought. The country has two international airfields and grass strips on many of the islands. The road system on most islands is rather poor, with few sealed all-weather roads.

Telecommunications are essential for all but the smallest manufacturing operations. At present, telephone exchanges exist only at Port Vila and Luganville; there are radio connections with remote areas and outlying islands. Only 35 per cent of the rural population is served by the telecommunications network. Potable water was available to 50 per cent of the

population in 1986. The urban water and sanitation system is considered adequate. Continuous power supply is only available at Port Vila and Luganville; elsewhere, enterprises would have to rely on generator sets. All commercial energy is imported.

d. Industrial Services

The commercial banks operating in Vanuatu are not intensively involved in lending to local entrepreneurs. The two main constraints (see UN 1990) are a shortage of branch offices catering for businessmen outside the main urban centres and the lack of well-prepared loan requests for viable projects. The Finance Centre is an offshore banking centre and would seem of little importance for local manufacturing.

The objective of the government-owned Development Bank of Vanuatu (DBV) is to facilitate and promote the development of the natural resources of the country; this explicitly includes (resource-based) manufacturing. The Bank provides loans and guarantees, undertakes equity participation and assists in the formulation and promotion of new projects. While primarily serving the Ni-Vanuatu business community, loans can be provided for viable joint ventures. There is a special micro-loan scheme for small entrepreneurs, with a maximum amount per loan for manufacturing enterprises of VT 100,000. The DBV has nine branch offices on the most important islands. The branch offices of the Vanuatu Co-operative Savings Bank (VCSB), which has a fairly strong presence in rural areas, work with the DBV in the collection of loan payments.

The UNDP/UNIDO project mentioned in section 2b is also providing assistance to the establishment of Ni-Vanuatu industries and extension services to improve the performance of existing industrial units. By early 1991, forty-five manufacturing enterprises had benefitted from extension services provided under the project; among these, food processing industries formed a major category (at least 11 units). The project had generated nine bankable projects prepared for the DBV, of which three (fish and kava processing, bakery) were in the food processing branch. DBV personnel also receive training under the project.

e. Human Resources

Although primary education is free, only 15 per cent of the population is literate, which is quite low by regional standards. About one-third of the teachers at this level have no formal training, and there is a serious shortage of facilities and educational material. Secondary schooling is very limited. Technical training for agriculture is provided through the Tagabe Young Farmers' Training Programme. The course stresses farm skills and work planning; there is no indication that rural processing is of the curriculum. Short technical training courses for small and micro-scale industries are provided in the context of the UNDP/UNIDO project referred to above.

The available material gives few indications of the position of women. It is known that most of the subsistence farming, and presumably part of the rural processing, is done by women. According to the 1986 Urban Census, only 51 per cent of women in urban areas - as opposed to 87 per cent of the men - were economically active. The term "economically active" is not, however, defined. The documentation does not say anything about the role that women

possibly play in urban food products manufacturing. One-fourth of the participants in the training courses under the UNDP/UNIDO project were women, but these courses have so far not focussed on food processing.

5. Related or Relevant Assistance Programmes

a. Country Specific

UNDP/UNIDO: Establishment of Ni-Vanuatu small and medium-scale industries (1988-1992)

b. Regional

UNDP/UNIDO: Small- and medium-scale industry and entrepreneurship development in the Pacific Islands (1988-1991)

UNDP/UNIDO: Development and testing of a coconut cheese production technology (1990-1993)

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YEMEN - Republic of Yemen**Summary of Constraints and Potential****Constraints:**

- Limited agricultural potential
- Limited domestic market
- Relatively low level of human resource development

Potential:

- Processed fish
- Meat processing

1. Review of Growth Constraints and Prospects

A major constraint to the growth of the food processing industry in Yemen is the scarcity of arable land and water. This does not mean that nothing can be done to reduce the dependence on imported food products, imported raw materials for the industry and the high cost of its end products. The scarce agricultural resources can be used more efficiently through improvements in cultivation methods (which presupposes improvements in education and agricultural extension services), and a better functioning transport, marketing and storage system.

More could be done to strengthen the linkages between the agricultural sector and the food-processing industry; the existing policy framework does emphasize the development of resource-based industries, but many industries are still heavily dependent on imported inputs. Given the rather dismal performance of many larger-scale industries, improving the performance and output quality of smaller-scale industries would warrant special attention.

The industry as a whole could also be made to perform better through better vocational training and relevant higher-level education and the search for cheaper sources of good quality packaging materials. The returning migrants from the Gulf countries represent a major source of skills for which additional training could be provided to enhance their usefulness for the industrial sector.

Yemen is making progress in commercial horticulture, cattle raising and poultry breeding. These could be the basis for future manufacturing; meat processing (now non-existent, except for artisanal slaughtering) could even be a new industry. The food-processing industries in the North are among the industries with the lowest domestic resource costs, according to the World Bank in 1990 and the country would have some competitive advantage here. Production will remain limited because of the limits to agricultural growth. If exports are envisaged, these should therefore focus on such products based on crops that are grown on a limited scale. A case could, however, also be

made for direct exports of fresh high-quality fruit and vegetables to high-income countries in the sub-region, where the favorable growing conditions existing in North Yemen do not exist. In the South there is scope to expand the fish processing industry. The very low degree of processing of the catch (around 2 per cent) can be increased. As in all other industries, packaging considerably increases the cost of the product. In the case of fish, freezing could be an alternative, albeit not in the domestic market, where traders usually do not dispose of suitable storage facilities yet. It would be worthwhile, however, to analyze the market potential in the region.

The consequences of the unified market cannot be assessed yet. While similar industries operate in both parts of the country, there seems to be a sufficiently large market for most of the existing production capacity. In any case, transport problems will probably justify the existence of local production of certain food products for the time being. It remains to be seen whether all existing units would be viable vis-à-vis imports - even with lower production costs - if the present tariff and non-tariff protection system were abolished.

Where in the future the establishment of new units is contemplated, their effects on natural resources must be taken into account, especially with regard to water consumption. Locating such units closer to production areas than is the case at present could help bring down production costs further. The impact of such units in existing small-scale/cottage operations should be taken into account, e.g. with respect to the traditional scale usually played by women in agro-processing.

2. Economic Performance

a. General Characteristics of the Economy

The Yemen Republic unifies two formerly independent states: the People's Democratic Republic of Yemen and the Yemen Arab Republic, covering the South and North, respectively, of the present country. The unification took place in 1990, and statistics are as yet partly available only for the separate entities. The former states will be called "South" and "North" hereafter.

In 1987, the North was more affluent, with a per capita GDP of US\$ 677, as opposed to a per capita GDP of US\$ 470 in the South. GDP growth was faster in the North as well. The annual average for 1985 - 1989 being 10.0 per cent, as opposed to -1.2 per cent in the South.

Both countries were to an extent oil economies, with 59 per cent of the 1988 export earnings in the North, and 84 per cent of those in the South coming from petroleum. Various forms of foreign financial support also played a large role in both countries' economies, external sources accounting for e.g. 72 per cent of South Yemen's investment funds in 1989. Migrant remittances made an important contribution to national income, but also led to a serious drain of skilled workers.

b. Agriculture, Fisheries and Manufacturing

The Ministry of Agriculture and Water Resources (MAWR) estimates that there are about 3.62 million ha of cultivable land in Yemen, representing

seven per cent of total area. Of this about 1.47 million ha is cultivated, of which about 20 per cent is irrigated, 54 per cent is rainfed and 27 per cent is left fallow, mainly through lack of rainfall.

Approximately four fifths of the population live in rural areas. Agriculture employs about 60 per cent of the labour force and provides one fourth of GDP. Total production in 1990 was estimated at YR 20,364 million, and value added at YR 15,405 million. About 85 per cent of total production comes from crop production.

Crop production is composed of grains (38 per cent), vegetables (35 per cent), fruit (16 per cent), fodder (16 per cent) and cash crops (2 per cent). Table 1 summarizes the agricultural production in Yemen in 1987-1990.

Table 1. Agricultural production in Yemen in 1987-1990.

	1987	1988	1989	1990
Production ('000t)				
Wheat	113	142	163	153
Maize	54	58	68	66
Sorghum/Millet	509	594	574	491
Barley	41	49	59	55
Sorghum Fodder	437	465	471	362
Pulse	39	46	72	76
Tomatoes	147	145	163	168
Potatoes	119	128	140	160
Grape	129	133	135	142
Coffee	5.1	6.5	6.8	7.4
Livestock ('000hd)				
Sheep	3488	3602	3738	3766
Goat	3085	3170	3260	3333
Cattle	1105	1137	1170	1175
Camel	153	161	170	174
Production				
Poultry ('000t)	77	60	57	
Eggs (m)	318	338	335	

According to the preliminary statistics, however, the production in every product group in 1991 was considerably lower than in the previous year, but again in 1992 the production was higher due to more favourable weather conditions.

Much of the agricultural potential of Yemen is in the North, where the high central uplands receive sufficient rainfall to allow agriculture with only supplementary irrigation. The difference in elevation also makes it possible to grow both tropical and temperate crops. The South is less favored, less than one per cent of the land being cultivable. Yields are low throughout the country. They could be increased if, a.o., irrigation were improved, but sub-soil water reserves are limited in many areas and already being depleted, even in the North.

Rapid growth in the sector is also hampered by low educational levels

and the usually traditional organization of production. In the North, modernization and the introduction of new crops have so far met with limited success, and agriculture remains heavily subsistence-oriented, with most of the farmers owning less than one ha of land. A number of modern horticultural farms now exists, but their impact on overall output is as yet limited. In the South, attempts at modernization were made by introducing state farms and co-operatives, but in spite of these, the contribution of agriculture to GDP has decreased over the past decade, as it did in the North. The output of individual crops has, however, increased considerably over the past decade. Cereals, fruit and vegetables are the most important crops.

Livestock is an integral part of the traditional rural economy throughout the country. Most of the livestock is owned by nomadic herders, and modern husbandry techniques are mainly used on a limited number of farms in the North, where special dairy and cattle raising farms have been established; poultry farms are found in both parts of the country.

Fisheries accounts for about one per cent of GDP, employing more than 16,000 people. It is especially important on the Gulf of Aden and the Indian Ocean coast; although the Red Sea is also productive. There are a total of 2,250 km of coastline and an economic exclusion zone (EEZ) of about 200 sea miles. While foreign (predominantly Soviet and Japanese) fishing played an increasingly important role during the 1980s, most of the catch was taken by the national fishing fleet, which was modernized and provided with industrial-scale vessels with assistance from the USSR. In recent years, the expansion and modernization of the artisanal fishery has been given more attention.

The Centre for Marine Research estimates fish stocks are about 1.6 million tons and total sustainable catch is between 250,000 to 450,000 tons per year. Similarly, as in agriculture, the potential of the fishery sector has remained underutilized: out of the potential production only around 100,000 tons is currently produced per year. It is estimated that the sector could grow about 10 per cent per year by taking into account the considerable potential for sea-deep fishing, interest of the private sector (including foreign investors), and proven internal and international market.

The manufacturing sector in both parts of the country is dominated by food processing and has been based mainly on import substitution. Food processing and fisheries account for 52 per cent of the value added and 32 per cent of employment. The contribution of other subsectors in terms of value added is: building materials (16 per cent), chemicals and plastics (15 per cent) textiles and clothing (3 per cent) and others including metal and equipment (13 per cent).

The strong position of food processing in the North is partly explained by the key role of agriculture in the economy, partly by the relative weakness of the other branches. The relative strength of the building materials industry is, a.o., explained by the good domestic raw material basis. In the South, the food processing industry has lost ground to the chemicals and - to a lesser extent - wood and paper industries. The growth of the chemicals industry is not (as might be expected) related to that of oil refining, the branch being largely dependent on imported inputs, using apparently no locally produced petrochemicals at all. The wood and paper industry is also heavily dependent on imports. The background for the growth of the chemicals branch is to be found in the different development approach followed by the South in

the past, which tended to favor capital-intensive projects, and these are relatively common in the chemicals branch.

Most of the manufacturing enterprises are owned by the private sector. There are 199 enterprises employing more than 10 people of which two thirds operate by the private sector. In 1989 they produced one third of the total output of industrial production. In terms of manufacturing value added, the private sector accounts for about 70 per cent; the public sector 20 per cent; the mixed and the cooperative sectors the remaining 10 per cent.

3. Food Processing Industries

a. The Raw Material Base

A remarkable phenomenon in North Yemen during the 1980s has been the decline of cereal production. The problem is mainly one of declining sorghum and millet production, crops which have suffered badly from several years of drought during the past decade. Production has been recovering, but meanwhile the deficit has been covered by cheap imports of cereals with which traditional production could not compete, and a large number of farmers has switched to more remunerative crops. In the South, cereal production has increased during the 1980s, but there is no indication that there is enough of a surplus over local consumption to cover the shortage in the North.

The North was successful in increasing output of fruit and vegetables. By the end of the 1980s, these crops were more important in agricultural production than cereals, although not all individual crops have been doing equally well. Much of the increase was at the expense of cereal production, and made possible by the increase in the number of tube wells. Because of the perishable nature of these crops, and the long distance to the nearest foreign supply sources, domestic producers have something of a monopoly, which has been strengthened by Government bans on imports. The inefficiency of the transport, storage and trade system further increases the price of fruit and vegetables. Infrastructural improvements and liberalization could probably do much to bring down the prices of agricultural raw materials in the North.

High prices are also a problem in the South, where only two crops have been found internationally competitive - onions and potatoes (UNIDO 1989a). Growth in the fruit and vegetables sector has been less rapid than in the North, and a basic input for the food processing industry, tomatoes, actually registered a sharp decline. On the whole, however, there has been a clear upward trend in production, which was particularly marked in the case of onions. As in the North, the sector is handicapped by storage and transport problems. Both in the North and in the South there is some modern large-scale production of vegetables, in the North on special horticultural farms, in the South on state farms. Few cash crops are grown for the food processing industry, with the exception of coffee and sesame, which are cultivated in modest quantities both in the North and the South.

In both parts of the country, only a fraction of the livestock production is marketed, most of it being consumed locally. In the North, red meat production has not kept pace with the expansion of the population, but the volume of meat imports has been kept down by an almost tenfold increase in poultry production since 1980. Poultry production has proved to be very profitable here, and a new poultry farm with a yearly capacity of almost 30

million was to become operational in 1989. The export potential to the sub-region is being explored, and there is an unsaturated demand in the North of the country. Production of red meat is expected to increase rapidly in the near future as new, intensive production methods are being adopted, and specialized livestock farming is being introduced.

With a far less favorable environment for livestock production, the output of the South is far lower. There is as yet virtually no commercial livestock farming, and there is a heavy dependence on imports. Poultry farming expanded rapidly in 1980s, but declined sharply in the beginning of 1990s. The South does, however, have considerable fisheries potential. The annual sustainable catch has been estimated at 450,000 tons. Only a fraction of the total potential is being exploited at present. The situation is different for the high value species, such as cuttlefish and shrimps. The decline in catch may well be a consequence of overfishing, and further research on marine ecology and fish stocks is essential to determine long-run optimal exploitation rates. Most of the catch, however, consists of low value fish such as mackerel and sardines. With an upgraded artisanal fishing fleet and the commissioning of a further fourteen deep sea vessels, a total production of approximately 106,000 tons was expected in 1990. About one-half of the catch was consumed in the country; little of this consisted of high value species, which are virtually all exported. Foreign factory vessels account for most of the exports.

b. Characteristics of the Sub-sector

The food industry sub-sector is relatively important in the industrial sector in Yemen, representing almost half of the value added production. This maybe also due to weaknesses in other sectors. The most important food processing industries are bakeries, biscuit industry, flour mills, certain processed fruit and vegetables products, beverage factories and milk (Table 2). Meat processing is non-existent.

Total milk production in 1990 was 149 million litres which gives 10 litres per capita consumption per annum. The industry is totally dependent on imported milk powder and packaging materials.

In the food processing sub-sector in the South, the production of aerated water and beer accounted for 75 per cent of value added in 1988 (the analysis only refers to formal sector enterprises under the Ministry of Industry, Trade and Domestic Supply). The two industries (in fact: two enterprises) have dominated the sub-sector since 1985. In terms of output, the public grain milling corporation is of a size comparable to the two factories in the beverages branch, but both its output and its MVA have decreased continuously during the 1980s; its MVA is now only a fraction of that in the beverages branch. In MVA terms, the biscuit and sweets factory, the bakeries, the tomato paste factory and the spices factory are also of importance. The strong MVA fluctuations in many factories are conspicuous. They are usually related to raw material supply problems.

Employment is not as heavily concentrated as MVA: The beverages branch accounted for 36 per cent of sub-sector employment - the aerated water plant is the largest industrial enterprise in the sub-sector. Factories employing more than 100 persons are found in beverages, dairy products, tomato paste manufacturing, grain milling and bakeries. Most of these large factories,

Table 2. Quantity of Industrial Production in 1990.

FOOD INDUSTRIES	
Bread	10,500 tons
Biscuits	65,400 tons
Ghee & Edible Oils	80,600 tons
Spices	68,2 tons
Broad Beans (canned)	14,326 tons
Potatoes	266 tons
Beans	5,397 tons
Green Peas	4,809 tons
Tomato Paste	3,083 tons
Fish Canned	702 M.Pkt.
Macaroni	1,879 tons
Cereal	1,398 tons
Milk & Products	67 M.lit.
Cheese	11 tons
Vermicelli	579 tons
Flour	207,900 tons
Bran	72,200 tons
Sago	29,900 tons
SOFT DRINKS & ICE	
Soft Drinks	63 M.lit.
Mineral Water	117,100 Cub.M.
Distilled Water	943,700 Cub.M.
Ice	45,200 tons
Beer	5 M.lit.
Vimto Drinks	2,196 tons
Ice Cream	1,305 tons
Fruit Syrup & Products	69 M.lit.
Tea	10,064 tons

however, show low value added rates per worker, even if output per worker is sometimes high. The highest MVA/worker in 1988 was actually observed in the spices factory, which is a small-scale operation.

There are also two fish canning plants in South Yemen which were not included in the statistics of the Ministry of Industry, Trade and Domestic Supply. The combined production value of these was YD 2.3 million in 1985, YD 2.0 million in 1986 and YD 2.4 million in 1987. In terms of output, they are comparable in size to the other large food processing enterprises. Their present contribution to MVA and employment could not be established. The output represents only 2 per cent of the catch. The products are low value mackerel, tuna and sardines, all of which are sold in the domestic market. Costs are high because - fish expepted - all materials are imported.

The following details were available on individual factories in South Yemen:

- Public Corporation for Grain Milling

The high cost and inadequate supply of local cereals is a major

problem. Imported flour (covering 50 per cent of consumption) is cheaper than locally produced flour. The milling facility, however, is considered important for reasons of food security. The Government is studying the feasibility of an animal feed plant to make better use of the mill's by-products.

Vegetable Oil Processing

Facilities have been at a standstill for several years due to shortages of cotton and sesame seed. At the moment, cooking oil is only produced on the artisanal scale. If regular supplies of inputs could be secured, local production could substitute expensive imports. By-products could again be used in the animal feed industry.

Industrial Bakeries

Those in Aden have found it very difficult to compete with small-scale bakeries, as a consequence of low quality and poor marketing and distribution networks. UNIDO suggested to improve capacity utilization through product diversification, but has had no long-term success. Production and management skills and better understanding of the market would be required to improve performance.

Biscuits and Sweets Factory

This new factory works at capacity, and production will probably expand. Although completely import-dependent (equipment, raw materials), the factory is thought to save considerable amounts of foreign exchange. Technical assistance is required for the time being to operate the factory.

Tomato Paste Factory

The factory has had great problems in securing domestic raw materials, as a consequence of both transport and agricultural production problems. The plant usually dilutes imported concentrate, which is then packaged. It is contemplated to establish new production facilities closer to the growing areas.

Public Corporation for Dairy Products

This factory mainly uses imported raw materials and packaging materials and is operating at a loss. There is, however, quite a large market for dairy products. If ways could be found to increase local milk production and improve its transport and storage, and if packaging costs could be lowered, then this industry could expand considerably.

National Bottling Factory

Although this factory imports all its inputs except water, it is financially successful, and the establishment of a second factory is being investigated. Production could possibly be diversified, using local fruit concentrates, and the possibility of reducing the cost of packaging materials could be studied.

National Brewery Corporation

A successful enterprise, like the soft drinks factory, which imports all its inputs. The substitution of bottles by cans is being investigated.

Food processing is one of the few areas where North Yemen has a prima facie comparative advantage since the country is the most productive agricultural economy in the Arabian Peninsula. However, industrialization has not been based on local agricultural products, but on imported raw materials. According to the 1984 Industrial Survey, 84.4 per cent of the inputs used by large-scale enterprises in the food, beverages and tobacco branch were imported - the highest proportion of all the branches of manufacturing.

In North Yemen (the survey presented on the following pages is largely based on UNIDO 1989b) the industrial production is dominated by vegetable oils and ghee (clarified butter); biscuits; flour; soft drinks, mineral water and fruit syrup; and milk. The beverages, grain and oil milling, and bakery products branches, therefore, dominate the sub-sector. Most of the major industries display vigorous output growth, with the exception of beverages, where a decline is registered after 1985.

According to the 1984 Industrial Survey, bakeries and confectionery shops generated 32.3 per cent of the food, beverages and tobacco sector's production value (and 34.2 per cent of value added). Small- and medium-scale bakeries predominate numerically - there were only 8 employing ten or more persons in the 1984 Industrial Survey - but the large bakeries and confectionery factories provide 90.1 per cent of production by value.

In recent years small bakeries have been established in the provincial towns and market centres, a new market for bread has been developing. There is a danger, however that entrepreneurs, seeing the success of existing bakeries, will duplicate these investments without the preparation of adequate market studies leading to over-capacity.

Output of the two biscuit and confectionery factories established in 1971 and 1977 has increased even faster than that of bread, rising from 15,000 tons in 1978 to 56,400 tons in 1987. Much of this increase may be accounted for by the success of these two enterprises in penetrating export markets, in particular South Yemen. The effect of the recent opening of the biscuit factory in the South (see above) on local production is not yet known. Diversification might help the factories to maintain a high sales volume.

Enterprises based on cereal products have depended almost entirely on imported flour, at a considerable cost in foreign exchange. Flour produced from local grain, and much of the imported grain, is generally milled within the home or by small-scale mills - a 1975 survey records 6,104 small-scale mills and coffee roasters and reported that the output of cereal mills amounted to some 582,921 tons of flour. In 1985 an industrial grain mill was established in Hodeidah by a private company. The mill has a capacity of 250 tons per day and is now working at near full capacity. The flour is milled from imported grain and sold for industrial and domestic use. According to the enterprises' calculations, the plant generates a foreign exchange saving of \$20 per ton of flour produced despite its dependence on imported grain.

The development of fruit and vegetable processing industries has been

hampered by shortages of agricultural products, high prices for agricultural produce and the geographical dispersal of surplus producing regions. A tomato paste plant was established at Bajil near Hodeidah with Italian assistance during the Second Five Year Plan (SFYP). Despite its limited capacity, 3,500 tons of paste per year, the plant is operating under capacity, 1,253 tons in 1987, due to inadequate supplies of tomatoes (as in the South). The problem of limited and unreliable raw materials supplies has been resolved by diversification of the product lines. The plant now processes canned beans and peas.

This sector is one of the few ones, where production could be based on local raw materials and this makes it the most important subsector of Yemen's agriculture. Before this can be done a lot should be accomplished to ensure a steady flow of good quality raw material. Large amounts of produce are wasted due to poor post harvest facilities, lack of marketing channels and transport. Local industry apparently has no organized purchasing system, the surplus is bought when found and needed. As a result, farmers are hesitant to produce more. The company supplying the army, MECO, makes contracts with individual farmers to buy their production of potatoes and some fruits and vegetables.

The production of fruit juices and concentrates from locally grown and imported grapes, mangoes, pineapples, limes and oranges has been a spectacular success. Output of fruit syrups has increased steadily from 15.8 million liters in 1983 to 72 million liters in 1987. Manufacture of these products is dominated by large enterprises which use imported packaging materials, concentrates and, where prices are favorable, imported fruit. Problems that still must be solved include an adequate distribution system and more reliable supplies of packaging materials.

The processing of livestock products suffers from several constraints. There are three main abattoirs at Sana'a, Taiz and Hodeidah, but no meat packaging or processing facilities. Methods of butchering and distribution are primitive and unhygienic. The dairies and ice cream factories that have proved successful in recent years are largely based on imported raw materials, such as milk powder, and packaging materials. Although a number of commercial dairy farms have developed, their milk is distributed fresh rather than delivered to the processing industry. A number of new product lines, such as yoghurt and floured milk, have been introduced by companies trying to build up their market share.

Mineral waters and soft drinks have proved one of the most dynamic elements in the food, beverages and tobacco branch in terms of private sector investment, but production seems to be reaching a saturation point and the South (see above) has its own production facilities.

An area which offers considerable potential for import substitution is the production of vegetable oils and fats. Imports of vegetable oils and fats amounted to YR 173.8 million in 1987. In the same year, the Yemen Arab Republic exported YR 13 million worth of oil seeds, mostly sesame. Local production of vegetable oils is largely an artisanal operation. An attempt was made to establish an industrial oil press at the textile mill in 1975, using cotton seed, but the plant foundered, primarily due to shortages of raw materials. Rehabilitation of the cottonseed mill could be considered, though the mill cannot produce high quality, refined oil and a bleaching, deodorizing and packaging line would have to be built. It is doubtful, however, whether

the current supply of cottonseed would merit the reopening of the plant. An alternative is to import soya beans, though a new oil mill would have to be built since the extraction procedure is raw material specific.

Attention has, therefore, turned to the higher value sesame seed oils, which are currently produced by small-scale mills. Sesame oil is widely used in Yemeni cooking and would have export potential. A sesame oil mill was under construction during the Third Five Year Plan (1987 - 1991). The main problem will again be to secure a reliable and adequate supply of raw materials.

e. Trade in Food Products

Food, beverages and tobacco accounted for 34.0 per cent of North Yemen's imports in 1987, and for 28.3 per cent of South Yemen's. The difference on the export side is quite marked: while in North Yemen, food, beverages and tobacco accounted for 72.4 per cent of all exports, their share in South Yemen's exports (while still substantial) was no more than 40.5 per cent, down from 59.5 per cent in 1980. The main reason is the strong growth of oil exports. The main processed food category exported by North Yemen was probably biscuits, exported to South Yemen. As indicated above, these exports may have gone down after the South Yemen biscuit factory became operational in 1988. In the case of South Yemen, frozen fish was probably the most important processed food export.

Food imports dwarf exports in both countries; in the North, exports were no more than 7.5 per cent of imports in 1987. Cereal products and unprocessed cereal (which serves as an input for the local grain mills) were the most important import category.

Given the meager arable land resources of the South, the heavy predominance of food imports over exports was probably not avoidable. In the case of North Yemen, however, a better balance would have been possible if the relatively good agricultural resource base had been exploited more efficiently. The unification of the two parts of the country naturally resulted in a different trade pattern (Table 3), and it should be possible to reduce imports by improving the performance of the North's food industries.

Table 3. Agricultural Imports and Exports in 1990 (YRm).

	Imports	Exports
Meat	186	1
Dairy Products	934	4
Cereals	3043	10
Fruit and Vegetables	368	98
Sugar	1132	9
Coffee and Tea	229	119
Tobacco	417	87
Hides and Skins	0	172
Oil Seeds	36	2
Crude Fibres (incl. cotton)	11	51
Animal/Vegetable Material	21	

4. Policy Framework and Support Infrastructure

a. Development Policy Orientations

The present industrial structure has partly been shaped by a project-by-project approach to manufacturing development in both the North and the South. This approach is partly responsible for the weak linkages between enterprises and between the manufacturing sector and the domestic raw material base - a weakness which is quite obvious in the food processing industry.

In recent years, the approach has been changing. In the North, the Government formulated an industrial strategy as part of the Third Five Year Plan, which emphasized domestic resource-based industries and linkages between industries, maximizing domestic value added. Special attention was to be paid to small-scale industry, as being better suited to the development conditions of the country. Better spaced distribution of industries was to stimulate linkages between manufacturing and the local raw material base, and to provide employment and raise living standards in several areas. The support infrastructure and training were to be improved.

Private enterprise was to play the lead role in industrial development, and an indicative list of investment projects for the period was drawn up. Out of 155 projects, 16 were in food processing. Otherwise, the emphasis was to be on consolidation and rehabilitation of existing industries. It is not known to what extent the strategy has been implemented, but the drawing up of a rather detailed list of priority projects seems to contradict the lead role for private enterprise.

The South did not formulate an industrial strategy, but under its Third Five Year Plan (1986 - 1990) the emphasis did change from relatively unplanned expansion to consolidation and rehabilitation of existing enterprises. Most of the new investment was to be left to private enterprise, but by improving the performance of public enterprises, the public sector was to retain its lead role.

In the future, development policies are to stress agricultural development and resource-based industries. Fish canning is specifically mentioned as a growth industry. Otherwise, the new development policy announced in July 1990 takes up some of the older issues: better linking of industries and stimulating the private sector. A unified investment code was finalized in 1991. It is more liberal than the very strict codes that applied in both parts of the country.

It is not known to which extent the existing incentive system will be changed. In the recent past, the industrial sector has been the main recipient of customs duties and tax exemptions in the North, with food processing industries among the leading beneficiaries of customs duties exemptions in the industrial sector. Foreign exchange to purchase imported inputs has, however, been scarce. High tariffs and complex import licensing have protected the food processing industry against competition and are partly responsible for, on the one hand, the inefficiency and, on the other, the low capacity utilization of many enterprises (UNIDO 1989b).

b. Relevant Government Agencies

The Ministry of Agriculture and Water Resources operates through three divisions: plant and livestock production, water resources, finance and general administration. The organizational structure is centred on 17 Director Generals, nine of whom have technical focus. To support agricultural development in the regions, Regional Development Agencies have been established within the Northern governorate in addition to the existing agricultural offices in Southern governorate.

Before unification, public fisheries activity was very weak in the North and was part of the Ministry of Agriculture; in the South the Ministry of Fish Wealth was more active, with donor support, geared to industrial production. The main responsibility rests now with the Ministry of Fisheries (headquarters in Sana'a) but most operations are still in Aden.

The main responsibility for industrial policy lies with the Ministry of Industry. It has research departments in Sana'a and Aden. However, they require equipment and data to be more effective.

c. Physical Infrastructure

The total main road network had a length of some 2,500 km in 1987. Not all urban centres were connected by all weather roads yet, and the feeder road network - imported for, a.o., transporting agricultural raw materials - is still relatively underdeveloped. The main ports, Aden and Hodeidah, are undergoing major expansion. Aden remains the major port, being provided with berths for ships up to 120,000 dwt. Telecommunication services are still rather poor in both parts of the country, especially in the countryside. There is an industrial estate at Sana'a in the North, and one at Marsana in the South. An EPZ at Aden port is at the pre-feasibility stage. The country suffers from a lack of industrial sites with adequate utilities.

Electric power is the main source of energy for modern industries; in the South oil is also important. In the North, electricity generation largely depended on imported oil. With the unification of the country, and on-going oil and gas exploration, a high degree of self-sufficiency in energy would seem possible. In rural areas, especially in the South, access to electricity is as yet limited.

Water is a limited resource, and the quality of water has been decreasing, especially in the North, as a consequence of overexploitation of sweet water reserves. A desalinization plant was to become operational in the South in 1989, and would partly solve the problem.

d. Industrial Services

In the North, the Government-sponsored Yemen Bank for Reconstruction and Development (YBRD) is the most important source of credit to the private sector. However, most of its lending is short-term, and credit extended to the manufacturing sector is largely limited to the provision of working capital to large-scale enterprises.

Medium- and long-term finance for industrial projects is mostly provided

through the Industrial Bank of Yemen (IBY) and the Yemen Company for Investment and Finance (YCIF); the YBRD holds 99.5 per cent of its shares, the IBY the remainder. Between 1977 and 1987, food industries accounted for 18.7 per cent of IBY loans, making the sub-sector the second largest borrower of IBY. In spite of conservative lending strategies, with securities exceeding the value of the loans, arrears on IBY loans are common - evidently the lack of an industrial tradition causes entrepreneurs to underestimate the difficulties of long-term operations. The YCIF does not only lend to industry, although most of the loan applications come from the manufacturing sector. Food processing accounted for 12.3 per cent of the loans in 1981-1987; about half of the YCIF's loans are extended to agriculture and the chemical industry. The YCIF also pursues a cautious lending strategy and it has been more successful than IBY in keeping arrears down. IBY and YCIF have always been oriented to medium- and large-scale enterprises, but a Small Enterprise Development Unit was being set up by IBY in 1990.

Small enterprises have so far depended on self-financing or lending from moneylenders at exorbitant rates. The UN Capital Development Fund and the Netherlands Government formulated a project to improve the credit facilities for this sector. Its implementation was to start in late 1989. It is not known what the impact of the unification of the country on this project was.

The South had only one bank providing credit, the National Bank of Yemen (NBY). Most of its funds were used for loans to public enterprises, with a rather low share for industry (10.8 per cent of the total in 1987); the share of food processing industries is not known. Private enterprises basically rely on self-financing. The consequences of the unification of the country for the banking sector are as yet unclear.

Both the North and the South have Chambers of Commerce which - in spite of serious human resource problems - provide certain support activities. Most of these concern licensing and tax problems.

UNIDO has provided industrial advisory services to Yemen (including counterpart training and the identification of enterprises to be supported in such areas as operations, quality control and marketing), and has helped to establish a quality control laboratory for food products in the North. In spite of these efforts, the country still lacks industrial support services in almost every area.

e. Human Resources

Literacy rates are probably still low, given the fact that in the North 57.9 per cent of the males and 92.5 of the females were illiterate in the mid-1980s. In the South, the overall illiteracy rate was 62 per cent in 1983 (no breakdown by sex was available). Participation in job-oriented education and training is low: in 1986-87 commercial, technical and agricultural secondary education accounted for 0.2 per cent of all enrollment in educational establishments in the North, and vocational training accounted for 0.1 per cent. The 1986-87 figures for the South were somewhat better: job-oriented secondary education accounted for 0.3 per cent and vocational training for 0.8 per cent. There was no information on the participation of women in these types of education and training. The curriculum of the various institutes is not always adapted to the present needs of the economy. There was no information on special training facilities for the food processing

industry.

At the higher level, both the universities in the North and in the South have faculties of economics, science and engineering, but the curriculum appears to be theoretical rather than practical. Both parts of the country have management training institutes, which mainly provide training for civil service recruits. The National Institute for Public Administration (NIPA) in the North now also provides training to private sector employees. In 1988, a polytechnic institute was under construction in the North. Shortages of skilled manpower are aggravated by emigration, mainly to the Gulf states. It is, however, likely that skilled workers constituted a high percentage of the many workers who returned to Yemen after the levelling-off of the oil boom and the recent conflict in the Gulf. Expatriates fill many of the higher-level posts, where domestic skill shortages are particularly marked. The World Bank has suggested the establishment of a National Technical Training Board (WB 1990).

5. Related or Relevant Assistance Programmes

a. Country Specific

UNDP/UNIDO: Pre-investment Studies and Advisory Service for Priority Industrial Projects (1988 - 1991)

UNIDO/Hungary: Establishment of a Food Testing and Quality Control Laboratory in the Republic of Yemen (1990)

b. Regional

Selected References

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	AFGHANISTAN	BANGLADESH	BHUTAN	CAMBODIA	KIRIBATI	LAO	MALDIVES
GENERAL AND ECONOMIC -----							
Geographic	landlocked	maritime access	landlocked	maritime access	island	landlocked	island
Total Population (1000)	16120	107000	600	9000	80	4050	214
Employment (%) of active labour force							
- agriculture	66	54	78	90	6	72	30
- industry (manufacturing)	N/A (11)	10			5 N/A	6	
Contribution to GDP (1989)							
- agriculture	63	35	45	40	39	70	24
- industry (manufacturing)	24	16.5 (7.4)		25	2	4 (3.2)	6
GDP per capita US\$ (1989)	105	190	425	63	470	180	451
MVA per capita US\$ (1989)	N/A	13.5	13	7	N/A	N/A	

FOOD-PROCESSING INDUSTRY -----							
Imports US\$ (000's)	unknown	some	some	some	some	some	some
Exports US\$ (000's)	unknown	growing	important	some	important	little	important
Substitution potential	good	good	low	good	none	good	limited
Employment	6,000	950,000	1,000			1000 (est.)	
MEDIUM-, LARGE-SCALE ENTERPRISES -----							
Number	3-4	20-25	2	2	1	2-3	1
Type	state	state/private	state	private	state	state/private	state
Employees	unknown	25,000	500		200	N/A	2500
Research&Development	none	available	limited	none	none	none	none
Technical Linkages	unknown	available	limited	limited		limited	available
Raw Materials							
- local	shortage	some	some	some	plenty	some	plenty
- imported	none	limited	some	none	none	some	none

	AFGHANISTAN	BANGLADESH	BRUTAN	CAMBODIA	KIRIBATI	LAO	MALDIVES
- quality	unknown	poor				poor	
- availability	low	limited	limited	limited	limited	limited/regional	plenty
Technology	limited	modern	average	old	limited	limited	modern
Equipment/Processes	average	average	average	old	average	average/few	modern
Quality Control	unknown	available	available	limited	none	N/A	available
Sub-contracting	unknown	available	none	none		limited	none
Product Mix	unknown	good	good	limited		limited	
Product Quality	unknown	average	average	average	average	average	good
Production Capacity	medium	medium	medium	small	small	low	medium
Capacity Utilization	very low	60-70%	high	low	low	low	high
Market:							
- domestic/export	domestic	both	both	both	export	domestic	export
- strategy	unknown	both	both	none	none	export/long-term	quality
- competitiveness	unknown	average	low	average	low	weak	limited
SMALL- AND COTTAGE-SCALE ENTERPRISES							

Number	unknown	5,500	36	several	5-10	few	several
Type	private	private	mixed	private	private	private	private
Employees	unknown	1037,000	500	unknown	unknown	N/A	unknown
Raw Materials							
- local	shortage	mainly	some	mainly	mainly	mainly	only
- imported	difficult	limited	some	limited	limited	limited	none
- quality	unknown	varying				varying	good
- availability	problematic	limited	limited	limited	limited	fair	plenty
Technology	unknown	mixed	mixed	old	simple	mixed	simple
Equipment/processes	unknown	reasonable	reasonable	old	simple	reasonable	simple
Quality Control	unknown	not common	not common	none	none	not common	limited

	AFGHANISTAN	BANGLADESH	BRUTAN	CAMBODIA	KIRIBATI	LAO	MALDIVES
Product Mix	unknown	good	limited	limited	limited	limited	
Product Quality	unknown	average	average	average	good		average
Production Capacity	unknown	large	small	small	small	small	medium
Capacity Utilization	low	low		low		low	
Market:							
- domestic/export	both	export	both	both	export	domestic	export
- strategy	unknown	some	some	none	none	some	none

ESSENTIAL SERVICES

Power	poor	problematic	good	poor	limited	limited	limited
Water	weak	limited	available	weak	limited	promising	poor
Transportation	difficult	difficult	difficult	difficult	difficult	difficult	difficult

HUMAN RESOURCES

AVAILABILITY OF LABOUR

Skilled Workers	limited	limited	limited	limited	limited	limited	limited
Unskilled Workers	large	large	limited	large	limited	large	limited

SKILLS

- technical	limited	limited	limited	limited	limited	limited	limited
- managerial commercial	limited	medium	limited	limited	limited	limited	limited
Training Facilities	limited	medium	limited	limited	limited	limited	limited

POLICY -----	AFGHANISTAN	BANGLADESE	BRUTAN	CAMBODIA	KIRIBATI	LAO	MALDIVES
Trade	conducive	conducive	conducive	conducive	conducive	conducive	conducive
Promotion of Small-Scale	conducive	conducive	growing	starting	conducive	starting	starting
Public Investment in Enterprise	declining	important	declining	declining	limited	declining	important
Investment Promotion (Private Sector)	conducive	conducive	growing	starting	conducive	starting	starting
Financial Support	problematic	limited	available	problematic	limited	limited	none
Utilization of Local Raw Material	good	good	good	promising	limited	promising	good
RAW MATERIALS -----							
	wheat nuts vegetables sugarbeet oranges grapes livestock	rice wheat sugarcane potato fish shrimps tea pine apple banana mango jackfruit livestock	rice wheat potato mustard beans oranges apples cardamom chillies	rice maize beans groundnut tobacco fish shrimps livestock	coconut fish toddy banana pandanus seaweed	rice sugarcane tubers livestock coffee cardamom orange pine apple	fish

	MYANMAR	NEPAL	SOLOMON ISLANDS	TUVALU	VANUATU	WESTERN SAMOA	YEMEN
GENERAL AND ECONOMIC -----							
Geographic	maritime access	landlocked	island	island	island	island	maritime access
Total Population (1000)	40000	19100	305	9	150	162	13000
Employment (%) of active labour force							
- agriculture	65	90			80	80	70
- industry (manufacturing)	9					2	10
Contribution to GDP (1989)							
- agriculture	48	60			24	50	28
- industry (manufacturing)	9	6			12 (6)	6	17 (11)
GDP per capita US\$ (1989)	200	180	1223	556	307	600	600
MVA per capita US\$ (1989)	21	6			75		N/A

FOOD-PROCESSING INDUSTRY -----							
Imports US\$ (000's)	some	some	some	some	important	important	substantial
Exports US\$ (000's)	substantial	limited	substantial	some	substantial	substantial	little
Substitution potential	good	good	low	low	average	average	good
Employment				some	440	750	125,000
MEDIUM-, LARGE-SCALE ENTERPRISES -----							
Number	250	260	2-3	N/A	2-3	5	30-32
Type	state	private	private	N/A	private	private	mixed
Employees		10,000		N/A			25,000
Research&Development	weak	some	none	N/A	none	none	weak
Technical Linkages	available	limited	limited	N/A	limited	limited	limited
Raw Materials							
- local	mainly	mainly	mainly	N/A	mainly	only	limited
- imported	negligible	some	negligible	N/A	some	none	significant

	MYANMAR	NEPAL	SOLOMON ISLANDS	TUVALU	VANUATU	WESTERN SAMOA	YEMEN
Product Mix	large	limited		limited	limited	limited	limited
Product Quality	low	low				good	average
Production Capacity	low	low	low	low	low	low	low
Capacity Utilization	low	low				medium	low
Market:							
- domestic/export	both		export	export	both		both
- strategy							some

ESSENTIAL SERVICES

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Power	limited	limited	average	limited	limited	average	average
Water	limited	limited	limited	limited	limited	average	limited
Transportation	difficult	difficult	average	difficult	difficult	average	difficult

HUMAN RESOURCES

=====

AVAILABILITY OF LABOUR

Skilled Workers	medium	limited	limited	limited	limited	limited	limited
Unskilled Workers	good	good	good	limited	good	good	good

SKILLS

- technical	limited	limited	limited	limited	limited	limited	limited
- managerial/commercial	limited	limited	limited	limited	limited	limited	limited
Training Facilities	limited	limited	limited	none	limited	limited	limited

POLICY -----	MYANMAR	NEPAL	SOLOMON ISLANDS	TUVALU	VANUATU	WESTERN SAMOA	YEMEN
Trade	changing	conducive	conducive	conducive	conducive	conducive	conducive
Promotion of Small-Scale	starting	conducive	starting	conducive	starting	conducive	starting
Public Investment in Enterprise	declining	declining	declining	limited	declining	declining	declining
Investment Promotion (Private Sector)	starting	conducive	conducive	conducive	starting	conducive	starting
Financial Support	limited	limited	limited	limited	limited	limited	limited
Utilization of Local Raw Material	good	good				limited	limited

RAW MATERIALS

rice	rice	coconut	fish	coconut	coconut	sorghum
sugarcane	wheat	rice	coconut	cocoa	cocoa	wheat
pulses	maize	fish		roots	taro	potato
wheat	oilseed			fish	livestock	tomato
groundnut	pulses			livestock	fish	onion
onion	fruit					grapes
potato	vegetables					livestock
spices	livestock					fish
livestock						lobster
dairy						
fish						
shrimps						