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SPECIAL PROGRAMME FOR THE INDUSTRIAL DEVELOPMENT OF ASIA AND THE PACIFIC:

COUNTRY BRIEFS ON AGRO-RELATED METALWORKING INDUSTRIES IN THE LEAST DEVELOPED COUNTRIES IN THE ASIA AND PACIFIC REGION

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

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Introduction

The Fifth Session of the Industrial Development Board of UNIDO, held in July 1989, adopted a decision on a Special Programme for the Industrial Development of Asia and the Pacific (IDB.5/Doc.23), with special emphasis on the then thirteen (at present twelve) least developed countries (LDCs) in the region. The General Conference of UNIDO, held in November 1989, endorsed this programme under resolution GC.3/Res.18 requesting the Director-General to strengthen the existing programmes of UNIDO and additional programmes to be agreed upon between member states of the region and UNIDO, in the following priority areas:

(a) Development of manufactured exports industries;

(b) Strengthening the industrial structure and sectoral interlinkages;

(c) Development of small-scale industries;

(d) Development of agro-based and allied industries;

(e) Development of national capability in design technology of plants, engineering and fabrication of machineries as well as the acquisition and development of main systems in electronic industry;

(f) Development of human resources with special emphasis on the training of industrial managers and entrepreneurs;

(g) Development of new frontier technologies and development of easy access to environment-friendly technologies.

In line with the Resolution and bearing in mind the resource limitations calling for prioritization, the UNIDO Secretariat proposed to start the elaboration of the Special Programme on agro-related metalworking industries, to be followed, funds permitting, by food-processing industries.

The priority areas in agro-related metalworking industries were identified as being:

i) agricultural tools and implements,

ii) agricultural machinery and

iii) post-harvest processing equipment.

The elaboration of this sub-sector was started with a detailed desk study carried out by a specialized consultant and an Associate Expert assigned to work on the Special Programme.

To formulate the first concept on agro-related metalworking industry, the methodology adopted was to review selected and relevant information, nationally and regionally, originating from UNIDO and other agencies/relevant programmes. This was undertaken for each of the Asian and Pacific LDCs, with a view to identifying the status of agro-related metalworking industries in the respective countries. The sphere of activities covered were those directly associated with, or related to, the provision of agro-related metalworking industries to support farm level activities necessary for crop production, harvesting and post-harvest processing. This was considered a fundamental necessity in order than an overview of the current position could be determined and, simultaneously, identify information gaps and potential constraints likely to inhibit the development of this sub-sector of the Programme. This review drew on available literature, reports, database sources and consultations with UNIDO staff.

The draft country briefs prepared during January - May 1990 were sent to all the concerned countries for comments together with a position paper on proposals for the development of this sub-sector and an invitation to a regional workshop on the same. Another consultant was sent to Afghanistan, Bangladesh, Lao PDR and Myanmar in August - September 1990 to identify concrete project proposals and to discuss with local experts.

Consequently, a joint UNIDO/ESCAP Regional Workshop on Agro-related Metalworking Industries was organized in Bangkok, Thailand, 12 - 15 October 1990 with the participation of nine LDCs from the region, namely: Afghanistan, Bangladesh, Kiribati, Lao PDR, Myanmar, Nepal, Samoa, Vanuatu and Yemen. During the workshop concrete recommendations were made on how to develop the sub-sector further through policy decisions, technical assistance, capital investment, joint ventures, ECDC/TCDC, etc. A separate report on the workshop has been issued by UNIDO. Close co-operation has been and will be ensured with relevant other agencies, particularly with FAO and the ESCAP-executed project for a Regional Network for Agricultural Machinery (RNAM).

The present document contains the country briefs, drafted originally at UNIDO during January - May 1990, but updated partly substantially on the basis of the information collected during the consultant's mission in August - September 1990 and during the regional workshop in October 1990, 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-related metalworking industries in the least developed countries in the Asia and the Pacific region.

AFGHANISTAN - Republic of Aghanistan

1. Summary

It appears doubtful whether positive growth rates in GDP have been achieved during the 1980s. Considering its share of the labour force, agriculture is relatively productive, although its growth has been low over the last decade. Industry is growing fast despite civil unrest, labour shortages and despite outdated and under-utilized capacity.

Although large State-run enterprises have been given priority by the Government. private and small-scale industries have lately received certain advantages which have been eagerly used by the beneficiaries. However, support to industry is largely insufficient, such as financial institutions and training facilities.

The extent to which agro-related metalworking industries function is not determinable, nor is the general supporting information to assess the overall perspective and the capabilities of these industries to meet the needs of the sector. A two tier structure in this sector is apparent, comprised of both the formal manufacturing and artisan cum village industries.

The constraints on the manufacturing sector, normally evident in a least developed country, have been compounded by ten years of conflict resulting in acute shortages of labour, raw materials, spare parts and essential service facilities. Nevertheless, the current attitude appears positive and the need to rehabilitate both agriculture and industry would appear to offer opportunities, at this stage, to provide an integrated linkage through the agro-related metalworking industries.

Further collection, collation and analysis of data is required to supplement the limited, and often conflicting, base-line data available at present.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

UNCTAD (1989, annex) quotes an average annual growth of real GDP of 2% over 1980-1986. It was reported (UNIDO, August 1988, pp.2) that the UNDP considers GDP growth to have been at an average of -1.0% annually during 1986/87-1988/89. UNIDO reports that agricultural growth was only 1% per annum in 1980-1987, and 1.2% in 1970-80 (Table: 2). Industry has done relatively better, and grew by an average yearly rate of 6.9% over 1970-1987, with a marginal increase over the last seven years (Table: 2). Growth in manufacturing proper is estimated by the UNDP to have reached almost 5% annually from 1978/79 - 1986/87. According to the UNDP (July 1989, pp.6), about 60% of the industrial output of the country is generated by Soviet assistance projects.

Per capita GDP was US$ 231 in 1987 (Table:1), whilst another source (UNIDO, 17 October 1989, pp.1) quotes US$ 130 as the per capita in 1986/87, In spite of the war, GDP per capita growth was 3.5% on average from 1981 to 198 , whilst it was only 0.8% from 1970 to 1980 (Table: 2).

b. Contribution to GDP

Agriculture accounted for 65% of GDP in 1987 (Table: 3), having fallen quite regularly from approximately 75% in 1970. Industrial activities are overwhelmingly agro-based and hence dependent on the performance of the agricultural sector. From 1985 to 1987, industry contributed about 20% of GDP, having grown with an annual rate of 7.7% from 1981 to 1987 and of 6.4% from 1970 to 1980 (Table: 2). In 1989, manufacturing is estimated (UNIDO, October 1989, pp.2) to have represented 12% of GDP. This contribution could easily be doubled within ten years, if manpower shortage were not so acute.

The war has created serious constraints to industrial development in terms of shortage of labour force, emigration, destruction of physical infrastructure, interruption of raw material supply and spare parts, freeze on joint ventures, etc. Despite these problems, most entrepreneurs and

industrialists have managed to keep their businesses running (UNIDO, February 1990, pp.2).

The manufacturing sector is composed essentially of food and beverage production, textile and chemical industries. Manufacturing activities are undertaken mostly on a small scale and based on the processing of locally available resources. It is reported (UNIDO, February 1990, pp.3 and 22) that handicrafts and cottage industry are responsible for about 6 to 7% of GDP. Another source (UNIDO, August 1988, pp.4) reports that production occupies approximately 20-25% of installed capacity, due to the combined effect of an irregular supply of imported raw materials, as well as electricity and labour shortages.

Private sector industry acccunts for more than 53% of the country's industrial value added and it is anticipated that the private sector industry will grow with a rate of 3.3%, as a result of the new policy for development of the sector.

c. Employment by Sector

The total population of Afghanistan, including five million currently living abroad, is estimated (UNDP, July 1989, pp.1) at 17.0 million. It is reported (UNCTAD, 1989, Annex) that 57% of the Afghan active labour force is engaged in agricultural activities. In 1979 it was estimated (ILO, 1986, pp.199) that manufacturing accounted for about 11% of the total active labour force, whilst another source (UNIDO Data Base, 21 February 1990) quotes employment in manufacturing as falling from 42,456 in 1979 to 26,478 in 1983. Figures for later years are not available. Handicraft and cottage industry is estimated to employ approximately 200,000 persons (UNIDO, February 1990, pp.22).

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

The only qualifiable data on imports, into Afghanistan, of agricultural

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: AFGHANISTAN

Indicator	Year or period	Country	South- and East Asia
GDP per capita (US$)	1970	184	373
	1975	187	452
	1980	183	499
	1986	229	580
	1987	231	601
MVA per capita (US$)	1970	...	49
	1975	...	65
	1980	...	89
	1986	...	116
	1987	...	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): AFGHANISTAN

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	1.2	2.8
	1981-1987	1.0	1.8
	1970-1987	1.0	2.8
Total Industrial Activity (incl. MVA)	1970-1980	6.4	4.7
	1981-1987	7.7	6.0
	1970-1987	6.9	3.9
Manufacturing	1970-1980	...	9.0
	1981-1987	...	7.5
	1970-1987	...	8.0
GDP per capita	1970-1980	0.8	3.3
	1981-1987	3.5	2.4
	1970-1987	1.7	2.7
MVA per capita	1970-1980	...	6.6
	1981-1987	...	5.0
	1970-1987	...	5.5

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: AFGHANISTAN

Year	Agriculture	Total Industrial Activity	GDP
	% of GDP		(million $)
1970	75.2	9.0	2507.6
1971	76.0	10.1	2386.1
1972	74.1	11.2	2344.5
1973	71.5	11.3	2610.0
1974	70.7	10.9	2734.7
1975	69.5	10.3	2878.7
1976	69.2	10.5	3022.6
1977	66.3	12.2	2814.7
1978	64.8	12.3	3054.6
1979	67.3	13.3	3029.0
1980	68.5	14.8	2945.8
1981	69.0	15.3	2981.0
1982	68.3	16.0	3032.2
1983	66.8	16.7	3153.7
1984	65.3	18.5	3204.^
1985	65.3	20.5	3195.3
1986	64.5	20.6	3326.5
1987	65.0	19.9	3393.5

Source: As Table: 1
Notes: As Table: 1

tools, implements, machinery and food processing equipment relates to the period prior to the 1978 coup. Although somewhat historical, they do provide an indication as to the level of reliance on imports in this sector. Details are provided in Table: 4. Imports have predominated over local production. The Soviet Union is the main supplier.

It is reported (Ministry of Agriculture and Land Reform, November 1990) that the General Directorate of Mechanized Services of the Ministry of Agriculture and Land Reform has from its conception in 1980 until 1990 imported some 732 Belarus tractors of 80 HPS together with their implements and has put them into operation by customs hiring through Agricultural Mechanised Units and Stations set up in 13 provinces. These tractors, together with some 178 Neva combine machines have been imported under credit from the Soviet Union. All needed spare parts for private and state-owned agro-machines, due to the absence of facilities for producing them at home, are imported from abroad.

b. Statistical Data on Local Production

There is no state, joint or private sector metalworking industry specifically producing agricultural tools and/or implements, with the exception of some post-harvest processing equipment manufactured by a large state complex, Jangalak. The present manufacturing of agro-related equipment is mainly reduced to the traditional blacksmiths' sector producing poor quality hand tools, such as spades, picks, sickles and hoes, using fuel drums metal sheet as scrap material.

c. Company Structures and Manufacturing Operations

According to a UNIDO report (1990), Afghanistan's biggest metalworking industry, the Kabul based Jangalak factory, was established in 1958 as a metalworking industry and mechanical workshop, with the share capital divided between the Government (51%) and a private local enterpreneur, who appears to be still living in Kabul. Prior to 1978 is reported[1/] to have employed some

1/ Personal discussions with Mr. R.P. Stimbre (UNIDO Consultant)

Table: 4 Import Statistics: Afghanistan - Agricultural Tools, Implements and Machinery (excluding tractors)

SITE Code	Description	1974		1975		1976		1977	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/ forestry	11,811	15,550	28,806	17,479	54,898	72,298	251,983	204,386
7121	Soil Cultivation equipment	68,760	N/A	52,626	N/A	16,932	N/A	52,383	N/A
7122	Harvesting/threshing/ sorting equipment	59,370	N/A	34,111	N/A	9,278	N/A	153,343	N/A
7129	Agricultural machinery and appliances	89,432	N/A	50,872	N/A	41,203	N/A	18,180	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

4,000 persons with over 5,000 product lines, although it had apparently accumulated a seven year backlog of orders. In 1978, the company was nationalized and thereafter substantially enlarged through Soviet financial investment and technical assistance. Its main activities could be proportionally divided in:

a) 40% manufacturing truck-mounted (18,000L) and underground fuel tanks (400,000L) for petrol and diesel;

b) 30% overhauling Kamaz truck V8 diesel engines (1,000 p.a.);

c) 20% manufacturing of parts for textile looms, printing presses and other casting and machining works;

d) 10% miscellaneous metalwork, such as aluminium cuttlery, hand tools (shovels, spades, rakes, hoes and piks), rubber and cast iron wheelbarrows and wheath threshers.

The following range was previously manufactured by Jangalak, but discontinued in :

a) 1978 4" waterpump sets equipped with Diesel engines (FRG);

b) 1980 French-designed animal drawn toolbar and implements

c) 1982 2.5" Deep well piston-type hand pumps.

In 1989, the Jangalak Factory produced 40 flat-belt tractor, PTO-driven (25 Hp) 400kg/H wheat threshers and 18 units are still for sale in the factory's premises. The 20 units of 1990's production were ordered by the Agricultural Development Bank, but will face sales problems, because the imported 1 Ton/H Pakistani-built rather similar model although substantially more expensive (300%) has much higher output and is far more reliable. The Jangalak-built wheat thresher is (i) an outdated design manufactured under (ii) very poor quality control, which are two production problems easy to improve. There seems to be a great demand for smaller self-powered (10Hp)

mobile wheat thresher-winnowers according to technical staff interviewed by the UNIDO consultant.

The current suggested status of the company is that it employs 1,440 persons with an annual turnover of Afghani 400 million, although another source (EIU, 1989, pp.62) quotes the 1979/80 turnover as being in the order of Afghani 172 million. It is the wish of the Government (UNIDO, 1990, pp.19) to transfer this public entity partly to the private sector.

It is reported (UNIDO, Oct. 1990) that the Industrial Estate of Pul-I-Charkhi, in the outskirts of Kabul is comprised of a metalworking industry, the Mayhan Felez, which is shut down due to lack of raw material.

Although not producing any type of agro-related eqiupment, one of the most successful and the largest private metalworking company in Afghanistan, is the Kabul Felez Ltd. Established in 1968, the Kabul Felez is located in town, employs more than 110 persons, including engineers, designers, marketing, sales and production staff and its main production is metal furniture and metal structure hangars.

Further information relating to company structures, manufacturing operations, process and equipment is not available, although it is noted (UNIDO, 1990, pp.12) that the Afghan Manufacturers Association has 300 active members, all private industrialists. Another apparently important group is at the artisan and cottage industry level. It is noted (UNOCA, 1988, pp.100 and 145) that blacksmiths at a village level have considerable capacity and, further, that there are 230 village industries. Basic skills exist and given better working conditions, access to raw material and training, most of the blacksmiths could produce improved hand tools, even small agricultural equipment (UNIDO, Oct. 1990).

Industry, in general, is cited (UNOCA, 1988, pp.145) at running at only 20-25% of installed capacity. The primary constraints identified (UNIDO, 1990, pp.4-5) are the acute shortage of labour, raw materials, spare parts, electricity and fuel. Even where factories have private generating capacity, fuel may have to be purchased on the black market, at up to ten times the official price.

d. Markets: Domestic and Export

Afghanistan has had a "war economy" since 1978, despite the efforts made by the successive governments to normalize it. In practical terms, this means that no reliable statistical data is available and that no medium and long term planning can be seriously done.

Most of the officials and nationals contacted by a UNIDO consultant (UNIDO, Oct. 1990) expressed a deep reservation about the outcome of the present political situation but were unanimous to say that once peace would be achieved, the agro-related metalworking industries would face great demand.

With an estimated (UNOCA, 1988, pp.99) decimation of half (150,000 pairs) the total stock of draught oxen, and the need to rehabilitate the all important agricultural sector, there is an undeniable need for a mechanization programme, although the full extent of the market potential requires further evaluation.

The Kabul AMS has a large collection of animal drawn equipment from different countries and it would be very valuable to compile all available data regarding the research and tests carried out in the last 20 years in this sector, before going into local manufacturing of animal drawn implements. As regards exports, it would not be realistic to consider such activities at this point in time.

4. Infrastructural Support

a. Policy

Industrial Policy

In the second half of the 1980s, prices and wages have been strictly controlled, and enterprises are required to adhere to physical targets set by the planning authorities. This strict control is managed by the Special Price Commission. The profit margin is determined at 10%, and enterprises are allowed to retain 50% of their profits under various schemes. It was noted

(UNIDO, August 1988, pp.2) that supply deficiencies due to the war made it almost impossible to implement the price controls at the retail level.

A report (Ministry of Agriculture and Land Reform, November 1990) informs that the State, "being aware of the importance of agriculture which is the main source of national income, has endeavoured to the best of its abilities to promote modern agricultural systems in place of traditional methods by substituting various agro-machines for the iron ploughshare and augmenting the productivity of the land, and thus liberating rustic labour for employment in industry". For this purpose, Mechanised Agricultural Stations have been set up in 13 provinces, and tractors together with their accessories, combine harvesters and other agro-machines and agricultural implements have been imported and put at the disposal of peasants and farmers. Consequently, there are at present some 732 Belarus tractors and some 178 Neva combines in operation in the state-owned sector.

UNCTAD (1989, pp.130) notes that, despite destruction and damage caused by disturbances during the 1980s, Government policies have aimed at an increased role for the industrial sector. The industrial strategy has been characterized by a clear priority for the public sector, coupled with private sector encouragement. The Government owned and mixed enterprises contributed 53% of total production in 1980 (UNIDO, August 1988, pp.2). These enterprises have benefitted from heavy investment and transfer of technology.

The Government has lately taken initiatives to develop the private sector and to facilitate the creation of new enterprises:

- 11 projects to extend and promote the private sector, involving an investment of US$ 4.3 million, were approved by the Council of Ministers in December 1987.

- Creation in 1987 of the Central Office for the Development and Promotion of Private Investment, placed under the Council of Ministers. The office has four Departments: Handicrafts and Manufacture Coordination Department; Evaluation and Feasibility Studies Department; Technical Assistance Department; and Planning Department.

- Promulgation of the Domestic and Foreign Private Investment Law in 1987 to promote joint ventures and private domestic investments.

- Creation of the First Industrial Serai (handicraft and small industry) center, with permanent supply of electricity and water, and very moderate rental, in Kabul. Two other serais are planned, of which one in Kabul will house a metal, wood and plastics workshop (UNDP/UNIDO project).

- Creation of an Industrial Park in the Pul-i-Charkhi area and its foreseen extension.

According to the Ministry of Agriculture and Land Reform (November 1990), the use of agro-machines does not have a long precedent in Afghanistan, but with the realization of the potentialities of these new implements and methods of cultivation, a marked tendency towards modern agriculture has developed amongst those engaged in the field. On the other hand, for the purpose of the further promotion of diversity in food production, production of raw material for industry, and the greater per-unit productivity of land, the State is putting a number of tractors on loan basis at the disposal of peasants, to be paid for in installments. For the further development of mechanized farming, the State has licensed the private and joint sectors of the economy (the national tradesmen) to import tractors, waterpumps and other agro-machines. Serious consideration is being paid to the further encouragement of enterprise in agriculture. Examples:

- With the improvement of the situation, the State intends to promote and encourage joint and private sector investments in production centres for agricultural tools, implements and agro-machinery;

- Due to limited mechanical (technical) service in the country, it is essential to set up technical service centres in the provinces to maintain effective use of state-owned and privately-owned agro machines in various parts of the country and keeping them operational. For this purpose, and in order to alleviate peasants' and farmers' problems in

time, the State intends to encourage private and joint sector investments parallel to State investment in this sphere;

- For the purpose of efficient technical overhauls and repairs, it is necessary to set up production centres to produce spare parts, especially rapidly wearing-out spare parts. State, joint and private investment should be given consideration in this regard.

According to a mission report (UNIDO, February 1990, pp.2), Afghanistan possesses the necessary policy and infrastructural support to develop a healthy industrial sector, but the serious constraints created by the war must first be overcome.

The outlook for the development and modernization of agriculture in Afghanistan seems very promising. Conditional to the provision of adequate funds, skilled personnel, modern agro-machines and technical service centres for agricultural tools and implements, the country will not only be in a position of self-sufficiency as regards agricultural production, but will also have surplus produce for exportation.

Trade Policy

The country's external trade and transit activities are totally dependent on the relationship with the USSR, Pakistan and Iran. The Technical Assistance Department of the Central Office for the Development and Promotion of Private Investment gives, among other services to new enterprises, authorizations for import of raw materials and machinery.

b. Financial

A serious constraint to economic development in Afghanistan is the lack of financial resources. Little information is provided on the financial system. However, a UNIDO mission has reported that the Industrial Development Bank of Afghanistan provides medium and long term credits to the manufacturing sector and, in particular, to the small and medium scale industries and to handicrafts (UNIDO, February 1990, pp.21). The Industrial Development Bank of

Afghanistan will provide entrepreneurs with loans for the development of the private sector.

c. Human

Industrial Development in the future will depend on the ability of the Government to compensate for the loss of highly qualified personnel, technicians, managers and skilled workers. A UNIDO mission report (UNIDO, February 1990, p. 7) suggests that the solution to the undersupply in skilled manpower is an increase in productivity and also mentions that the training of women for industry is to be recommended. The Ministry of Agriculture and Land Reform (November 1990) informs that there is a sufficient labour supply in the country. Although skilled manpower is inadequate, there are quite a number of skilled agricultural workers of various proficiency levels trained both inside the country and abroad who, in the event of the establishment of factories producing small agricultural tools and implements, may be put to good use, especially in the initial stages. But for the further development and expansion of such industrial plants, it will be necessary to train a number of Afghan personnel at different levels abroad.

In all places, except for Kabul, vocational training and university education are basically non-existent. In Kabul there is an engineering college, a polytechnical school and a trade school, and the number of technical institutions has been increased. Vocational training has been an important part of assistance programmes for refugees (UNOCA, September 1988, pp.132). Enrolment in vocational schools and institutes of higher education has been on the increase. There is still an undersupply of engineers, assistant engineers, technicians and supervisors. There is a need for a management training institution (UNIDO, February 1990, p. 7 and 23).

d. Technological

Information as to the current status on research and development capabilities within Afghanistan is not available. Kabul University has an

agricultural engineering department. but. again. further details are not available.

e. Services

Afghanistan is a net exporter of energy (EIU. 1989. pp.64) although it is reported (UNOCA, pp.150) that only 6% of the population has access to electricity and that 75% of the total electricity production is utilized at a community level, mainly in Kabul. As stated, industry in general suffers from frequent interruption in power supply.

Transportation has been severely impeded by the events of the last decade. It is suggested (UNOCA, 1988, pp.41) that some 70% of paved roads and 25% of the secondary road network have been damaged, representing 2,000 kilometres and 3,000 kilometres respectively. Further, that some 300 bridges have been destroyed. Being a landlocked country with no established rail network and reliance mainly on roads, vehicular access has been a problem.

5. Related or Relevant Programmes

UNDP/UNIDO: DP/AFG/85/018 "Extension Services for Industrial Serais", US$ 1,377,000, duration: 3 years, scheduled to start in the first quarter of 1990.
UNIDO: UC/AFG/88/251 "Preparatory Assistance for the Development of a Training Center for Industrial Managers", US$ 16,000, duration: 2 years, approved December 1988.

Others

USSR: "Tractor and Machinery Services Stations in Seven Provinces", US$ 4,700,000, duration 1979-indef.
Objective: Equipment, spare parts and expert services.
USSR: "Jangalak Plant Reconstruction and Maintenance", US$ 900,000, duration 1982-indef.
Objective: Equipment, spare parts and expert services.
USSR: "Nineteen Vocational Schools in Kabul and Provinces", US$ 2,250,000, duration: 1981-indef.
Objective: Provision of equipment, training audio-visual aids and appliances, machine tools and expert services.

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BANGLADESH - People s Republic of Bangladesh

1. Summary

Industrial activity has grown moderately in the 1980s, although in relative terms it has stagnated both in contribution to GDP and in its share of the labour force. About two thirds of industrial employment are situated in small scale and cottage industries.

The agro-related metalworking sector would appear to be broadly classified into two distinct groups, namely, the formal manufacturing industries and the artisans and workshops of a cottage industry level. It has not been possible to assess the contribution of these sectors in meeting local demand nor for that matter the total demand potential within Bangladesh. The full extent of this sectors capacity utilization is, equally, not available although the generally perceived low level utilization could be augmented to curtail the current level of imports as part of an import substitution programme.

In the absence of detailed current information on specific industries within this sector it is only possible to emphasize the general constraints applicable to industry as a whole. In manufacturing operations the list is fairly extensive, encompassing design capabilities, product quality, raw material supply and intermittent power supply. Educational and training facilities are quite well developed but lack in quality and practical orientation, and skilled workers are in undersupply. General industrial and trade policy are largely encouraging for the manufacturing sector, while financial policy has not been conducive to the smaller manufacturer.

The general objectives and policy of the Regional Network for Agricultural Machinery are orientated towards improving the capabilities of manufacturers in the agro-related metalworking industries. These are implemented in Bangladesh through the National Institute, Bangladesh Agricultural Research Council, although the full extent of physical, financial and human resources available to effect the inputs required is unknown.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

Growth in real GDP was 2% in 1987/88, whilst in 1988/89 growth was estimated (UNIDO, April 1989, p.1) to be negative, due to serious floods causing a drastic decline in agricultural production and damage to factories and equipment. From Table: 1 it can be noted that GDP per capita was US$ 181 in 1987 and that growth per capita was at an annual average rate of about 1.3% during 1981-87, against 2.2% in 1970-80. In spite of this low average growth, per capita income growth in years with normal weather conditions show signs of good economic potential in Bangladesh.

b. Contributions to GDP

It is indicated (Table: 3) that in 1987 agriculture represented about 41.5% of GDP, having fallen by one third since 1970 whilst industry represented a relatively small proportion of economic activities, with 10.3% of GDP in 1987. The contribution of industry to GDP grew in the 1970s from 4.7% in 1970 to 10.1% in 1980, but during the 1980s there seemed to be no growth trend and the percentage fluctuated around 10%. Recent statistics (UNIDO, Data Base, 1990) show that the manufacturing sector's contribution to GDP grew in step with global industry in the 1970s. It declined slightly during the first half of the 1980s, but since it has risen a little, representing 9.5% in 1987. From 1973/74 to 1986/87, growth has remained concentrated on a relatively small number of intermediate industrial branches, notably fabricated metal products and electric machinery.

MVA per capita more than doubled from US$7 in 1970 to US$17 in 1980, and in 1986 and 1987 it was still at that level, as the growth rate from 1981 to 1987 was only 0.8%.

Productivity growth is quoted (UNIDO, April 1989, pp. xiii) as low in Bangladesh's manufacturing sub-sector, due more to low utilization of installed capacity than increase input costs.

Both agriculture and industry's contribution to GDP have thus declined, and the growth in GDP has largely been the result of growth in services, construction and trade, who's share in GDP grew from 31% in 1971 to 39.2% in 1987 (UNIDO, 1987, pp.4)

c. Employment by Sector

The total population in Bangladesh is estimated (UNDP, May 1989, pp.2) to be 110 million. The ILO estimated (ILO, 1987, pp.19) that in 1987 under-employment in Bangladesh was between 33% and 40% of the labour force. In a study (ADB/ILO, 1987, pp.222) it is shown that in 1980 some 75% of the labour force were engaged in agriculture, 19% in services and 6% in industry. Subsequent data (World Bank, 1989, Country Data) indicated that 59% of the labour force engaged in agriculture, 30% in services and 11% in industry, demonstrating that the structure of population activity is undergoing a rapid change from agriculture towards industry, and to a greater extent towards the services sector.

It is reported (UNIDO, April 1989, pp. xii) that large- and medium-scale enterprises account for only 20% of the employment in manufacturing, and that these are concentrated in the textiles, chemicals and pharmaceuticals, food manufacturing and metal products branches. The small scale and cottage industries employ 80% of the manufacturing labour force, concentrating on food, textiles and wood products, with the major part of this sector producing traditional consumer goods. The performance of the agricultural and manufacturing sectors is summarized in Table: 2.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

From the selected import statistics provided in Table: 4 there is evidence of considerable reliance upon the overseas sourcing of agricultural tools, implements, machinery and food-processing equipment for the Bangladesh market. Apart from the monetary values indicated, little further information is available on quantities, type/size, source or quality of the equipment

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: BANGLADESH

Indicator	Year or period	Country	South- and East Asia
GDP per capita (US$)	1970	155	373
	1975	161	452
	1980	171	499
	1986	179	580
	1987	181	601
MVA per capita (US$)	1970	7	49
	1975	16	65
	1980	17	89
	1986	17	116
	1987	17	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): BANGLADESH

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	1.9	2.8
	1981-1987	2.0	1.8
	1970-1987	2.1	2.8
Total Industrial Activity (incl. MVA)	1970-1980	12.9	4.7
	1981-1987	4.2	6.0
	1970-1987	7.7	3.9
Manufacturing	1970-1980	13.0	9.0
	1981-1987	3.5	7.5
	1970-1987	7.4	8.0
Construction	1970-1980	6.1	8.8
	1981-1987	8.6	2.6
	1970-1987	6.9	5.5
GDP per capita	1970-1980	2.2	3.3
	1981-1987	1.3	2.4
	1970-1987	1.5	2.7
MVA per capita	1970-1980	9.8	6.6
	1981-1987	0.8	5.0
	1970-1987	4.4	5.5

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: BANGLADESH

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	61.5	4.7	4.5	10321.0
1971	63.3	6.0	5.9	8946.6
1972	57.3	6.5	6.2	9504.2
1973	56.6	6.7	6.5	10653.9
1974	54.1	10.3	10.2	11014.8
1975	53.8	9.9	9.7	12364.0
1976	51.5	10.2	10.0	12529.0
1977	50.8	9.3	9.1	13344.5
1978	47.9	10.1	9.9	13952.8
1979	47.3	10.2	9.9	14135.6
1980	46.7	10.1	9.8	15094.0
1981	46.8	10.3	9.9	15216.8
1982	47.2	9.9	9.4	15766.3
1983	46.0	9.9	9.3	16433.7
1984	44.8	9.9	9.3	17044.7
1985	44.4	9.7	9.1	17798.7
1986	43.1	10.1	9.3	18601.6
1987	41.5	10.3	9.5	19345.3

Source: As Table: 1
Notes: As Table: 1

Table: 4 Import Statistics: Bangladesh - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding tractors)

SITE Code	Description	1984		1985		1986		1987	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/ forestry	22,560	N/A	31,400	N/A	19,800	N/A	61,500	N/A
7121	Soil Cultivation equipment	341,900	N/A	839,000	N/A	2,198,300	N/A	747,200	N/A
7122	Harvesting/threshing/ sorting equipment	24,400	N/A	90,300	N/A	271,900	N/A	147,400	N/A
7129	Agricultural machinery and appliances	148,200	N/A	227,600	N/A	170,700	N/A	113,900	N/A
71831	Machinery for Milling Grain	2,420,300	N/A	1,726,100	N/A	972,700	N/A	714,800	N/A
71839	Other Food Processing Equipment (excl. domestic)	10,104,400	N/A	5,922,100	N/A	3,549,400	N/A	2,496,800	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

supplied. In the case of the major categories, namely machinery for milling grain and other food processing equipment, large single items of plant and equipment may be incorporated and could be misleading in terms of potential.

b. **Statistical Data on Local Production**

In the absence of detailed information on the production performance of industries within the agro-related metalworking industries it has not been possible to prepare figures relating to the production levels. However, it was noted (ESCAP/RNAM, 1989, pp.23) that a study is to be conducted by the RNAM (Regional Network for Agricultural Machinery) National Institute, Bangladesh Agricultural Research Council, to assess existing manufacturing capabilities. The precise scope of the study is not known, but could yield valuable data on the current production status.

c. **Company structures and Manufacturing Operations**

Data relating to the structure and manufacturing operations of the formal agro-related metalworking industries is limited to a study (Baldo & Co S.r.l., 1983), in which data was compiled on some nineteen enterprises. Many of these companies have diverse product ranges but the consolidated data in Table: 5, refers only to the specific agro-related sector. In addition, there are five (UNIDO, August 1989, pp.3) diesel engine assembly/manufacturing operations which are a potential source of power units for agricultural equipment, including the Bangladesh Diesel Plant (UNIDO DP/BGD/84/037).

The overall performance of these industries does not appear to have been assessed in detail, although Table: 5 does indicate that Farmland Traders Workshop, Dhaka, attained a 75% capacity utilization factor for one product line. A report (Chr. Michelsen Institute, 1986, pp.294-295) cites the metalworking industries as the weakest of Bangladesh's present industrial structure. The case of the Bangladesh Machine Tool Factory is quoted as accounting for 5% of the fixed assets in all industries in Bangladesh, but for which output is negligible.

TABLE: 5 Company Structures and Manufacturing Operations: Bangladesh

Company/Location	Ownership	Employees	Turnover	Manufacturing Facilities	Production (Agro-related)	Notes
Arabian Engineering Co. Chittagong		N/A	N/A	N/A	Sugarcane crushers Spare parts for irrigation equipment	
Bangladesh Machine Tools Factory - Joydevpur		1,500	N/A	8 No. Lathes 6 No. Milling M/C 4 No. Pillar drilling M/C 2 No. Radial drilling M/C No. Power hammers - (0.5 to 3.0 tonnes) 1 No. Surface grinder No. Presses (160 to 1,000 tonnes) 1 No. Forge 2 No. Foundries No. Pre-heating ovens	Centrifugal pumps Power tillers	Factory Training school facilities Manufacturing facilities shown are training facilities of the company being used for manufacture of agricultural implements. The company can produce 6000 tons of cast iron per year and has wide facilities for machining, heat treatment etc. which are utilised for agri-machinery manufacture.

Company/Location	Ownership	Employees	Turnover	Manufacturing Facilities	Production (Agro-related)	Notes
B.E.C.O. Industries Ltd. Dhaka	Private	150	N/A	2 No. Lathes 4 No. Radial drilling M/C 2 No. Milling M/C 1 No. Planing M/C 1 No. Mortise M/C	Centrifugal pump-800/month capacity Manual pumps - 400/month capacity Capacity utilization - N/A	Product finish considered poor.
Bengal Engineering Works Noakhali	N/A	13	N/A	N/A	Seed drills Ploughs Weeders Thresher Sugarcane crushers Spare parts for irrigation equipment	
Comilla Cooperative Karkhana Ltd.	Co-op	106	N/A	N/A	Fertilizer applicators Seed drills Weeders Hand-hoes Threshers Seed cleaners Ploughs Rice mills spares Centrifugal pumps	Considered necessary to improve design and engineering of products.
Farmland Traders Workshop Dhaka	N/A	N/A	N/A	20 No. Lathes 1 No. Radial drilling M/C 2 No. Pillar drilling M/C 1 No. Foundry	Centrifugal pumps - 2000/month capacity Capacity utilization - 75%	Factory conditions and products considered poor.
Fakhiri Industrial Works Ltd. - Chittagong	N/A	70	N/A	N/A	Centrifugal pumps	

Company/Location	Ownership	Employees	Turnover	Manufacturing Facilities	Production (Agro-related)	Notes
General Engineering and Agricultural Equipment Industries - Comilla	N/A	N/A	N/A	N/A	Spare parts for ploughs, weeders, sprayers, power pumps, threshers, dryers, husking machine	
Jonata Machinery Tools Ltd. - Jessore	N/A	N/A	N/A	N/A	Sugarcane crushers Spare parts - various	Quoted as well equipped and able to increase production.
K.S.B. Pumps Ltd. Tongi	Private	135	N/A	4 No. Lathes 1 No. Milling M/C 4 No. Radial drilling M/C 3 No. Pillar drilling M/C	Centrifugal pumps - 1,000/month capacity (several designs) Turbine pumps - 30/month capacity Capacity utilization - N/A	Practical training considered weak.
Mannan Iron and Metal Industries - Sylhet	N/A	N/A	N/A	N/A	Spare parts for tractors and irrigation pumps	Noted that additional facilities required to increase production.
Marshall Ltd., Chittagong	Private	368	N/A	1 No. Foundry (1,000 tonnes/year) 22 No. Lathes 1 No. Vertical lathe No. Milling M/Cs	Irrigation pumps Tea machinery Dryers Mills	Reported lack of heat treatment facilities.
New Light Inventor of Modern Agricultural Implements	N/A	N/A	N/A	N/A	Ploughs Seed drills Weeders Sprayers Threshers Spades Hand water pumps	

Company/Location	Ownership	Employees	Turnover	Manufacturing Facilities	Production (Agro-related)	Notes
Northern Engineering Works, and Industries	N/A	30	N/A	N/A	Hand pumps Husking mills Sugarcane crushers	Noted lack of design and engineering capabilities.
Ragoti Industries Ltd. Chittagong	N/A	620	N/A	Not detailed - but mainly assembly	12 horsepower tillers Tractors (Massey Ferguson)	
Prantic Engineering Co. Ltd. - Dhaka	Private	150 (per shift)	N/A	N/A	Centrifugal pumps	Training school operational.
Tejgaon Engineering and Construction Co. Ltd. - Dhaka	N/A	N/A	N/A	N/A	Pumps Deep tubewells and strainers	Noted that design and technology lacking.
Vandari Iron Works Bogra	N/A	68	N/A	N/A	Hand pumps Husking mills	

Source: Baldo & Co. S.r.l. Training Programme in the Agricultural Machinery Industry in Argentina, Bangladesh, Syria, Sudan and Tanzania, 1983.

The questions of quality control and standards does appear to have been addressed by a number of the companies in this sector and, nationally, by the Bangladesh Standards and Testing Institution. Whilst the most recent list of standards, June 1988, cover general engineering materials and ancillary electrical components the only standards applicable to the products of the agro-related metalworking industries are for spades and centrifugal pumps. Information relating to the enforcement of standards is not available. Additionally, it was noted (ESCAP/RNAM, 1989, pp.23) that a national testing programme is currently being evaluated, although the report and master plan have not yet been completed.

Another sector within the agro-related metalworking industries, which cannot be neglected is the role of cottage industries. A survey (BSCIC, 1983) indicated that there were 9,600 blacksmiths and 2,500 light engineering industries, employing 23,600 and 10,100 people, respectively, in the cottage industry sector. Reliable data on the extent of products produced by these industries is not available, but it is reported (Chr. Michelsen Institute, 1986, pp.37) that there has been significant growth in metalworking industries at this "grass roots" level. In this respect the Grameen Bank has been particularly active in promoting cottage industry activities and entrepreneurial development although no details are available to verify the extent of progress made in this direction. A list of indigenous agricultural equipment manufactured in cottage industries is given in Table: 10.

General constraints noted in Table: 5 relate mainly to design and technology issues affecting product quality and training. In the case of small scale light engineering units raw material supplies are identified (CFTC, 1981, pp.3) as a serious problem, although in a later report (Chr. Michelsen Institute, 1986, pp.34) the situation was considered greatly improved. In the information reviewed several general references are made to the poor capacity utilization in the manufacturing sector.

d. Markets: Domestic and Export

From the import statistics provided in Table: 4 it is apparent that there are further opportunities in the field of import substitution. There is

Table -10

INVENTORY OF INDIGENOUS AGRICULTURAL EQUIPMENTS IN USE IN BANGLADESH

Kind of operation	X	Equipments
1		2
1. Tillage		1. Plough
		2. Spade
		3. Yoke
		4. Ladder
		5. Mallet
2. Interculture		1. Hand hoe
		2. Weeder
		3. Khurpi
		4. Rake
3. Irrigation		1. Swing backet
		2. Done
		3. Seuti
4. Harvesting		1. Sickle
		2. Curved knife
5. Threshing		1. Pedal
		2. Molon
		3. Scraper
6. Winnowing		1. Winnoer

currently little information to indicate potential domestic demand although an earlier study (CFTC, 1981, pp.26-32) for selected agricultural equipment does indicate the number of machines in use and the demand projections based on these figures, but these are considered somewhat dated at this point in time. It was noted during the data review that reference was made to three further market studies which may, when/if completed, provide valuable market indicators. These were: i) a demand survey (ESCAP/RNAM, 1989, pp.23) being undertaken by the RNAM National Institute, in Bangladesh; ii) an agricultural mechanization strategy document prepared by an RNAM consultant (ESCAP/RNAM, 1989, pp.11); and iii) a proposed market study for the Bangladesh Diesel Plant (UNIDO project - DP/BGD/84/037). To date, further information is not available.

It would appear that projections for potential export demand have not been contemplated, although available statistics do feature the export of agricultural hand tools, in 1987, to the value of US$ 57,200.

Supplementary information on the use of and need for agricultural equipment has been given by the Bangladesh Steel and Engineering Corporation (November 1990) as follows:

(1) **Land Preparation**

During the last few years, especially after the two successive severe floods, mechanical tillage is making a comeback. This has been caused by two factors. Firstly, these floods have destroyed a significant number of draft animals and secondly, need for faster land preparation to replant the crop as soon as the flood water recedes. Another significant event which encouraged mechanization is that during the last five years tillage by power tillers has become cheaper than using animals. All these factors coupled with the liberalization of the Government policy has given a real boost and it is expected that within a very short period tillage will be mechanized to a considerable extent which will help fill up the power shortage Bangladesh argriculture is facing today. Available data indicates that 500, 1,000, 2,500 and 3,000 power tillers were in operation during the years 1985, 1986, 1987 and 1988 respectively. It has been estimated that 3,000 units of power tillers

were imported by the private sector during 1988-89. Next year's projection is over 10,000 units.

For years imports of power tillers were banned. This was done with a view to encouraging local production. Some manufacturers started the development of the right type of prototype suitable for local conditions. Some successful prototypes were marketed and available data indicate that 1,000 and 2,000 units were produced in 1987 and 1988 respectively. This is well below the production capacity of 15,000 units per year.

Due to the recent lift on the ban on the import of power tillers, together with the withdrawal of taxes and duties, have made imported power tillers cheaper than the locally produced ones. This has resulted in suspension of production by local manufacturers.

Some importers, however, have established assembly plants, both for power tillers and tractors with joint collaboration.

(2) Sowing and Planting:

Sowing and planting is one of the most intensive agricultural operations which alone accounts for 20% of the total cost of production. No serious effort has been made to mechanize this operation primarily due to the fact that no alternative avenue is available to absorb the substantial number of labourers that is expected to be unemployed once these operations are mechanized. This is completely a manual operation and even no implement is in use.

(3) Fertilizer Application:

Application of chemical fertilizer for increasing agricultural output is a recent phenomena. But ever since its introduction, its consumption has been increasing steadily. During the last decade use has more than doubled (BSS, 1987). Among the 27 countries of the Asia and Pacific region, Bangladesh ranks 9th in fertilizer consumption (FAO, 1988). The average annual growth rate is around 10%. The fertilizer use by plants, however, is very low. It has

been estimated that only about 22% of the applied fertilizer is used by the plant. The rest is lost to the environment. This low efficiency not only costs more money to the farmers, but also is a potential threat to the ecology and environment.

To overcome this twofold problem, research is being conducted for mechanical placement of the fertilizer at required quantity and at the desired depth. Adaptive research is underway for deep placement of USG (Urea Super Granule) with manual machines. Though available data is promising, its adoption by the farmers by an significant level shall have to wait for quite some time. This is also a manual operation and no machine or implement is used.

(4) **Crop Protection**:

Use of machinery: Bangladesh is a tropical country and naturally her climate is extremely favourable for the growth and proliferation of insects and pests. For rice alone 132 insects and 29 diseases have so far been identified. For the last 2 decades, farmers are using both knapsack type and small powered sprayers. At present their number is 11,000 and 1,500 respectively. Initially, they were distributed among the farmers free of cost. Now they have to buy their own. A number of manufacturers within the country are manufacturing the manual type whereas the powered ones are imported.

Preventive spray is not recommended as yet. Spraying is advocated when the infestation goes beyond economic threshold. Considering the adverse effect pesticides can have on the environment, adoption of integrated pest management approach is advocated.

In case of regional level infestation of epidemic nature the Government conducts aerial spraying with 4 planes it has acquired for this purpose.

The country has developed substantial capability to produce manually operated pesticide sprayers. Thirteen industries have been set up with an annual single shift production capability of about 70,000 units. The actual production coverage is around 20,000 per year. This industry with some

expansion and modernization has the capability of meeting entire demand of the country.

(5) Water Lifting Machinery:

Most significant development has taken place in the manufacture of minor irrigation equipment, like pumps (both centrifugal and turbine), engines, gear head, etc.

At present the production capacity of centrifugal pumps exceeds 100,000 units per annum which is more than adequate to meet the country's yearly requirements. Production capacity of turbine pumps which has been estimated at 15,000 units is also sufficient to meet requirements. Except for one all the manufacturing industries are owned by private entrepreneurs.

The county does not yet have the capability to manufacture a complete engine, but progressive manufacturing has already been started. A public sector manufacturer, namely Bangladesh Diesel Plant (BDP) under a foreign license, is producing engines for nearly a decade and nearly 60% of the components are manufactured locally. The Government also sanctioned three diesel engine manufacturing plant in the private sector, but none went for production because the imported ones are cheapers than the locally made ones.

The country is also self-sufficient in gear head production. The quality, however, needs further improvement. Two manufacturers, one in the public and the other in the private sector, are the only manufacturers.

(6) Harvesting, Threshing and Post Harvest Processing:

Use of machine: Harvesting is another extremely labour intensive operation and therefore, considering the socio-economic implications, no attempt has so far been made to mechanize this operation. There is no possibility of its mechanization in the near future either.

Except for wheat where as few as hundred machines are used, threshing of no other crop has been mechanized as yet. These wheat threshers are locally

made except for the engine which is imported. More commonly, engines used for lifting water are generally used to power these threshers. For rice an intermediate technology, a manually operated rotating drum type thresher (Japanese design), has been introduced. These have become very popular in certain areas and nearly 5,000 of them are now in use. They are easy to manufacture and small smithy shops in the rural areas are now producing them. Costing only $50, these usually pay back the investment in one year.

Over the last two decades, rice milling has been mechanized to a considerable extent. Estimates indicate that there are now nearly 7,500 Engleburg-type steel huller mills in the country. In addition, there are 250 major rice mills with a daily capacity of over 4,000 metric tons. These small and large mills together process 70% of the rice produced in the country. The remaining 30% is milled by traditional method in the household.

Though a substantial capability in rice milling has been developed yet manufacturing facilities for the milling machines are far from satisfactory. Most of these mills are imported and India is the major supplier. Recently, however, some mills have started to install Japanese rubber rollers to reduce broken grain whose percentage can run as high as 30%.

4. Infrastructural Support

a. Policy

Industrial Policy

After the nationalization drive in the 1970s, the New Industrial Policy of 1982 and the Revised Industrial Policy of 1986 aim at increasing the resource utilization capacity of the manufacturing sector. The following extracts (UNIDO, April 1989, pp.55-58) enumerate the relevant key measures, as follows:

- Government subsidies are significantly reduced;

- A very extensive privatization programme is introduced (Government participation reduced from 85% to 40% of large-scale manufacturers);

- Firms are encouraged to meet their foreign exchange needs through the secondary market (Wage Earners Scheme - WES);

- All investments require approval by the newly created Board of Investment, which is intended to facilitate foreign and domestic investment in industry.

Latest formulation of industrial policy is being finalized which would be implemented shortly. This policy would make further advancement to privatization and free market economy-oriented industrialization (Bangladesh Steel&Engineering Corporation, November 1990).

Trade Policy

It is noted (UNIDO, April 1989, pp.38) that there is in general heavy effective protection of food products, cotton and chemical products. Under protection of import controls and taxes, domestic manufacturing covers most of the demand for most categories of manufactured goods, with the important exception of goods from the metalworking industries and to a lesser extent chemical products. Imported higher quality goods limit the market for this category of local products in most industries.

Import is subject to licences, issued for goods announced as eligible for import and placed on an Open General Licence List. Other goods require individual authorization. Some items can only be imported by the Trading Corporation of Bangladesh or other Government approved agencies (EIU, 1989, pp.44).

The trade reform package is quoted (UNIDO, April 1989, pp.59) as aiming to reduce the anti-export bias and stimulate import substitution contains the following initiatives:

- Establishment of the Wage Earners Scheme exchange market for financing all exports and all non-aid financed imports of registered firms. The exchange rate of the Scheme is 10% higher than the official rate;

- Relaxation of the quantitative restrictions on imports. Of 6% of restricted industrial imports identified in the Import Policy Order of 1987, 17% were removed in 1988;

- Rationalization and general lowering of tariff barriers. In 1988 the maximum-minimum tariff rate was lowered from 200% to 125% for the protected products;

- Gradual alignment of the official and the free exchange rate;

- Measures to stimulate exports.

In 1989, an extremely liberal investment holiday was introduced with extensive tax breaks, import concessions and profit repatriation. Chittagong has the country's first Export Processing Zone. New ones are planned for Dhaka and Khulna.

b. Financial

A conservative macro-economic strategy since the financial year 1982/83, aiming to achieve economic stability, has resulted in reduced investment and consumption levels by creating:

- a significant rise in the cost of credit;

- a reduction of accessibility of medium- and small-scale enterprises to credit from commercial and financial institutions, due to the introduction of a less discriminatory system of monetary control and the use of a wide range of monetary instruments by the Central Bank, resulting in a bias towards larger scale enterprises.

However, the Government is introducing new credit policy reforms which wold eliminate bottlenecks and would encourage investment. special purpose banks and financial institutions are being established with the objective to extend credit to small industrial investors (Bangladesh Steel&Engineering Corporation, November 1990).

c. Human

It is reported (Chr. Michelsen Institute, 1986, pp. 115) that agricultural mechanization, which started to be introduced in the 1970's, had a low impact due to a lack of adequate back-up service with trained maintenance personnel and a lack of training for operators.

A report (Baldo & Co. S.r.l., 1983, pp.154-156) on the identification of training reveals that there is an imbalance in the mix of skills; the overall manpower needs of the economy have not been well planned; the curricula of the educational system are mostly theoretical and inadequately linked to the requirements of industry ; and that the quality of training is poor. In the period 1982-83, there were only approximately 30,000 scientists, engineers and technicians, and approximately 100,000 skilled workers. Moreover, labour migration to the Middle East has created a severe shortage of competent and experienced skilled manpower, thus, capital utilization is low and Bangladesh is increasingly dependent on imported physical capital and technical knowhow. It was also noted, in the same report, that the technical sub-sector of the educational system in Bangladesh consists of one technical university, one technical teachers college, three engineering colleges for training technicians, and 35 vocational training institutes (VTI) for producing skilled workers.

The Polytechnics conduct training programmes of three years duration, covering 12 technologies, including mechanical, electrical and farm machine shop technology. The vocational training institutes run two-year programmes in ten different specializations, including auto-diesel machine-shop, farm mechanics, welding, drafting, forge work, fitting, electricity and foundry work courses. Other agencies involved in technical training programmes with links to metalworking industries are:

- The Bureau of Manpower, Employment and Training: Offer two year training courses in 16 different trades, including machine tool practice, electrical, welding and sheet metal, foundry and forging, mechanical and civil drafting, general mechanics, and diesel operation.

- The Bangladesh Industrial Development Corporation: Trains mechanics in the maintenance and servicing of diesel and electrical motor pumps.

- Bangladesh Industrial Technical Assistance Center (BITAC): Provides specialized training services to update skills of high level engineers already operating in industry. BITAC also provides advisory and consulting services in a number of fields, including: foundry technology, manufacturing technology, machine tool engineering, die mould and tool design, heat treatment, welding methods, metal fabrication technology, protective and decorative coatings.

d. <u>Technological</u>

A number of organizations, at a national level, have a direct or peripheral interest in the development and application of agricultural tools and machinery. Although not exhaustive, the following list schedules the most prominent bodies and their main interests.

- Bangladesh Agricultural Development Corporation: Supporting the role of agricultural development on a nationwide basis.

- Bangladesh Agricultural Research Council: Research coordination and multidisciplinary research in agriculture.

- Bangladesh Agricultural University: Primarily educational but with research and development facilities.

- Bangladesh Council of Scientific and Industrial Research: Multidisciplinary research and pilot plant investigations.

- Bangladesh Industrial Development Corporation: Testing facilities for pumps.

- Bangladesh Industrial Technical Assistance Center: Provides, in addition to training, advisory and consulting service in the manufacturing sector.

- Bangladesh Standards and Testing Institution: Statutory body for standards in Bangladesh.

- Bangladesh Rice Research Institute: Research on varietal improvements, cropping systems and mechanization.

Since 1987, a primary role in fostering a greater awareness of development, testing, evaluation, manufacture and commercial introduction of technologically appropriate agricultural machinery has been played by RNAM, through the designated national institute, the Bangladesh Agricultural Research Council. With strong regional linkages in ten Asian countries, and international linkages in Africa and Latin America, RNAM have instituted a programme of regional seminars and workshops to promote these activities although Bangladesh does not appear as active as other member countries. This may be due to Bangladesh's fledgling status in RNAM.

e. Services

In the material reviewed, several references were made to the problems associated with intermittent power supplies but it was noted (Chr. Michelsen Institute, 1986, pp.34) that these were troublesome but hardly decisive, except in those few industries with full order books. No specific problems were noted in the context of electricity supply to the operation of agro-related metalworking industries.

5. Related or Relevant Programmes

Country Specific

UNDP/UNIDO/84/037 "Assistance to the Bangladesh Diesel Plant". US$2.7 million, 1985-1989

UNDP/UNIDO: SM/BGD/87/034 "Industrial Master Plan - Preparatory Assistance".

UNDP/UNIDO: DP/BGD/84/018 "Assistance to Chittagong Dry Docks", US$1.6 million, 1985-1991

UNDP/UNIDO: DP/BGD/87/034 "Strategic Plan for Industrial Development", pipeline

UNDP/UNIDO: DP/BGD/85/144 "Assistance to Bangladesh Standards Testing, pipeline

UNIDO: Industrial Investment Division projects:

- Agricultural Machinery, submitted 1985
- Machinery and Spares for textiles and jute mills, railways and agricultural implements, submitted 1983
- Steel Casting Foundry, submitted 1986

UNDP/FAO: "Agricultural Extention", duration 1980-1989, US$5.5 million. Objective: Strengthen the Department of Agriculture in training, supervising and supporting agricultural extention workers, to motivate farmers to adopt improved farming practices.

UNDP/BSCIC/ILO: "Cottage Industries Development" US$0.9 million, 1987-1990.

Objective: To promote and develop cottage industries by developing products and providing marketing assistance, skill development through 4 BSCIC workshops and extention and development programmes for 4 districts.

AsDB/UNDP/Agrani Bank, Rupali Bank: "Rural and Agro-based Industries", 1985-1990, US$20,000,000.

Objective: Promotion of private sector investments in rural and agro-based industries and small-scale (non-agro-related rural industry that are labour intensive).

Regional

UNDP/ESCAP: RAS/86/135 "Regional Network for Agricultural Machinery" (RNAM), phase IV, US$1,862,500, duration 1987-1991, based in Manilla.
Objective: To provide advisory service in improving design, selection, adaptation and increased use of suitable agricultural machinery, and to promote local manufacture of local machinery.
UNDP/ESCAP: RAS/86/143 "Promotion of Technology Utilization" (APCTT), US$1,510,040, duration 1987-1991, based in India.
Objective: To increase the utilization of indigenous and imported technologies in the region.
UNDP/FAO: RAS/86/040 "Agricultural Demonstration Centers" US$1,348,000 whereof US$152,000 approved for preparatory assistance. Duration 5 years, host country unknown.
Objective: Provision of training and consultancies to strengthen the network established under phase I to make it a sustainable coordinating programme for transfer of post-harvest technologies and experience.

Others

Swiss Development Corporation/CARITAS: "Mirpur Agricultural Workshop". Dhaka, US$unknown, duration 1974-1989.
Objective: Training agro-mechanisms, Development of Agro-implements.
Netherlands/EC/BRDB/LGEB: "Rangpun Rural Development Programme". Duration 1985-1992, US$3,448,000.
Objective: Development of Human Skills, Promotion of Economic Activities in Agro- and non-agro Sector and Upgrading of Infrastructure.
DAN[illegible]A/BRDB: "Noahal Rural Development and Project in Savar". Duration 1985-1990, US$6,987,000.
Objective: Promotion of Economic Growth and Social Progress through an Integrated Approach in Particular aiming at the Poorer Sections of the Population, including Women.
IDA: "Vocational and Technical Training", 1991-1995, US$20,000,000.

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BHUTAN - Kingdom of Bhutan

1. Summary

Bhutan is undergoing a period of sustained growth, both in agriculture and industry. The information base is poor and statistical discrepancy is very high for the figures from the 1970's, but quite low for the 1980's. It is, therefore, difficult to compare the two periods, and movement in sectoral distribution of GDP are not altogether realistic up to 1980.

The available figures point to the development of a significant industrial base relying largely on government and joint-venture projects, particularly in the mineral and agro-based industries. Figures relating to the agro-based metalworking industries are elusive and information on the engineering industries and workshop/artisan activities spartan. The presence of a state-owned Agricultural Machinery Center, of three formal private engineering companies and local workshop facilities suggest that the nucleus is available, albeit limited, to stimulate activity in this sector, particularly in a country where 90% of the workforce are engaged in agriculture and rural activities.

However, given the limited raw material resources, technical resources, physical infrastructure, manufacturing orientated labour force and management expertise, further evaluation of this sector is required to ascertain its full potential, considered in the context of prevailing market opportunities and consumer purchasing power.

2. Performance of the agricultural and manufacturing sectors

a. GDP

From an average of about 6% per annum from 1981 to 1986, Bhutan's real GDP accelerated to an estimated 14% in 1987 (UNCTAD, 1989, pp.138), stimulated to a large degree by a high ratio of aid disbursements to GDP. The main source

of growth is the newly completed Chukha hydro-electric project. Agriculture grew at a rapid 7.0% from 1970 to 1987, as did total industrial activity (Table: 2), manufacturing grew at a slightly slower pace with 6.2% over the same period.

Until 1960 there was virtually no cash economy in Bhutan, no private sector enterprise and sources of finance were minimal. The internal market was fragmented and enterprises had to seek their markets largely outside the country, notably India (UNIDO, February 1987, pp.9). This accounts for the very low GDP per capita of US$69 in 1970 (Table: 1). During the 1970s per capita income grew at an average rate of 4.8% per annum (Table: 3), whilst from 1980 to 1987 it grew at an average rate of only 2.9%, with per capita standing at US$147 in 1987.

b. Contribution to GDP

Agriculture's share of real GDP grew from 50.3% in 1970 to 61.0% in 1978, at the expense of the construction industry, whilst at the beginning of the 1980s it fell to about 50% to pick up only slightly during 1983-87 (Table: 3). Industry's share in real GDP underwent approximately the same movement, but recuperated in 1987 (4.6%) all the relative loss it had undergone in 1978-1982 (Table: 3). Agro-based industries accounted for 27% of industrial GDP in 1987 and forest based industry for 11% in 1984. Mineral based industry was also important (UNIDO, February 1987, pp.15) and the share of power generation in GDP was estimated to be 10% in 1988 (UNCTAD, 1989, pp.138).

It was reported (UNIDO, February 1987, pp.12) that, in 1976, the contribution of the manufacturing sector was estimated at only 1% of GDP, and that in 1981 it contributed 4% of GDP. This does not correspond to figures from UNIDO Data Bank which indicate a quite stable share of GDP during the 1970s (fluctuating around 4.4% as shown in Table 3). This percentage was a little lower during 1980-1987, still without any clear trend. Table 3 indicates that MVA per capita grew faster (4.0%) during the 1980s than did GDP per capita and is best explained by the very small base of US$3 which MVA started out with in 1970 (Table: 3).

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: BHUTAN

Indicator	Year or period	Country	South- and East Asia
GDP per capita (US$)	1970	69	373
	1975	81	452
	1980	119	499
	1986	143	580
	1987	147	601
MVA per capita (US$)	1970	3	49
	1975	4	65
	1980	4	89
	1986	5	116
	1987	6	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): BHUTAN

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	7.0	2.8
	1981-1987	6.5	1.8
	1970-1987	7.0	2.8
Total Industrial Activity (incl. MVA)	1970-1980	6.8	4.7
	1981-1987	6.9	6.0
	1970-1987	7.0	3.9
Manufacturing	1970-1980	6.3	9.0
	1981-1987	6.0	7.5
	1970-1987	6.2	8.0
GDP per capita	1970-1980	4.8	3.3
	1981-1987	2.9	2.4
	1970-1987	5.3	2.7
MVA per capita	1970-1980	4.4	6.6
	1981-1987	4.0	5.0
	1970-1987	4.4	5.5

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: BHUTAN

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	50.3	4.4	4.2	72.1
1971	51.5	4.5	4.2	75.4
1972	53.5	4.6	4.4	77.7
1973	52.8	4.5	4.3	84.3
1974	54.7	4.7	4.4	87.1
1975	55.1	4.7	4.4	92.6
1976	56.0	4.8	4.4	97.4
1977	56.0	4.8	4.4	104.3
1978	61.0	5.2	4.8	102.5
1979	53.1	4.5	4.1	126.1
1980	48.4	4.1	3.7	148.3
1981	49.2	4.3	3.9	152.8
1982	49.5	4.0	3.5	169.3
1983	50.1	4.2	3.8	179.5
1984	50.5	4.4	3.9	184.1
1985	52.2	4.8	4.2	190.2
1986	54.6	4.5	3.8	199.0
1987	52.4	4.6	3.9	209.3

Source: As Table: 3-1
Notes: As Table: 3-1

c. **Employment by sector**

In 1986 it was reported (UNDP. July 1988. pp. 12) that the total population in Bhutan was 1,312,700. In 1987 it was estimated that 90% of the labour force was engaged in agriculture and rural activities.

For industry there is a problem of labour availability and manpower is often sourced from India. In 1984 it was reported (AsDB. 1985. pp.25) that there was no reservoir of unemployed in Bhutan and that employment in industry is mostly undertaken during quiet periods in agriculture, seemingly being of little attraction to the Bhutanese. This situation will continue until higher agricultural productivity releases labour for use in industry. The growth of employment in Bhutan's industrial sector has been as follows (AsDB, 1985, pp.44): 1,768 in 1977; 2,300 in 1980 and 4,000 in 1984.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

Little statistical data is available on the importation of agricultural tools, implements, machinery and food-processing equipment to Bhutan. According to the Ministry of Agriculture, the following products sold in Bhutan from 1983 to 1987 were all imported: 50 sets of farm machines; 300 sets of rice mills; and 400 sets of plant protection equipment. None of these products are produced locally. About 3,000 hand tools were imported and sold in Bhutan in that period.

Details on imports of agro-related metal products from India in 1988 are provided in Table: 4. Bhutan also imports agro-related metal products from Japan. No statistical data is available on these imports.

The Agricultural Machinery Center (AMC) and the private sector at the dzongkhag level are capable of providing some service and spare parts facilities for imported products. The Center also sets norms of standardization for the importation of threshers and processing equipment.

Imported goods are subsidized by the Government.

b. Statistical Data on Local Production

Limited information is available on the amount of local production in Bhutan. It is known, however, that 90% of 30,000 hand tools sold from 1983 to 1987 were produced locally.

The Agricultural Machinery Center produces rotory paddy weeders; small tools, hayrakes, garden rakes, planting ropes, etc.; winnovers; plastic houses; hot frames/nursery box, etc.; and solar dryers/stoves etc. According to the Ministry of Agriculture, for 1988 and onwards, the AMC has set annual production targets as follows:

200 pedal thresher sets, corresponding to the amount actually sold (Nu. 406.000):
200 winnovers:
50 reversible ploughs:
1,000 paddy weeders:
50 wooden hot frames
200 watering cans:
2 km fence fabrication.

As there is no iron or steel production in Bhutan, raw materials are partly imported from India. The agro-related metal tools produced by the AMC correspond to the needs of the end user: their quality is equal to that of imported products, and were easily available than the latter. The AMC sells only to the national market.

The AMC has provided maintenance services of tractors and power tillers, a service which has recently been privatized.

c. Company Structures and Manufacturing Operations

The State owned Agricultural Machinery Center (AMC), located in Bondey, Paro, stands under the Ministry of Agriculture, and has benefitted from Japanese capital and technical assistance. 14 people are employed by the Center.

From a report (AsDB, 1985, pp.67) it was possible to identify three licenced industries in the manufacturing sector with an engineering bias, although specific detail on the product range is not identifiable nor is capacity utilization. Further details are provided in Table: 5. In a subsequent report (UNIDO, 1987, pp.49) a further ten workshops and tyre retreading industries were referred to in the service industries sector, although the reference to tyre retreading may imply that these are in fact automotive workshops.

TABLE: 4 Imports from India to Bhutan in 1988

Agro-related Metal Products

Commodity	Quantity	Value in Rs.
Directly related to Agriculture		
Ploughs	2	67,000
Threshing Machines	120	64,722
Rice huller and husking machine	535	209,588
Parts of agricultural machinery	12,332	596,408
Carts + wheelbarrows, hand propelled excl. toys	294	37,991
Trailers and semi-trailers	327	121,137
Parts of carts + wheelbarrows and trailers	43	2,445
Indirectly related to agriculture		
Dairy machinery	630	1,074,681
Parts of dairy machinery	17	12,877
Machinery used in fruit juice preparation and the like	29	6,596
Parts of juice machinery	186	98,760
Road tractors for semi-trailers	8	529,103

Source: Department of Trade and Industry, Thimphu, Bhutan

TABLE 5 Company Structures and Manufacturing Operations: Bhutan

Company/Location	Ownership	Employees	Turnover (1)	Manufacturing Facilities	Production (Agro-related)	Notes
Choden Engineering - Sauchi District	Private	N/A	N/A	N/A	N/A	
Kuma Steel Factory - Sauchi District	Private	26	1,527,(XX)	N/A	N/A	
Tashi Engineering Works - Sauchi District	Private	96	4,613,(XX)	N/A	N/A	

Source: AsDB - Final Report - Industrial Sector Study, TA No. 614-BHU (P.E. International Operations Ltd)

Notes (1) - Turnover quoted in Bhutanese Ngultrum. Exchange rate at time of data collection 12 Ngultrum = US$1

The Ministry of Agriculture has mentioned a private workshop in Bumtang (originally established by Helvetas of Switzerland) which is mostly based on logging activities and offers maintenance services, and the Forestry Department maintenance workshop in Paro. It is not likely that these workshops have any agro-related metalworking activities, but they may have potential for the undertaking of such activities.

In the private sector Karma Steel Industries in Phuntsoling, traditionally manufacturer of structural components, steel furniture, etc., has started manufacturing spades, shovels and irrigation channels and is experimenting with a hydro-harvester.

4. Infrastructural Support

a. Policy

Industrial policy

The Government has established four industrial estates, at Phuntsholing, Gaylegphug, Gedu and Pasakha, and has been undertaken to reduce infrastructure costs and hence investment costs for entrepreneurs, and to assist pollution control and urban planning. However, the industrial estates are failing in their duty to supply promised services to industry, mainly because of their lack of capital, but also due to electricity and water shortages, lack of incentives, lack of labour, lack of maintenance and service facilities and a severe lack of management skills (AsDB, 1985, pp.44).

The Sixth Development Plan stipulated that licences would be required for all industrial activities in Bhutan, except for small agro-related industry. The objective is to guide the private sector in achieving the overall national objectives set for industry (UNIDO, Feb. 1987, pp.25).

Industrial strategy aims at increased processing of indigenous raw materials, with emphasis on exportables. In the Sixth Plan, measure were foreseen to reduce the price and improve the availability of raw materials and

other inputs (UNIDO, Feb. 1987, pp.28). To solve the problem of limited markets, all government departments and their contractors should give priority to local products for government procurements. The Sixth Five Year Development Plan (1987/88 - 1991/92) stipulated that industry will benefit from an assured and cheap supply of power from the Chukha hydro-electric project completed in 1988.

The Government wishes to reduce to a minimum its direct investment in projects, and proposes to put greater emphasis on medium and small sized enterprises. Major concerns of the government are to stimulate private sector growth, and facilitate the acquisition of managerial skills (UNIDO, February 1987, pp.22).

No information is available on whether these measures put forward by the Sixth Plan have been carried out, or how far they have succeeded. It is however reported (UNCTAD, 1989, pp.136) that state controlled activities have been partially transferred to private hands.

Trade policy

A Trade Agreement between India and Bhutan permits entry of goods to each others markets on a duty-free basis (UNIDO, February 1987, pp.9), and transit agreements have been concluded with India with a view to expanding trade with Bangladesh and Nepal. It is noted (UNCTAD, 1989, pp.136) that stricter licensing has been enforced to curtail non-essential imports, particularly of luxury goods.

b. Financial

The Royal Government renders ample scope and privileges for the development of agricultural and commercial activities. The agricultural sector is free of all taxes. The Bhutan Development Finance Corporation is expanding access to credit facilities, with a view to encouraging private initiative (UNCTAD, 1989, pp.136). Industries based on indigenous raw materials are particularly supported by the Government and assistance is provided to maximize the viability of the industries.

For well formulated plans in key areas, the Ministry of Trade and Industry will be prepared to guarantee funds and one method considered is the provision of equipment on a leasing system with the equipment being transferred to another entrepreneur should the venture fail.

c. Human

The major constraint for the expansion of the economy is the availability of manpower and what local manpower there is, is seldom trained. Kharbandi Technical Institute trains about 45 artisans and technicians per year. The Royal Polytechnic trains 50 electrical and civil engineers per year, although this output is insufficient to meet the requirements of a growing economy. The Government is reported (UNCTAD, 1989, pp.136) to have launched a programme to train Bhutanese nationals for entrepreneurial and managerial jobs, although no further information was given on the content and capacity of this programme. In the Sixth Development Plan, manpower development is considered of great importance to the Bhutanese government and firms will be obliged to implement a plan for manpower training and the gradual replacement of expatriates. Government scholarship holders will be encouraged to take up employment in industry rather than in public service and in-plant training will be facilitated (UNIDO, Feb. 1987, pp.26).

In the agro-related metalworking sector, there are training workshops on the maintenance of tractors and power tillers. There are plans for a private mobile training unit at dzongkhag level. The AMC gives training courses in mechanics for the end users (including maintenance).

d. Technological

The level of technology employed in most small/medium-scale industries in Bhutan is quoted (AsDB, 1985, pp.26) as simple, often old, but robust. Mixed technology is used in as much as indigenous technology is employed in the fabrication of simple products. The AMC's design capabilities cover simple hand tools and agricultural implements. The Center's research and development activities permit it to develop prototypes. These, if approved, are

subsequently produced by private workshops and indigenous blacksmiths. The AMC also promotes the application of new products.

e. **Services**

Essential support services are reported (AsDB, 1985, pp.17, pp.23) lacking in all key sectors, that is, electricity, water, communication and transport links. It is further noted (AsDB, 1985, pp.44) that even at the four purpose established industrial estates there are severe constraints on the essential services available, somewhat contrary to the establishment objectives and negating possible benefits that could be derived. The situation with regard to power supply may now be greatly improved following the scheduled commissioning of the Chukka hydro-electric power station.

5. Related or Relevant programmes

Country Specific

UNIDO: SM/BHU/87/027 "Assistance in Industrial Planning and Monitoring", US$284,100, 1988-1991.
UNIDO/UNCTAD: DU/BHU/87/004 "Human Resources Development and Strengthening of Institutional Capacity", US$55,000, 1988-1991.
UNDP/UNIDO: DU/BHU/88/001 "Integrated Entrepreneurship Development Programme", US$687,000, Pipeline.
UNDP: DP/BHU/87/007 "Technical and Vocational Training", US$145,000, 1987
Objective: Preparation of sectoral master plan.

Regional

UNDP/ESCAP: DP/RAS/86/143 "Promotion of Technology Utilization", US$1,510,000, 1987-1991. Regionwide. Based in India.
Objective: To increase the utilization of indigenous and imported technologies in the region.

6. Reference Material

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Regional

ESCAP. Perspective on the Economic Development of the ESCAP Least Developed Countries: Bhutan, Lao People's Democratic Republic and Maldives, A Synthesis Paper. December 1989

KIRIBATI - Republic of Kiribati

1. Summary

Economic growth is very slow in Kiribati and whilst the role of agriculture has grown, industry has fallen sharply over the last decade and is today composed of mainly small and cottage industries. An increasing share of the workforce is being absorbed by the subsistence economy and the country is very dependent upon Australia and the U.K. for trade, financial and technical assistance.

The import statistics give little information on the reliance, if any, for agricultural equipment and there is reported to be only very limited activity in the agro-related metalworking sector, undertaken by artisans/workshops. The extent of the facilities available, access to raw material and the technologies employed is difficult to gauge, but the acute shortage of skilled personnel is perhaps indicative of the status of these enterprises. The small local market, and in particular the limited role of agriculture in that market, would not appear conducive to the establishment of an agro-related metalworking industry other than possibly at a very basic workshop level. The export potential is equally discouraging given Kiribati's relative isolation and limited access to significant markets.

New policy initiatives give greater importance to the productive sector, with special emphasis on local resource utilization and domestic sector development. The private sector is being promoted with special attention to small scale industry, but foreign investment is also being promoted.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

Kiribati had a GDP growth of 0.9% over the period 1980-86 and displayed

considerable fluctuations over this period, as illustrated below:-

1980/81	1981/2	1982/83	1983/84	1984/85	1985/86
-5.0%	7.6%	-3.4%	11.4%	-9.3%	3.0%

Source: UNCTAD The Least Developed Countries: 1988 Report, Kiribati, 1989, annex.

Per capita income was estimated (UNIDO, 1980, pp.268) at US$730 in 1974 whilst a further source (UNCTAD, 1989, annex) indicated that in 1986 per capita GDP was only US$317, having fallen by 1.1% since 1980.

b. **Contribution to GDP**

It is reported (UNCTAD, 1986, pp.442) that in 1972 the composition of GDP was broken down in agriculture 13%, industry 38%, construction 4% and trade 2%. In 1986, it was estimated (UNCTAD, 1988, annex) that in terms of GDP agriculture share was 29% and although figures for the manufacturing sector were not available for that year the figure for 1985 was given as 2%. Another source (World Bank, 1988, Country Data pp.1 of 2) quotes the figures for 1985 as being: agriculture 30%, industry 8% and services 62%.

The local manufacturing industry was reported (World Bank, May 1988, pp.11) in 1985 to be confined to small scale operations encompassing handicrafts, furniture, cement blocks, water tanks, soap, printing, small boats and some motorcycle and bicycle assembly. Further, that most manufacturing activities were confined to urban Tarawa.

c. **Employment by Sector**

Formal employment in 1978 was reported (EIU, 1989, pp.90) as representing some 6,630 persons out of a total workforce of about 38,000. A further study (World Bank, May 1988, pp.14) noted that the population census in May 1985 showed that the cash economy registered very little growth since the previous census in 1978. While the labour force grew by about 13% over the period, cash employment rose only by about 5%. Most of the increase in the labour force was absorbed by the subsistence economy and cash employment represented only 19% of the workforce in 1985, against 21% in 1978. About 60% of cash employment continued to be concentrated in urban Tarawa. The detailed percentage distribution of labour amongst the sectors is shown, as follows:-

	1978	1985
Agriculture	4.9	3.0
Fishing	1.4	3.0
Mining	4.0	0.2
Manufacturing	2.3	1.6
Utilities	2.5	2.9
Construction	12.4	5.5
Commerce	11.6	14.0
Services	45.1	56.7

Source: Census of Population 1978 and 1985.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

The most recent import statistics (Table: 1) available are, unfortunately, some ten years old but indicate a virtual nil import situation, with imports in three out of the four years being less than US$10,000 in this sector.

b. Statistical Data on Local Production

Information is not available to indicate what, if any, local production is undertaken in Kiribati though it would not be unreasonable to assume, from the level of imports indicated in Table: 1 that some basic tools are fabricated by local artisans. It is reported (Ministry of Finance, 1988, pp.166) that a sheet metal manufacturing unit was established in 1986 with technical assistance from the Commonwealth Fund for Technical Cooperation, albeit primarily to produce tubs and buckets. The existence of public sector workshops are also reported (UNIDO, 1986, pp.195) to be producing tools, although no further details are available.

c. Company Structures and Manufacturing Operations

Apart from the observations noted in the previous paragraph, no further particulars are available on the enterprises engaged tool manufacture, at an artisan/workshop level.

d. Markets: Domestic and Export

Data on the demand within the domestic market is not available. Export potential in the medium terms would appear somewhat dubious given the technical and manufacturing limitations in this sector, the high weight to value ratio of the products produced in the agro-related metalworking sector, and the remoteness of the islands relative to potential markets.

4. Infrastructural Support

a. Policy support

Industrial policy

Kiribati's National Development Plan (1987-1991) has the main objective of securing a higher degree of economic self-reliance. The government intends to allocate less development expenditure to infrastructure building and more to the productive sectors, with priority given to natural resource exploitation, reflecting a reorientation of investment priorities towards the promotion of growth in fisheries, agriculture and small scale industry.

To promote the private sector, the Foreign Investment Act provides for duty-free imports of capital goods and raw materials and tax holidays of up to five years and the Foreign Investment Commission gives priority to export promoting and import-substituting investments. Indigenous private sector investment is very limited (UNCTAD, 1989, pp.175). During 1988, the Government took initiatives to launch small-scale industries with assistance from Australia and China and a government objective is to expand manufacturing activity by local people.

TABLE 1 Import Statistics: Kiribati - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding tractors)

SITE Code	Description	1976		1977		1978		1979	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/forestry	3,560	N/A	3,177	N/A	4,294	N/A	6,889	N/A
7121	Soil cultivation equipment	1,623	N/A	2,218	N/A	320	N/A	-	-
7122	Harvesting/threshing/sorting equipment	871	N/A	479	N/A	744	1	-	-
71831	Machinery for milling grain	244	N/A	2,311	N/A	-	-	-	-
71839	Other food processing equipment (excl. domestic)	-	-	13,031	3	4,251	1	1,041	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

It is noted (UNCTAD, 1989, pp.175) that to improve the efficiency of public sector enterprises these were to receive subsidies reflecting 6% of GDP in 1988, but that lately the government has taken measures to curtail these payments.

Trade policy

Imports amount to about 80% of GDP, and the exports trade is dominated by two commodities, copra and fish. Kiribati has a liberal foreign-trade regime and, except for some few items, imports are not restricted, nor are exports impeded by taxes or quantitative barriers.

b. Financial support

Extension of bank credit to the private sector has been small, and the sole commercial bank (Bank of Kiribati) invested most of its funds abroad. The World Bank notes (May 1988, pp.iii) that while this partly reflects the small size of private sector activity and the relative paucity of evident lending opportunities, it also reflects a rather conservative approach to lending outside traditional bank operations, namely trade and real estate.

The Development Bank of Kiribati is a wholly government owned development financing institution providing loan and equity to local businesses. The National Loans Board lends for industrial, agricultural and commercial activities and the Kiribati Cooperative Wholesale Society, and member cooperative societies, dominate local retail trade. The Australian dollar is the official currency and the sole circulating medium of exchange.

c. Human

The workforce has a fairly high level of basic literacy, however, there are many expatriate workers, due to a shortage of higher level education and specialized skills, including engineers and mechanics. Technical and post-secondary level training is provided in three training institutes located in Tarawa.

d. Technological

There is no information available to indicate the existence of any technological infrastructure or support facilities in this sector, although technical resources are in evidence through from the automotive/general workshops to the larger scale ship building operations (World Bank, 1988, pp.56) at Betio Shipyard. However, these factors considered, the shortage of technical skills is cited (World Bank, 1988, pp.35) as critical.

e. Services

Transportation poses a major constraint, both inter-island and externally, due to the 33 atolls being spread over a large area and by their remoteness from other supply sources and markets. Electricity supply is also a considerable constraint, with South Tarawa quoted (Ministry of Finance, 1988, pp.348) as the only island with 24 hour electricity supply. It is noted (Ministry of Finance, 1988, pp.171) that a proposal is in hand to develop a small industrial estate, albeit primarily for food processing industries, in South Tarawa with full service facilities to the units on the estate. Further details as to the status of this development are not available.

5. Related or Relevant Programmes

There are no programmes related or relevant to the agro-related metalworking sector.

6. Reference Material

Country Specific

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LAO - Lao People's Democratic Republic

1. Summary

The economy of Lao is undergoing an important transition to become more market oriented, and less state controlled. Although agriculture still occupies more than two-thirds of GDP and of the workforce, the industrial sector is now growing at a very rapid pace, stimulated by far reaching economic reforms undertaken in 1985. Larger autonomy is given to public enterprise, and the private sector is being encouraged.

Information pertaining to the activities and performance of the formal agro-related metalworking sector are insufficiently detailed to make any conclusive assessment. Whilst production of agricultural equipment is undertaken at a local level, indications are that the sector suffers the same inherent constraints as the manufacturing sector as a whole, such as poor management, lack of skilled and poorly trained manpower, inadequate access to raw materials, low productivity and capacity utilization, inappropriate technology and poor maintenance. In the informal sector artisanal activity is acknowledged as sizeable and whilst possibly contributing to the agro-related metalworking sector the extent of these activities, or the methods employed, is not known.

Opportunities in the domestic market would seemingly appear unfulfilled, although further analysis is required, but given the relatively uncompetitive production performance access to export markets seems severely constrained.

Indications are that infrastructural support needs strengthening: in both the type and orientation of training; an improved financial framework to stimulate entrepreneurial activity; institutional strengthening in the area of technology; and remedial action to improve the level of essential services provided.

2. Performance of the agricultural and manufacturing sectors

a. GDP

It is reported (UNCTAD, 1989, annex) that there was no growth in real GDP during the 1970s, averaging -0.1% per ye: and it is shown (Table: 2) that agricultural production grew slowly but total industrial activity fell by a dramatic -4.8% on average during the decade. From 1980 to 1986, however, GDP grew at an average rate of 5.4.% per year, with a high of 9.1% in 1984 (UNCTAD, 1989, annex). This growth was due to a more relaxed policy environment, permitting agriculture to attain a healthy average growth rate of 6.4%, and industry to reach an impressive average yearly growth of 15.3% (Table: 2). Correspondingly, GDP per capita fell by a yearly average of -2.1% through the 1970, but picked up in the 1980s where it rose at an average annual rate of 4.2% and represented (Table: 1) a per capita of US$274 in 1987.

b. Contribution to GDP

Agriculture's contribution to GDP has grown quite regularly, after a low in the mid-1970s and a high of 75.1% in 1980 (Table: 3), and at the end of the 1980s it reached approximately 70% of GDP. The share of industry in GDP has fallen in relative terms, in spite of a high industrial growth rate in the 1980s. In 1987 industry's contribution was only 3.6% of GDP (Table: 3), however, the UNDP (UNDP, July 1989, pp.9) estimates the percentage to be approximately 8.7% in 1988.

Industrial activity is largely confined to the processing of agricultural and forestry products, mining and energy generation, with energy generation representing about 55% of gross industrial output in 1988. About 39% consisted of manufacturing, of which two-thirds was agro-industries and one-third was from construction materials (UNDP, July 1989, pp.8).

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices.
LAO PEOPLE'S DEMOCRATIC REPUBLIC

Indicator	Year or period_	Country	South- and East Asia
GDP per capita (US$)	1970	225	373
	1975	220	452
	1980	195	499
	1986	262	580
	1987	274	601
MVA per capita (US$)	1970	...	49
	1975	...	65
	1980	...	89
	1986	...	116
	1987	...	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.
ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices).
LAO PEOPLE'S DEMOCRATIC REPUBLIC

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	2.1	2.8
	1981-1987	6.4	1.8
	1970-1987	5.1	2.8
Total Industrial Activity (incl. MVA)	1970-1980	-4.8	4.7
	1981-1987	15.3	6.0
	1970-1987	-2.5	3.9
GDP per capita	1970-1980	-2.1	3.3
	1981-1987	4.2	2.4
	1970-1987	0.9	2.7
MVA per capita	1970-1980	...	6.6
	1981-1987	...	5.0
	1970-1987	...	5.5

Source: As Table: 1
Notes: As Table: 1

Manufacturing is characterized by low value added, producing for the local market from either domestic or imported raw materials. The composition and structure of the manufacturing sector is noted (World Bank, July 1988, pp.1-2) to have changed very little since the early 1970s.

c. **Employment by sector**

It is reported (Government of Lao PDR, 1990) that in 1989 the total population of Lao was 4.618 million. The population growth rate is estimated by the same source to be 2.9% per year. The main inter-sectoral employment shift (World Bank, September 1988, pp.71) in Lao has been from agriculture to services, with a more moderate absolute increase in industry. It was reported (UNIDO, 1980, pp.3) that in 1977 the active working labour force totaled about 1,764,000, of which 1,261,000 (72%) were active in the agricultural sector, and fewer than 10,000 (69%) were engaged in mining and manufacturing. Later in 1988, it was reported (World Bank, July 1988, pp.1) that mining and manufacturing together provide employment for fewer than 30,000 people, or less than 3% of the labour force. Taken at face value this represents a significant numerical increase but reflects a fall of one half as a percentage of the labour force.

In 1975 (UNIDO Data Base) employment in manufacturing activities was concentrated in food producing industries, textiles and clothing, wood processing and fabricated metal products. The structure is said (World Bank, July 1988, pp.1) to have remained the same since then.

TABLE: 3 Distribution of GDP at Constant (1980) Prices.
LAO PEOPLE'S DEMOCRATIC REPUBLIC

Year	Agriculture	Total Industrial Activity	GDP
	% of GDP		(million $)
1970	55.8	5.9	610.1
1971	52.1	6.6	634.0
1972	51.1	7.5	658.9
1973	54.6	7.2	651.3
1974	54.1	5.8	662.2
1975	51.0	4.9	665.5
1976	49.4	5.5	627.5
1977	53.8	6.1	618.8
1978	59.9	5.2	580.8
1979	66.7	4.6	615.5
1980	75.1	4.0	626.0
1981	73.1	2.3	705.1
1982	69.0	3.0	748.1
1983	69.8	2.9	770.6
1984	70.1	3.1	854.8
1985	69.0	3.5	924.8
1986	70.2	4.0	965.6
1987	69.8	3.6	1036.2

Source: As Table: 5-1
Notes: As Table: 5-1

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

The most recent information available on the importation of agricultural tools, implements, machinery and food processing equipment relates to the period immediately prior Lao PDR came into being, in 1975. The figures are given in Table: 4, but can only considered of marginal interest at this time. The only evidence of imports since this time is a study (World Bank, 1981, pp.97) which reported, at that time, that government was importing large quantities of farm tools and implements to meet local demand.

b. Statistical Data on Local Production

Information on the extent of production of agricultural equipment by the agro-related metalworking sector is exceedingly vague. The data provided in Table: 5 demonstrates the performance of this sector by the number of items produced. An earlier report (UNIDO, 1983, pp.15) provides an example of the production capability of an agricultural implements plant in Vientiane as being 25 tonnes of nails, 1,700 pails, 2,100 watering cans, 4,200 miscellaneous small tools per year, and 12,000 pieces of chalk per month. How these i) strictly fall into the category of agricultural implements, or ii) correlate with the data presented in Table: 5, is not clear.

Table: 4 Import Statistics - Lao PDR - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding tractors)

SITE Code	Description	1973 US$	1973 No.	1974 US$	1974 No.
6951	Hand tools for agriculture/forestry	15,310	N/A	83,700	N/A
7121	Soil cultivation equipment	30,540	1,243	144,530	10,214
7122	Harvesting/threshing/sorting equipment	4,410	82	104,350	N/A
7129	Agricultural machinery and appliances	1,540	18	27,180	33
71831	Machinery for milling grain	44,000	174	66,160	413
71839	Other food processing equipment (excl. domestic)	1,041,740	43,559	52,700	373

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

Table: 5-5 Local Production: Lao PDR - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding Tractors)

Description/Year	1982	1983	1984	1985	1986	1987(est)	1988*	1989*
Agricultural implements (items)(1)	64,120	23,471	11,507	26,251	60,890	54,920	197,824	263,137

Note (1). Further classification not available.
*Source = Ministry of Industry and Handicrafts, Vientiane, Lao PDR, 1990.
Source: World Bank, Lao PDR Country Economic Memorandum, Report No. 7188 LA, 1988 (pp.171)

c. Company Structures and Manufacturing Operations

There were reported (UNIDO, 1980, pp.16) to be two or three manufacturing industries producing agricultural tools although only two were subsequently identified, namely "Lao Industries" and "555 Factory".

During a UNIDO mission to Vientianne (24 August - 2 September 1990), only two agro-related metalworking industries were identified and visited: the Agricultural Machinery Company, and the Mechanical Manufacturing Factory. They were described by the consultant as follows:

+ The Agricultural Machinery Co., located at km 5 Phone Keng Road

The company was previously called "Agricultural Tool Factory" and was created in 1978 by the Government, as a recipient of the UNDP/AsDB project DP/LAO/79/018. It appears that this project started as DP/LAO/74/018, a metalwork training project assisting a privately owned company "Lao Industries". All machinery existing in Lao Industries were relocated in 1978 to the site of the Agricultural Tool Factory. This new unit was put under the Vientiane Municipality authority as a provincial-level metalworking industry.

In early 1990, however, under the Government's new market oriented approach policy "New Economic Management System" (NEMS) the "Agricultural Tool Factory" changed its name and became a mixed company, the state having 50% of the shares and the company's 57 employees the other half. The totally obsolete metalworking equipment belonging to the ex-Lao Industries, were then transfered back to the old premises.

At the time of the consultant's visit, the premises of the "Agricultural Machinery Co." were poorly maintained and its agro-related manufacturing capabilities was restricted to nails, machettes and shabby-looking shovels. Limited metalworking capacities still exist, but are rapidly dwindling as staff moved or lost practice. In fact, the manager expressed his intention to transform the company into an agricultural machinery dealership and had already imported five rotary tillers and one mobile

rice thresher from Thailand, and was in the process of importing 10 more power tillers (8HP), to be retailed at US$ 2.000 each. He confirmed that there was a good demand for this item around Vientiane Municipality and the main urban areas.

+ The Mechanical Making Factory (MMF), km 8 Thadeua Road

The "Mechanical Making Factory" is an off-shoot of "555 Factory", a large industrial concern, which in 1973 was put under the control of the Ministry of Industry and Handicrafts and divided into smaller units. The cigarette factory unit retained the trade brand and is now successfully operating under Thai management. The factory's mechanical workshop was transformed into a metalworking indudstrial enterprise, called "Agricultural Tools Making Factory" and controlled at central-level because of its size and output capacity. Later, an oxygen and acetylene plant was attached to it and the name updated to "Agricultural Tools Making Factory and Oxygen-Acetylene".

In May 1986, the tripartite agreement between the Government, the Asian Development Bank and UNDP, decided to revise DP/LAO/79/018 (Revision "I") to assist this industrial company with US$ 242,471 for the purchase of a 500 kg electric arc furnace from India.

Also due to NEMS, the "Agricultural Tools Factory and Oxygen-Acetylene" changed its actual name, better known by its acronym "MMF". It is, according to the Ministry of Industry and Handicrafts, the only capable agro-related metalworking industry in the whole country. MMF has good potential as an industrial unit because of its readily available infrastructures and installed equipment, but requires assistance in management-level training.

Outside the formal agro-related metalworking industries it is noted (World Bank, 1981, pp.97) that private workshops are involved in this sector. In a later report (World Bank, September 1988, pp.100) a sizeable informal

Table: 6 Company Structures and Manufacturing Operation: LAO PDR

Company/Location	Ownership	Employees	Turnover	Manufacturing Facilities	Production (Agro-related)	Notes
Lao Industries - Vientiane	Public[1] Provincial Authority	85	N/A	1 No. Die cutting press (20t) 4 No. Stamping press (2t) 1 No. Pillar drill 1 No. Bench grinder 1 No. Arc welder 1 No. Foundry	Plough shares (320/day) Tools (not specified) Total production 20,000 Capacity utilization - N/A	Raw material/ input supply problems.
555 Factory	N/A	N/A	N/A	N/A	N/A	N/A

Source: UNIDO (Consultant Lenaerts, H.E.) Report: Lao PDR Production of Agricultural Tools, 1978.

Notes: (1) Under the Governments economic reform programme, New Economic Mechanism, decreed by the Fourth Party Congress in November 1986, Lao Industries was granted (World Bank, July 1988, pp.29) autonomous status in February 1987.

sector of artisans are acknowledged as making a contribution to the sector. No further statistical data is available.

The salient constraints effecting the sector in general, are: unexperienced management, shortage of skilled labour, scarce access to credit and raw materials, low productivity and capacity utilization, inappropriate technologies and poor maintenance. Plus the inherent shortcomings related to management systems of centrally planned economies, such as lengthy decisions making periods for problems requiring almost immediate action.

In the manufacturing sector in general, capacity utilization is in the order of 30% (World Bank, July 1988, pp. 1) and it is not unreasonable to assume that this constraint also applies to the agro-related metalworking industries.

d. **Markets: Domestic and Export**

Information on market potential is limited. A very early projection for Lao Industries, made by the then UNIDO Project Manager, Mr. H. Lenaerts, in 1976, suggested that there were approximately 560,000 rural families each requiring a Lao spade, medium sized spade, hoe, sickle, mower, hay-fork, rake and machete. Given an estimated three year life span this equated with some 1.49 million hand tools, and that even with the theoretical capacity of Lao Industries, of 300,000 tools per year, only 20% of demand could be met by this plant. Even if optimistic, local production (Table: 5) has fallen far short of this level.

As stated, the government was importing large quantities of farm tools and implements, but a more recent study (World Bank, September 1988, pp.98) indicated that one of the reasons for the slow uptake of agricultural credit was the shortage of equipment and implements for sale. While from this information domestic demand is apparent, export potential would require further detailed evaluation and analysis, given the manufacturing constraints.

4. Infrastructural Support

a. Policy

Industrial policy

Since 1985, the process of improvement in the management system of public enterprises has been significantly changed with a considerable adjustment in most official prices and the introduction of a New System of Economic Management (NSEM), to switch from rigid administrative controls to autonomous decision making by individual enterprises. Under the System, firms have been granted autonomy, which is to say that local managers determine wages and prices on the basis of production costs and anticipated profits, arrange purchases of materials from public and private supplies and are responsible for borrowing capital from the banking sector and making capital investments. Local managers do, however, still consult with the authorities on all these matters (UNCTAD, 1989, pp.177). Inefficient and uncompetitive companies will no longer be subsidised by the State and a new investment code will allow foreign firms to invest either in wholly owned enterprises or to participate in joint ventures.

Most industrial concerns were taken over by the government in 1975, and private activities were until recently restricted to small-scale handicraft production. With the NSEM, a shift in government policy towards the private sector is meant to lead to a gradual increase in industrial investment by private, cooperative and mixed enterprises (World Bank, July 1988, pp.1). The existence of a parallel market, where a wide range of commodities were traded, and the fact that the private agricultural output accounted for about 20% of the GDP in 1988 (UNCTAD, 1989, pp.177) suggests that the private sector was already playing an important role in the economy and that it would greatly prosper if given equality of treatment with the public sector.

The second Five Year Plan (1986-1990) stressed the need for local industries to make greater use of locally available raw materials, to use wage incentives to raise productivity and to improve the quality of output trading, in the hope that industries will respond to demands for improved supplies of

consumer and producer goods. Industries which received support in 1988 included agro-industries, industries supporting agricultural development, basic consumer goods and export oriented industries. The Government policy of economic liberalization has encouraged private enterprises, and some state owned enterprises are being leased out to the private sector.

Trade policy

Traditionally, exports of manufactured goods have been very limited, due to the uncompetitive industrial structure, and an inappropriate policy framework, although lately there has been increased cross-border trade with Thailand.

Several measures were taken in 1988 to stimulate exports, such as the simplification of the procedures for allocation foreign exchange and import licences; authorization for public enterprises and provincial authorities to export their own products directly; and a greater decentralization of decision making power to the enterprise level (UNCTAD, 1989, pp.176). The NSEM included measures to reduce constraints on internal and external trade with a view to promoting increased monetization of the economy through freely contracted trading agreements among all economic agents (World Bank, July 1988, pp.4). In 1987 and early 1988, nearly all import prohibitions were eliminated. The only constraint left (World Bank, September 1988, pp.48) to importation of raw materials and machinery is the lack of foreign exchange.

The almost 300% devaluation of the kip, which took effect in the first half of 1988, has rendered export activities more profitable. Further, as a result of sharp increase in the effective rate of tariff protection, there is better opportunities for import substitution.

b. Financial

The manufacturing sector suffers from a severe lack of foreign exchange resources, as the government in the past gave priority to other sectors in the allocation hard currency funds. This attitude has eased recently, but the

sector is reported (World Bank, July 1988, pp.2) as still not having access to foreign exchange for financing fixed assets, raw materials and spare parts.

The country's financial sector is rudimentary and the only banking institution is the Banque de l'Etat de la RDPL, which combines the functions of central, commercial and development banking. Its role in allocating resources has been minor. Interest rates were determined in the light of government policies with little concern for economic efficiency (World Bank, July 1988, pp.6). With the NSEM, there have been major reforms (UNCTAD, 1989, pp.177) in the state controlled banking system, creating a type of commercial bank which will eventually facilitate private sector transactions. It is reported (World Bank, July 1988, pp.4) that government has decided to move progressively towards a unified exchange rate system in line with the free market exchange rate.

c. Human

Each Ministry or sector has its own professional training institute. There are two technical schools at Vientiane, and five vocational training schools offering two year programmes in mechanics and mechanical engineering, amongst others. A Lao-German Technical School gives a three-year cause in automobile mechanics, electricity, general mechanics, welding and plumbing. The Pakpassak Technical School, receiving technical assistance from the GDR and UNIDO, offers a two-year training programme awarding a certificate of skilled worker, and a three-year programme for a certificate of technician with the choice of twelve sections, including general mechanics and welding courses. There is also a school of public works, and a Polytechnic School which was started up in 1985. Many students are reported (UNIDO, March 1983, pp.25-27) to have trained abroad, in particular in the USSR.

The Lao PDR has greatly expanded its education system since 1975, with much emphasis on vocational and technical sub-sectors. However, educational programmes are not well coordinated and not of very high quality (World Bank, September 1988, pp.71), and not evenly distributed over the country. Instruction tends to be academic and there is very little provision for practical work, due to lack of funds and equipment.

d. **Technological**

There is no evidence of any institutional support for research and development activities in the agro-related metalworking industries, although this may have been addressed on ad-hoc basis in-house. There is insufficient data, from the information reviewed, to indicate the appropriateness of the level of technology employed in this sector although it is noted (World Bank, July 1988, pp.1) that in manufacturing generally most factories operate with antiquated and often obsolete equipment. There is no serious quality control.

e. **Services**

Again, no specific information is available to indicate the existence of constraints by the lack of essential services in the agro-related metalworking industries. However, services in terms of power, roads, communications and water are generally perceived as poor.

5. Related or Relevant Programmes

Country Specific

UNDP/AsDB: DP/LAO/79/018 "Agricultural Tools Manufacturing" US$274,530, 1981-1988

UNDP/FAO: DP/LAO/84/005 "Rehabilitation of Mechanical Workshop" US$383,320, 1986-1990. Objective: workshops.

UNDP/ILO: DP/LAO/85/001 "Rural Technology Center" US$276,550, 1986-1989. Objective: identify, test and disseminate appropriate rural technology.

UNDP/ILO: DP/LAO/79/020 "Vocational Training" US$ 1,256,170, 1987-1989. Objective: Training of instructors in mechanics, welding, carpentry, masonry, etc.

Others

USSR: "Agricultural Machinery Workshop" US$3,166,000, 1980-1982. Objective: Repair of agricultural machinery and delivery of spare parts.

6. Reference Material

Country Specific

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MALDIVES - Republic of Maldives

1. Summary

The Maldives is a typically developing island economy characterized by an acute shortage of material and human resources. Despite this situation the industrial sector is rapidly developing, contributing a growing GDP per capita. The economy had, however, been slowing down over the last decade. GDP contribution and labour force composition are undergoing a slow, but sure, transition towards manufacturing and other urban activities.

There is little evidence of any organized agro-related metalworking sector, although the activities of artisans and small workshops are not known. The limited raw material resource base and the lack of skilled personnel make the prospects for developing the sector as a viable concern highly questionable, given the very limited domestic market potential. The export market potential is, equally, questionable.

The government encourages foreign investments and export oriented activities, but in trying to limit the growth in credit to the private sector and to reduce imports, financial support to small domestic industry has not been a major concern.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

The economy of the Maldives had an average GDP growth rate of 3.6% through 1974-1980, and a rapid 9.9% in 1980-1986 (UNCTAD, 1989, annex). This growth was based on low agricultural growth (1.9%) and high industrial growth (27.0%) in the period 1970-1980. During 1980-1987, the country experienced an improved average annual growth for agriculture (4.9%) and a more normal and healthy growth in industry (9.9%), (Table: 2). Growth in manufacturing was higher than industry in general during 1980-1987, with an average of 10.6%.

GDP per capita grew quickly (10.2%) during the 1970s, but fell to an average growth of 2% from 1980 to 1987, however. MVA per capita grew by an average of 7.1% in 1980-87 (Table: 2). Per capita GDP was US$380 in 1987 (Table: 1).

b. Contribution to GDP

Agriculture's (and fisheries) contribution to GDP has fallen dramatically since 1970 (Table: 3), from an almost total domination (97.2%) of the economy in 1970 it has fallen regularly until 1982 when its share of GDP was 29.5%. Thereafter its contribution stabilized. By comparison, industry and manufacturing displayed significant growth, with industry share of GDP rising from 2.2% in 1970 to 10.1% in 1983, where its position stabilized. Manufacturing activity attained 8.4% of GDP in 1987 and other sectors that gained in importance were construction industry and "other services" (UNIDO Data Base, 1990). The main activity in the Maldives is fishing and fisheries industry, with tourism also being an important traditional sector.

c. Employment by Sector

According to a UNIDO mission (UNIDO, undated, pp.47), the economically active population represented 55% of the working age group in 1985, with the sectoral distribution, as follows:-

Agriculture and forestry:	6%
Fishing:	25%
Manufacturing:	22%
Other industry + mining:	2%
Construction:	5%
Trade and services:	41%

Source: Population census, 1985, (UNIDO, undated, pp.47).

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: MALDIVES

Indicator	Year or period	Country	South- and East Asia
GDP per capita (US$)	1970	112	373
	1975	183	452
	1980	302	499
	1986	360	580
	1987	380	601
MVA per capita (US$)	1970	2	49
	1975	6	65
	1980	13	89
	1986	31	116
	1987	32	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): MALDIVES

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	1.9	2.8
	1981-1987	4.9	1.8
	1970-1987	3.2	2.8
Total Industrial Activity (incl. MVA)	1970-1980	27.0	4.7
	1981-1987	9.9	6.0
	1970-1987	23.7	3.9
Manufacturing	1970-1980	22.5	9.0
	1981-1987	10.6	7.5
	1970-1987	22.2	8.0
GDP per capita	1970-1980	10.2	3.3
	1981-1987	2.2	2.4
	1970-1987	7.8	2.7
MVA per capita	1970-1980	18.9	6.6
	1981-1987	7.1	5.0
	1970-1987	18.4	5.5

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: MALDIVES

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	97.2	2.2	2.1	13.0
1971	87.2	2.3	2.3	14.7
1972	78.2	2.5	2.5	16.7
1973	70.2	2.8	2.7	19.0
1974	63.0	3.0	2.9	21.6
1975	56.5	3.3	3.1	24.5
1976	51.5	3.8	3.4	28.1
1977	46.8	3.9	3.5	31.3
1978	38.9	5.3	3.9	35.9
1979	34.7	6.2	4.4	39.7
1980	34.7	6.2	4.4	47.1
1981	33.5	7.6	6.0	52.6
1982	29.5	9.2	7.6	56.0
1983	29.4	10.1	8.4	58.2
1984	28.1	9.6	8.0	65.7
1985	32.4	10.3	8.6	64.0
1986	29.9	10.3	8.7	68.4
1987	30.2	10.1	8.4	74.5

Source: As Table: 1
Notes: As Table: 1

It is foreseen (UNIDO, undated, pp.51), that the pattern of employment will remain unchanged in the years to come, however, in the rural areas, it is assumed that a decreasing number of male workers will participate in the traditional occupations of boat building and fishing and that rural women will be increasingly involved in cottage industries.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

There are no details to indicate the level of imports, if any, of agricultural tools, implements, machinery and food processing equipment into the Maldives.

b. Statistical Data on Local Production

Equally, though production of agro-related products such as rakes, hoes, coconut scraping blades, axes, watering cans, hand carts, knives and choppers are undertaken in the Maldives, no concrete statistical data is available.

c. Company Structures and Manufacturing Operations

There are no registered activities of any companies engaged in the agro-related metalworking sector. Reference is made (Ministry of Planning and Development, 1984, pp.89) to a number of repair shops and metalworking shops, employing less than 20 workers, but detailed information on the products produced is elusive. Reference is also made (UNIDO, undated, pp.116) to the rudimentary production techniques employed in the production of knives and choppers.

General manufacturing constraints noted in the data review are: i) lack of skilled personnel; ii) lack of raw materials resource base; iii) adaptation of technological processes commensurate with the scale of production; and iv) low productivity.

d. Markets: Domestic and Export

In a study (UNIDO, undated, pp.114) it was noted that a survey of opportunities for metal products was prepared by the Vocational Training Center, Malé. The list identifies the potential agro-related products as rakes, hoes, coconut scraping blades, axes, watering cans, hand-carts and bearing brackets, but gives no indication, numerically, to demand. Given a total of 2,956 workers in agriculture and forestry (UNIDO, undated, pp.47) demand is likely to be extremely low. Export potential is considered minimal due to the fact that the two closest markets, India and Sri Lanka, have well established agro-related metalworking industries of their own.

4. Infrastructural Support

a. Policy

Industrial Policy

Industrial strategy is geared mostly towards export promotion and diversification away from traditional sectors. Incentives have been given to encourage investments in export-oriented industries. Thus, there is very little investment regulation or other government interference in industrial management. According to the 1979 Foreign Investment Law, currency for investors is freely convertible, and profits are easily repatriated. Promotion of foreign investment in the Maldives comes down to promoting export oriented industries.

Trade Policy

Imports cover about 63% of GDP in 1987, and exports represented about 50% (UNIDO Data Base). It is reported (Ministry of Trade and Industry, 1985, pp.3) that the Maldives imported 90% of all requirements, the Maldivian economy is, therefore, extremely dependent upon the generation of foreign exchange.

The government's strategy aims to maximize net foreign exchange receipts through the expansion of fisheries and tourism, diversification to non-traditional products and markets, and an export processing zone is expected to be established on Laamu Atoll. Government policy is liberal in respect of imports, but an import licencing system gives priority to foreign exchange allocations geared to activities with foreign exchange saving or earning potential (UNCTAD, 1989, pp.184). The tariff structure is being rationalized, with the aim of promoting essential imports and discouraging low-priority imports. It is mentioned that import-substituting industries are encouraged (Ministry of Trade and Industry, 1985, pp.5), but no further information is given on the subject.

b. Financial

Presently, there is scarcity of financing for industrial activities in the Maldives and there are no special financial schemes to provide low cost medium term investment loans with easy repayment terms under government guarantees. To dampen import demand, strict credit ceiling have been imposed on banks for both domestic and foreign currency loans. Guidelines have been established to channel credit to priority sectors. In order to mobilize domestic savings, plans are being considered to expand commercial bank facilities in the outer atolls.

c. Human

There is a shortage of skilled and semiskilled workers and it is reported (UNIDO, undated, pp.xiv) that there is also a shortage of people willing to work in high pressure industrial jobs and a reluctance to submit to the discipline of performance-oriented activity. Work motivation is low, and it is said that this is an important reason for insufficient performance, high turnover and absenteeism, resulting in a need to import labour. Though unemployment is as low as 1.5% of the workforce (1985 Census) there is considerable under-employment. There is neither college or university in the Maldives although the Vocational Training Center (VTC) in Malé provides training in, amongst others, diesel engine repair and maintenance, mechanics,

welding and sheet-metal work. Foundry work and automobile repair were also reported to be being introduced. Five Vocational Training Centers are also established in the atolls and one of them, in Eydhafushi (to be transferred to Kuluduffushi), teaches diesel engine repair and maintenance. The VTCs aimed to release skilled workers beginning in 1989, and produce about 134 per year. Although the quality of training in these VTCs is evaluated to be good, there will in future years continue to be a serious shortfall in the supply of skilled technical and professional personnel.

d. **Technological**

The only institution identified as having any development role is the Vocational Training Center, Malé. The extent of this is not known but, in the context of its main training function, is likely only to be peripheral.

e. **Services**

Very general observations are noted (UNIDO, undated, pp.68) with regard to services. In summary, suitability of power and water supplies is dependent upon scale of operation and specific location. Inter-island transport infrequent due to the low volumes of cargo. The Industrial Zone at Gan, Addu Atoll is noted (UNIDO, undated, pp.53) as having good basic facilities but some improvements are recommended, particularly with regard to telecommunications.

5. Related or Relevant Programmes

Country Specific

UNDP/UNIDO: DP/MDV/89/9xx "Assistance to Small Scale Industries" US$392.000. pipeline.
UNDP: "Production Promotion and Credit Project"
UNDP: "Upgrading Rural Industries"
UNDP: "Rural Youth Vocational Training Programme, Phase II"
UNDP: "Restructuring the VTC"

6. Reference Material

Country Specific

Ministry of Trade and Industry, Workshop on Development of Trade and Industry: Republic of Maldives, 1985.
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Ministry of Trade and Industry, Workshop on Development of Trade and Industry, 1985.
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Regional

ESCAP, Perspective on the Economic Development of the ESCAP Least Developed Countries: Bhutan, Lao People's Democratic Republic and Maldives, A Synthesis Paper, December 1989.
UNIDO, Marine Resources as a Base for Industrial Development: Problems and Prospects in the Western Indian Ocean Island States, Vienna, 1986.

MYANMAR

1. Summary

The Union of Myanmar had pursued a centrally planned socialist economic system, by formulating and implementing a series of four year plans from 1974/75 until 1988/89. However, the planned targets were not materialized and economic growth lagged much behind. Myanmar's economic growth had been faltering and had been on the decline since 1986/87 due to the low performance of the key productive sector such as agriculture, livestock and fishery, mining and manufacturing and processing sector which in turn effected trade and in particular foreign trade. The manufacturing capacity as a whole appears to have suffered chronic under-utilization due to shortages of raw materials and spare parts, and also due to the very limited linkages that exist between the various sectors.

After 1988, the Union of Myanmar has implemented major economic policy changes. The Government has undertaken major reforms to liberalize the economy, such as initiatives to attract foreign investment, promote international trade, restructure the State economic organization and encourage greater private sector's involvement.

Inspite of these initiatives, important constraints still remain, such as insufficient financial support. Human resources do not appear to be a major constraint and Myanmar has adopted a policy to eliminate unemployment and under employment. Essential services have failed to meet the needs of the manufacturing sector, but the Government is taking steps to improve the situation.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

It is reported (UNCTAD, 1989, annex) that real GDP grew by an annual average of 4.6% over the period 1970 - 1980 and by 5.0% over the period 1980 -

1986, although this fell towards the end of the period. The economy has steadily deteriorated (UNCTAD, 1989, pp.145) through much of the 1980s with real GDP growth declining to 3.7% in 1986/87, and an estimated 2.2% in 1987/88. This declining growth reflected the slower growth in agriculture, including livestock and fisheries. GDP grew by 7.4% in 1989/90, although the level of production was lower than that realized during 1987/88. (Ministry of Industry, 1990).

Agricultural production grew in real terms by an average rate of 4.4% over the period 1970 - 1980 and by 4.2% over the period 1980 - 1987 (Table: 2). It is noted (UNCTAD, 1989, pp.145), however, that agricultural growth fell from a peak of 6.8% in 1982/83 to 1% in 1987/88, due to bad weather conditions and limited supplies of inputs. Agricultural output grew by 13.3% in 1989/90 (Ministry of Industry, 1990), due to the low level of production after the disturbances of 1988/89 and favourable weather conditions in 1989/90.

After an average annual growth rate of 3.9% over the period 1970 - 1980, industrial activity reached 5.9% over the period 1980 - 1987. Manufacturing activity also improved after the 1970s, but at a slightly slower growth rate, attaining an annual average growth rate of 5.4% over the period 1980 - 1987. It was reported (UNCTAD, 1989, pp.146) that in 1987/88 the manufacturing sector remained stagnant as shortages of fuel and other inputs constrained capacity utilization.

GDP per capita grew by an annual average of 2.8% over the period 1970 - 1987, with a slight acceleration after 1980 (Table: 2), and stood at US$210 in 1987. It is reported (EIU, 1989, pp.40) that the World Bank put the GDP per capita in 1988 at US$282. Despite this, the extent of poverty was quite low because of the plentiful supply of cheap foods and other essentials, and the large informal economy. Nevertheless, the urban population suffered serious food shortages in 1988 and 1989.

b. <u>Contribution to GDP</u>

Agriculture's contribution to real GDP was 44.9% in 1970 and 46.4% in

1987, after attaining a high of 47.5% in 1983. In 1988/89 it was reported to be 40.2% (Ministry of Industry, 1990). Industry, and manufacturing activity in particular, seem to have kept their share of GDP since 1970, attaining respectively 11.7% and 9.9% in 1987 (Table: 3). Another source reports that these were respectively 9.5% and 8.9% in 1988/89 (Ministry of Industry, 1990). The agricultural sector appears to have grown relatively, to the disadvantage of the service sector (UNIDO Data Base, 1990).

c. **Employment by Sector**

The population of the Union of Myanmar in 1989/90, was estimated to be 40.03 million, an increase of 0.74 million over the 1988/89 population of 39.29 million. The growth rate is 1.88%. The working age between 15 years was 22.9 million or 57.5% of the total population (Ministry of Industry, 1990).

During the year 1989/90, out of the total estimated employment of 15.22 million, the largest portion (totalling 10.08 million or 66.22%) was engaged in the agricultural sector. The workers employed in industry constituted the second largest work force, totalling 1.14 million or 7.47% of the total population in 1989/90. Out of this group, the State Economic Enterprises employed 14%, co-operatives 1% and private owned industries employed the remaining 85%, as shown in Table: 4 (Review of the Financial, Economic and Social Conditions for 1990/91). (Ministry of Industry, 1990).

Accurate statistics on under- and unemployment are not available, it is suggested (EIU, 1989, pp.46), however, that both are widespread in urban and rural areas, depending on the season, and that outside the organized state sector there appears to be high labour mobility.

3. **Agro-related Metalworking Industries**

a. **Statistical Data on Imported Products**

Myanmar imports are categorized under three main groups: consumer goods, inter-industry-use goods and capital goods. Change in the pattern of import by type of commodity are shown in the Table: 5.

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: MYANMAR

Indicator	Year or period	Country	South- and East Asia
GDP per capita (US$)	1970	141	373
	1975	141	452
	1980	173	499
	1986	204	580
	1987	210	601
MVA per capita (US$)	1970	14	49
	1975	14	65
	1980	17	89
	1986	21	116
	1987	21	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): MYANMAR

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	4.4	2.8
	1981-1987	4.2	1.8
	1970-1987	5.3	2.8
Total Industrial Activity (incl. MVA)	1970-1980	3.9	4.7
	1981-1987	5.9	6.0
	1970-1987	5.2	3.9
Manufacturing	1970-1980	3.6	9.0
	1981-1987	5.4	7.5
	1970-1987	4.8	8.0
GDP per capita	1970-1980	2.0	3.3
	1981-1987	2.5	2.4
	1970-1987	2.8	2.7
MVA per capita	1970-1980	1.4	6.6
	1981-1987	3.2	5.0
	1970-1987	2.6	5.5

Source: As Table: 7-1
Notes: As Table: 7-1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: MYANMAR

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	44.9	11.5	10.3	3812.6
1971	46.3	11.7	10.2	3970.1
1972	46.1	11.3	10.0	4066.8
1973	43.0	11.2	9.8	4027.4
1974	45.4	10.6	9.4	4132.1
1975	45.7	11.0	9.8	4303.7
1976	45.4	11.3	10.0	4565.4
1977	45.0	11.5	10.1	4837.5
1978	45.5	11.1	9.7	5152.8
1979	45.5	11.1	9.6	5420.4
1980	46.5	11.0	9.5	5850.7
1981	47.1	11.1	9.6	6222.6
1982	47.3	11.2	9.6	6571.4
1983	47.5	11.1	9.5	6859.9
1984	47.0	11.4	9.8	7241.8
1985	46.2	11.5	9.8	7554.4
1986	45.9	12.0	10.1	7831.0
1987	46.4	11.7	9.9	8220.6

Source: As Table: 1
Notes: As Table: 1

Table : 4

Estimated employment in Various Sectors

(1989/90)

Sr. No.	Sector	Numbers (Thousand)	Percentage
1	2	3	4
1	Agriculture	10079	66.22
2	Livestock and Fishery	360	2.37
3	Forestry	175	1.15
4	Mining	78	0.51
5	Processing and Manufacturing	1137	7.47
6	Power	17	0.11
7	Construction	174	1.14
8	Transport and Communications	385	2.53
9	Social Services	394	2.59
10	Administration and other Services	562	3.69
11	Trade	1405	9.23
12	Workers n.e.s	455	2.99
	Total	15221	100.00

Source: Ministry of Industry, Yangon, 1990.

Table : 5

Imports by Type of Commodity

(Kyat in million)

Sr. No.	Type of Commodity	1986/87	1987/88	1988/89 (Provisional actual)
1	2	3	4	5
1	Consumer goods	234.1	222.0	184.4
1	Durable goods	80.2	106.2	85.4
2	Foodstuffs	2.5	12.0	12.0
3	Textiles	16.1	31.0	22.2
4	Medicines & pharmaceuticals	104.8	50.1	43.3
5	Other consumer goods	30.5	22.7	21.5
2	Raw materials & spares for inter-industry use	1158.1	1207.7	813.5
1	Raw materials	643.3	499.7	451.7
2	Fuel			
3	Tools & spares	514.8	708.0	361.8
3	Capital goods	2522.2	2614.3	1406.6
1	Construction materials	583.5	691.1	285.9
2	Machinery & equipment	1484.0	1130.1	648.5
3	Transport equipment	336.5	695.6	425.6
4	Other capital goods	116.2	97.5	46.7
	Commodity unspecified	21.7	21.7	1038.5 *
	Total	3936.1	4065.7	3443.0

Note:- Imports on arrival basis.
* Includes border trade.

Source: Ministry of Industry, Yangon, 1990.

90% of Myanmar imports consists of raw materials and capital goods. The importation of agricultural tools, implements, machineries and equipment is limited by the availability of foreign currency. Myanmar Heavy Industries being the dominating agro-related metalworking enterprise, produced agricultural tools, implements, machines and equipment for the domestic market.

The O.E.C.F. Commodity Loan was available for the funding of such products till 1988-89. After 1988/89, raw materials and auxiliary materials are imported with own Free Foreign Exchange.

Products for farmers were distributed through the Agricultural Mechanization Department, Co-operatives and a small percentage is distributed by Vehicle and Machinery Store's Enterprise. Detailed information relating to the importation of agricultural tools, implements, machinery and food processing equipment is given in Table: 6 for the period 1974 to 1977. At this point in time, the level of imports was quite significant.

b. Statistical Data on Local Production

The plan and result of the local production of agro-related metalworking products of pumping sets, power tillers, threshers, agricultural hand tools, etc. are indicated in Table: 7. The actual production results were either almost steady or showed a slightly downward trend. Production of the said items relies almost completely on import for raw material, parts and auxiliary materials (except for foundary parts).

A very small part of the steel for mamootie hoe is domestically produced. The local manufacturing ratio is rather high, for example 92% for water pumps and 70% for power tillers (Table: 8). All castings and forging products are locally produced for agricultural equipment as a whole.

c. Company Structures and Manufacturing Operations

A report (Gorski, J.B., September 1987, Table: 10) indicated that there were ten industries, in the manufacturing sector, producing agricultural equipment, of which three were state-owned and seven were in the private

Table: 6 Import Statistics: Myanmar - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excl. tractors)

SITC Code		1974		1975		1976		1977	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/ forestry	216,220	N/A	159,620	N/A	19,850	N/A	654,540	N/A
7121	Soil cultivation equipment	5,390	N/A	100,710	N/A	411,370	N/A	15,240	N/A
7122	Harvesting/threshing/sorting equipment	28,000	N/A	54,980	N/A	9,500	N/A	N/A	N/A
7129	Agricultural machinery and appliances	152,290	N/A	406,980	N/A	426,290	N/A	354,590	N/A
71831	Machinery for milling grain	44,410	N/A	68,290	N/A	631,290	N/A	628,510	N/A
71839	Other food processing equipment	17,610	N/A	216,600	N/A	77,280	N/A	1,291,970	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

Table: 7-5 Local Production: Myanmar - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excl. tractors)

Description/Year	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89(1)
Pumpsets	4,928	4,200	4,630	4,920	3,780	2,940
Power Tillers	425	393	190	270	340	200

Notes: (1) Provisional

Source: Ministry of Planning and Finance, Myanmar, Review of the Financial, Economic and Social Conditions for 1989/90.

Production Capacity, Plan and Results

Table: 7

	Product Name	Production Capacity (A)	1987-88 Production Actual (B)	1987-88 Capacity Result Ratio(%) B/A	1988-89 Production Actual (B)	1988-89 Capacity Result Ratio(%) B/A	1989-90 Production Actual (B)	1989-90 Capacity Result Ratio(%) B/A
9	Agricultural Machinery & Equipment							
	Pumping Set							
(1)	4" Pumping Set(SC4C x KND5B)		3050		1695		1425	
	4" Pump With Motor (SC4C x EMEB 4P3-7KW)		150		50		-	
		7200		52		28		24
	4" Pumping Set(High Head) (SVO-102 KB xKND 7)		440		270		330	
	4" Pump With Motor (SVO-102KBxEMFB4P 7.5KW)		80		-		-	
(2)	Light Agricultural Machinery							
	Power Tiller (Model KMB-200xKND7)	600	340	57	115	19	125	21
	Power Thresher Model ATA45xKND5B,PT862xKND5B	500	100	20	90	18	120	24
(3)	Diesel Generating Set							
	2KVA Portable Generator		100		60		39	
	(Model:BSK-120 x KND-5B)	300		117		45		63
	4KVA Portable Generator							
	(Model:BSK-140 x KND-7)		252		75		150	

Table: 7 (cont'd)

Product Name	Production Capacity (A)	1987-88 Production Actual (B)	1987-88 Capacity Result Ratio(%) B/A	1988-89 Production Actual (B)	1988-89 Capacity Result Ratio(%) B/A	1989-90 Production Actual (B)	1989-90 Capacity Result Ratio(%) B/A
(4) Pesticide Equipment							
High Pressure Sprayer (H-2)		680		352		380	
Automatic Knapsack Sprayer(A-8)	10000	1800	25	300	7	-	4
Hand Push Duster (Q-2)		-		-		--	
Rotavator (Model:EG-1800 F)		-		-		-	
(5) Tools							
Hand Tools (9 Types)	400000	29962	7	28250	7	31670	8
Mamooties (3 Types)		433273		342017		302910	
Shovel	600000	16500	76	653	58	9100	53
Pick Axe		5700		4566		6240	
Axe		1000		1040		1100	

Table: 8

Local Manufacturing Percentage and Production Capacity of Agricultural Machines and Implements

Name of factory location and year of establishment	Products Manufactured	Production Capacity Per year	Local Manufacturing Percentage
No(2) Myanma Heavy Industry Malun, (1966)	Tractor (50 HP Type)	1000	87.6 %
	Trailer (1 Type)		90.1 %
Employee-1706	Steel Casting Parts		
	Cast Iron Parts	3376 Tons	100 %
	Forging Parts	300 Tons	100 %
No(3) Myanma Heavy Industry Sinde, (1965)	Water Pumping Set (4 Types)	7200	92.3 %
	Diesel Engines(2 Types)		84 %
Employee-2804			
	Power Tiller(1 Type)	600	70.8 %
	Portable Diesel Gemarators(2 Type)	300	78 %
	Rotary Device	50	20 %
	Pesticide Equipment(4 Types)	10000	94.7 %
	Threshers(1 Type)	500	67.2 %
	Agricultural Hand Tools (1toes-3Types,shovel, Pick Axe Axe etc)	600000	100 %
	Hand Tools (24 Types)	400000	100 %
	Cast Iron Parts	3456 Tons	100 %
	Forging Parts	400 Tons	100 %

Table: 9

Production of Processing and Manufacturing Sector by Commodity Group
(At current prices)

(Kyat in million)

Sr. No.	Commodity Group	1986/87	1987/88	1988/89 (Provisional actual)	1989/90 (Provisional)
1	2	3	4	5	6
1	Food&beverages	22,880	23,540	23,546	40,624
2	Clothing&wearing apparel	1,581	1,216	1,086	1,502
3	Construction materials	1,133	997	834	1,487
4	Personal goods	454	310	319	691
5	Household goods	213	183	208	226
6	Printing& Publishing	309	226	153	309
7	Industrial raw materials	1,653	1,388	1,218	2,072
8	Mineral&petroleum products	1,033	1,043	1,457	2,372
9	Agricultural equipment	119	96	66	87
10	Machinery& equipment	34	39	31	34
11	Transport vehicles	584	457	434	576
12	Electrical goods	250	207	200	150
13	Miscellaneous	663	859	663	886
	Total	30,906	30,561	30,215	51,022

Table 10.

Production of Processing and Manufacturing Sector by Commodity Group

(Quantum Index 1985/86 = 100)

(Index)

Sr. No.	Commodity Group	1987/88	1988/89 (Provisional actual)	1989/90 (Provisional)
1	2	3	4	5
1	Food & beverages	96.32	86.22	93.98
2	Clothing & wearing apparel	57.11	49.48	59.63
3	Construction materials	84.81	67.03	100.89
4	Personal goods	52.75	35.94	51.95
5	Household goods	100.67	109.66	114.89
6	Printing and publishing	63.70	42.78	71.14
7	Industrial raw materials	77.02	58.31	77.39
8	Mineral & petroleum products	79.30	74.68	83.31
9	Agricultural equipment	80.32	45.77	45.64
10	Machinery & equipment	147.47	101.39	123.98
11	Transport vehicles	61.41	46.92	55.85
12	Electrical goods	71.89	49.57	37.54
13	Miscellaneous	86.81	63.92	80.85
	Total	89.52	78.35	88.19

sector. None were registered as co-operatives. Further, that the approximate average annual value of production per factory was US$ 6.33 million for the state-owned factories and US$ 0.14 million for the privately owned factories.

According to the Ministry of Industry (1990) there were officially twenty industries in the manufacturing sector producing agricultural equipment in 1989/90. Three were State-owned and seventeen were in the private sector. None were registered as co-operatives. According to this source, the private sector increased from two in 1988/89 to seventeen in 1989/90 and seems to be expanding. The position of the industry producing agricultural equipment are shown below:

Sector	1986-87		1987-88		1988-89		1989-90	
	State owned	Private	State owned	Private	State owned	Private	State owned	Private
Agricultural Equipment	3	7	3	7	3	2	3	17
Machinery & Equipment	7	5	7	5	7	3	7	20

Of the three State-owned enterprises, the Myanma Heavy Industries (MHI) under the jurisdiction of the Ministry of Industry No. 2 has large-scale facilities for production of agricultural equipment. The outline and a brief history of Myanmar Heavy Industries, and the organization of the Ministry of Industry No. 2 and 1 are attached as Annexure I, II and III respectively.

In September 1990 a UNIDO consultant visited the MHI's factory of agricultural machinery and equipment in Sinde, Pye Township (formerly Prome) about 200 kms north of Yangon. The vast complex was well kept, but performing

at about 10% of its capacity. The General Director of the factory expressed his interest in improving its performance, but argued that, although an open market economy was introduced and that state-owned enterprises were made accountable for themselves, orders still had to come from Yangon for major decisions.

Information on the physical facilities and manufacturing operations undertaken at Myanma Heavy Industries is indicated in Table: 11. The industrial average for the production of agricultural machines and equipment of state-owned industries, with 1985/86 as base, has fallen from 80.32 in 1987/88 to 45.84 in 1989/90 (Table: 10) (Ministry of Planning and Finance 1990 pp. 116).

Average capacity utilization of state-owned industries in general is given (UNIDO, 1989, pp. 15) as having fallen from 57.4% in 1985/86 to 34.4% in 1988/89. Given, as stated, a fall in output of the agricultural equipment industries of some 44% since 1985/86, then the capacity utilization would appear broadly in line with the industrial average.

The principal causes for this poor utilization are attributed (Ministry of Planning and Finance, 1989, pp.4) to the limited supply of both domestic and imported raw materials and spare parts. In the case of imported items, the situation has been aggravated by the acute shortage of foreign exchange. In addition, the political instability during 1988 is also considered to have seriously affected manufacturing capacity. Weaknesses in organization and management capabilities were also quoted (UNIDO, 1989, pp.15) as contributing to low productivity. However, the situation is more promising today due to the introduction in 1989/90 of the new open door economic policy.

There is a general lack of substantial linkages between the various industrial sectors, both small and large scale, resulting in a waste of resources due to expensive repeat investment of metalworking facilities in the State Established Enterprises.

Table: 11(a)

Physical and Manufacturing Facilitiesof Myanma Heavy Industries.

1. Name.	-	No.(2) Myanma Heavy Industry.
2. Type	-	State owned.
3. Location	-	Malun, Myanmar Factorysite(acres), 155 Floor Area (acres) 13.8
4. Annual Turnover	-	
5. Employess	-	Total, 1706
6. Design Capability	-	Drawing Boards.
7. Technical linkage	-	Provides practical in-service training to Industrial Training Center Students(p.a)
8. Raw Material Supplies	-	Procured locally- Pig Iron, Coke. Imported - Raw Materials, Parts, Auxilary Materials, Tools & spares. Lead time - 3 months after placement of order.
9. Type of Equipment and Processes	-	(a) Foundary - Machine Mould and Hand Moulding line. - Self Hardencing Moulding line. - Furnaces - Cupala - Electric Furnace. (b) Forging - Air Drop Hammers. - Forging Press up to 4000 Tons. (c) Press works - Press Machines up to 500 Tons (d) Machine Shops - Lathes(Vertical, Horizontal Automatic, Copy) - Milling Horizontal, vertical copy, Universal. - Gear Making (Hobbing, Shaving Chanfering) - Orinding (Cylindencal, surface, centerless, can) (e) Welding - Spot welding, sean welding Arc welding, Butt welding.
10. Quality Control	-	Measurement and visual Inspection, Flaws inspection, Mechanical Properties Insp. Metal Chemical Composition Inspection, Performance Inspection.

2/-

Table: II (a) (cont'd)

11. Production Capacity	-	Tractors (50 HP)) Trailers))	1000 p.a.,
	-	Steel castings .) Cast Iron Castings))	3376 Tons.
	-	Forging Parts -	300 Tons.
12. Production Capacity Utilization	-	High to Medium.	
13. Marketing	-	(a) Donestic.	
		(b) Access Market Intelligence Data - Few.	
		(c) Strategy (i) Some advertisement.	
		(ii) After sale evaluation and monitoring	
		(iii) Some market research.	

Source: Ministry of Industry, Yangon, 1990.

Table: 11 (b)

Physical and Manufacturing Facilitiesof Myanma Heavy Industries.

1. Name - No.(5) Myanma Heavy Industry.

2. Type - State owned.

3. Location - Sinde, Myanmar-Factory Site (acres) 280
Floor area (acres). 177

4. Annual Turnover -

5. Employees - Total, 2804

6. Design Capability - Drawing Boards.

7. Technical linkage - Provides practical in-service training to Industrial Training Center Students(p.a)

8. Raw Material - Procured locally- Pig Iron,Steel Rods for Hoes.
Imported - Raw Materials, Parts,Auxilary Materials,Tools and spares.
Lead time - 3 months after placement of order.

9. Type of Equipment and Processes. - (a) Foundary - Mutomatic Moulding Line.
- Self Hardening Moulding line.
- Shell Moulding Line.
- Machine and Hand Moulding Line.
- Furnaces - Electric Furnace, [illegible] Rotary Furnace.
- Resin coated sand making.

(b) Forging - Airdrop Hummers up to 5tons.
- Forging Press up to 1600 tons.
- Forging Roll- up to 50 tons.

(c) Press works - Press Machines up to 500 tons.

(d) Machine Shops - Lathes(Vertical,Horizontal, Automatics) Copy.
- Milling M/cs.(Horizontal, vertical,Universal Copy Milling)
- Gear Making (Hobbing) Chanfering shaving).
- Orinding (Can Grinding,centerless surface, cylinderical)
- Broaching (Horizontal,Vertical)

(e) Plating - Automatic Plating, Batch Plating

(f) Welding - Spot welding,Sean welding,

	-	- Projection welding . Arc welding, Butt welding.
10. Quality Control Procedures	-	Measurement and Visual Inspection, Flaws Inspection, Mechanical Properties Inspection, Metal Chemical Composition Inspection, Performance Inspection.
11. Production Capacity	-	Refer to Table ( )
12. Production Capacity Utilization	-	High to Medium.
13. Marketing	-	(a) Domestic and few Export. (b) Access Market Interlligence Data - Few (c) Strategy :(i) Some advertisment. (ii) After sale evaluation and monitoring of products. (iii) Some market research.

source: Ministry of Industry, Yangon, 1990.

Until today, state-owned agro-related metalworking industries has played a major role in Myanmar whereas the private sector has played a very limited role. The example of the average private small and medium scale enterprises is illustrated in Annex IV.

Very little information is available in the role of workshops, blacksmiths and artisans under the Cottage Industries Department or in the informal sector. The general situation of small-scale private sector agro-related metalworking industries as of 1988 is provided in Table: 12.

Table 12: General Situation of Private Sector Agro-related Metalworks (1988)

Particulars	Accounting Units	Blacksmith and Foundry Shops	Farm Implements
Number of Establishments	No	131	17
i) Less than 5 workers		109	14
ii) 5 to 10 workers		22	2
iii) 11 to 50 workers		-	1
Initial Investment	US$ in million	.73	.14
Annual Average Production Valve	US$ in million	1.4	.42

Source: Ministry of Industry, Yangon, 1990

In the co-operative sector, there are 523 industrial producers co-operatives with and annual turnover of Kyats 8.8 million (Ministry of Industry, 1990). Although they are not exclusively agro-related metalworking industries, they produce some agricultrual machine spare parts for tractors, ploughs, harrows and farm implements. The Metallurgical Engineering Producer's Co-operative, Yangon, produces 50 items of components as agricultural machine spare parts. The annual production value of agricultural machine spare parts for 1989/90 was Kyats 3.2 million. There are altogether 13 industrial

co-operatives established by graduates from Yangon Institute of Technology. The progress of the co-operatives societies is shown in Table: 13.

c. **Market, Domestic and Export**

Under the Ministry of Agriculture and Forest, the Agricultural Mechanization Department promotes research and development of agricultural tools and equipment to meet the needs of Myanmar farmers. It has tractor stations in ninety locations with a total stock of 5,000 tractors and makes it available for the use of farmers. In addition, A.M.D. has set up medium-scale repair shops in Yangon and Myittha to produce spare parts for agricultural equipment and offers workshops and counselling. The A.M.D. sells pumps, tillers and threshers through these stations to the farmers.

Statistical information on the sales value of agricultural tools, implements and machinery made by Myanma Heavy Industries and Myanmar Agricultural Services are provided in Tables: 14 and 15 respectively. Quantity sales are given by Table: 16.

Total domestic demand potential is very difficult to comprehend. However, based on the information available, market demand of major items, namely power tillers, threshers and water pumping sets can be estimated:

* **Power Tillers**

The average annual production output of Myanma Heavy Industries for the years 1984 to 1988 was 300 tillers, of which 90% were supplied to co-operatives and farmers through the AMD and the remaining 10% through the Ministry of Agriculture and Forest. The supply ratio of Myanma Heavy Industries is estimated at about 80%.

However, it is noted that because of the present production model being a higher range one, the price is high and farmers can generally not afford to purchase it. The tiller is comparatively complex technologically and, with the engine attached, is relatively heavy. At present, due to the higher cost of draft animals for farming, it can be envisaged that there

Table : .13

Progress of Co-operative Societies

Sr. No.	Type of Societies	1986/87			1987/88			1988/89(Provisional actual)			1989/90(Provisional)		
		Society (Nos.)	Member/ Member Society (Nos.)	Turnover (Kyat in million)	Society (Nos.)	Member/ Member Society (Nos.)	Turnover (Kyat in million)	Society (Nos.)	Member/ Member Society (Nos.)	Turnover (Kyat in million)	Society (Nos.)	Member/ Member Society (Nos.)	Turnover (Kyat in million)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Central Co-operative	1	298		1	298		1	298		1	298	
2	Township Co-operative Syndicate	15	298	1164.6	15	298	1296.7	15	298	958.4	15	298	990.9
3	Township Co-operative	298	18986	4614.6	298	19061	4980.9	298	18638	1891.9	298	18673	3248.1
4	Primary Co-operative Syndicate	137	1102	62.4	137	1099	61.3	116	723	35.2	87	600	29.1
	Total	451	20684	5841.6	451	20756	6330.9	430	19957	2885.5	401	19869	4268.1
5	Agricultural Producers' Co-operatives	86	20972	8.9	86	20537	7.6	86	20564	4.8	86	21334	8.4
6	Co-operative Farms	919	95217	36.6	921	97553	35.1	923	97728	22.5	923	97800	52.8
7	Livestock Breeding Producers' Co-operatives	127	7947	85.3	128	24751	73.4	128	26203	70.3	120	26445	66.6
8	Fish Producers' Co-operatives	607	54328	54.4	606	53120	59.8	606	53991	41.6	606	47673	47.9
9	Forest Product Producers' Co-operatives	66	9821	9.6	66	9609	11.0	66	9864	9.9	66	6663	10.0
10	Mineral Producers' Co-operatives	37	4650	14.2	37	11803	15.9	37	11825	5.8	37	11809	8.9
11	Industrial Producers' Co-operatives	523	96921	260.7	522	104923	286.6	523	105136	142.4	523	105621	149.5
12	Village Tract Co-operatives	12487	4611706	2419.2	12529	4640633	2176.9	12537	4989460	681.9	12540	4995263	1219.5
13	Consumers' Co-operatives	2463	1678748	1763.4	2466	1707299	1579.3	2470	1728687	791.4	2473	1734965	999.6
14	Armed Forces Co-operatives	385	209502	228.7	398	212020	225.7	284	154263	80.4			
15	People's Police Force Co-operatives	304	43887	40.6	304	43496	35.8	304	45200	26.9	304	46774	34.2
16	Co-operative Credit Societies	2732	836813	755.0	2761	842511	666.7	2641	782573	570.4	2347	704513	583.7
17	Services Co-operatives	27	843	7.6	27	1795	12.9	28	2197	17.6	28	2215	17.6
	Total	20769	7671355	5684.2	20851	7770130	5186.7	20633	8027691	2465.9	20061	7801075	3198.6
	Grand Total	21214		11525.8	21302		11525.6	21063		5351.4	20462		7468.7

Note:- Armed forces Co-operatives were liquidated in 1989/90.

Table: 14

Sales of Agricultural Tools, implements and Machinery by Myanma Heavy Industry

No.	Part Name	1987-88		1988-89		1989-90	
		Quantity	Value	Quantity	Value	Quantity	Value
1.	Tractor (50 HP)	529	15610.2	27	1556.2	250	17938.5
2.	4" Water Pumping Set	2435	19347.9	755	8357.7	1600	1771.2
3.	4" High Delivery Pumping Set	239	3389.7	32	636.8	250	4975.0
4.	Power Tiller	30	608.0	1	20.2	120	3432.0
5.	Power Thresher	301	2664.7	17	210.9	75	930.7
6.	Knapsack Sprayer	419	322.6	55	42.3	500	385.0
7.	Power Sprayer and Duster	63	224.3	1	3.5	100	356.0
8.	Hand Duster	1	0.8	125	103.3	100	82.7
9.	Hand Sprayer	362	253.4	596	417.2	500	350.5
10.	Mamootie Hoe	80944	1034.3	96303	1802.9	152660	5239

(Value in Kyat Thausands).

Table : 15

Sales of Sprayers and Agriculture Implements by the Myanma Agriculure Service

(Number)

Sr. No.	Particulars	1986/87	1987/88	1988/89 (Provi-sional actual)	1989/90 (Provi sional)
1	2	3	4	5	6
1	Hand duster		14	1	10
2	Hand sprayer	1267	439	242	332
3	Power sprayer and duster combined	53	6	12	79
4	Secateurs	100			2000
5	Shears	100	48		

Table: 16 Sales of Agricultural Tools, Implements and Machinery: Myanmar

Description/Year	1985/86	1986/87	1987/88	1988/89(2)
Disc ploughs(1)	2	N/A	N/A	N/A
Disc harrows(1)	3	N/A	N/A	N/A
Pumpsets(1)	3,741	3,324	2,681	4,811
Power tiller(1)	349	376	320	592
Thresher(1)	3	62	168	406
Hand duster(3)	55	N/A	14	10
Hand sprayer(3)	3,530	1,367	439	300
Power sprayer/duster(3)	50	53	6	50
Secateurs(3)	N/A	100	N/A	N/A
Shears(3)	N/A	100	48	N/A

Notes:

(1) Sales recorded by the Agricultural Mechanization Department and Myanmar Heavy Industries Corporation

(2) Provisional

(3) Sales recorded by the Myanmar Agricultural Corporation

Source: Ministry of Planning and Finance, Myanmar, Review of the Financial, Economic and Social Conditions for 1989/90 (pp.43 and pp.50)

will be a very high demand for a simplified type of power tiller. considering its functioning and cost.

According to the Agricultural Mechanization Department (UNIDO. 1990). the need of power-tillers were estimated at more than 500.000 units. because agricultural land amounts to 10 M. Ha with a "net sown" double cropping area estimated at more than 20 M. Ha.

* **Thresher**

The annual average production output of Myanma Heavy Industries for the year 1984 to 1986 was 240 threshers. These being handled by AMD. and the supply ratio was only 50%. In the past. the rice grain harvested by farmers has been sold to the Government via MAS in the form of unthrust rice. However. since 1989 sales and distribution of rice grain has been liberalized by the Government. farmers are now responsible for the threshing and hulling of their own rice and this has produced a rapid increase in demand for threshers (Ministry of Industry. Yangon. 1990).

* **Water Pumping Sets**

The average annual production of Myanma Heavy Industries for the period 1984 to 1986 was 4.500. of which 80% was supplied for agricultural irrigation. According to AMD. this supply represented ony 60% of their requirement. Taking into consideration the requirements of Government institutions and private sector demands, the present domestic demand can be estimated as approximately 11.000 per annum.

The activities of Myanmar Agriculture Service (MAS) range from land use. agriculture and applied research to extension and its main concern is the adequate transfer of technology to the farming sector. MAS suggests (UNIDO. 1990) that the mechanized irrigation component of Myanma agriculture be improved. as only 12% is at present irrigated. While Upper Myanmar is hilly and dams could be built for gravity irrigation. the Lower Myanmar needs waterpumps. More than 500,000 units might have been sold over the last 30 years (UNIDO. 1990). The private sector is already

producing crude engine blocks and other parts to answers high demand. According the the AMD (UNIDO. 1990) small rice mills (englebert type) are being produced by blacksmiths at village level and they would use the KUBOTA KND7 waterpump engine as a prime mover.

Information on the total population of agricultural tools. implements and machinery. owned by co-operative societies. is scheduled under Tables: 16&17. Information on the agricultural tools. implements and machinery owned by the Myanmar Agricultural Corporation is given in Table: 18. Assuming that the marketing environment is conducive. it would not be unreasonable to assume an overall annual replacement level of 30 to 50%. Such a figure would indicate a healthy potential for replacement equipment even neglecting new scales (Ministry of Industry. Yangon. 1990).

Export of agro-related metal products is poor. As most of the industries have no experience in international marketing. the exportation of agricultural machinery and implements presents difficulties. Also the agro-related industries barely cope with the domestic demand. export of agricultural machines is non-existant. However. Myanma Heavy Industries. as a first step to penetration of export market. has exported casted parts to the industries which have cornered the existing market. Export of casted parts is undertaken because of excess capacity in the foundries. Total export value achieved up-to-date by agro-related metalworks of Myanma Heavy Industries increased as below:

Table: 19 Export Earning by No. (3) Myanmar Heavy Industry

Particulars	Export Earnings (US$)
Diesel Engine and Pumps	2.764.310
Water Pumps	138.550
Water Pump Accessories (Foot Valves&Collars)	241.874
Casted Parts for Mini Tractors	9.487
Casted Parts for Irrigation Water Sluce Gates	7.142
Man Hole Cover&Frames	96.883
Base Plate for Printing Press	17.550
Total	3.275.796

Source: Ministry of Industry. Yangon. 1990

Table: 17

Tractors, Water Pumps and Agricultural Implements owned by Co-operative Societies

Sr. No.	Particulars	A/U	1986/87	1987/88	1988/89 (Provisional actual)	1989/90 (Provisional)
1	2	3	4	5	6	7
1	Tractor	No.	3.805	3.806	3.773	1.727
2	Disc plough	"	3.528	3.528	3.515	1.790
3	Disc harrow	"	3.704	3.704	3.887	1.881
4	Power tiller	"	409	409	409	286
5	Rotar cultivator	"	9	9	9	7
6	Trailer	"	1.005	1.008	1.005	730
7	Water pump	"	7.173	7.173	7.171	4.280
8	Thresher	"	79	79	73	65
9	Rice huller	"	72	72	72	47
10	Rotary slasher	"	4	4	4	4

Table: 18.1 Population of Agricultural Tools, Implements and Machinery:[1] Myanmar

Description/Year	1985/86	1986/87	1987/88	1988/89[2]
Disc plough	N/A	N/A	3,528	3,528
Disc harrow	N/A	N/A	3,704	3,704
Rotary cultivator	N/A	N/A	9	9
Pumpsets	N/A	N/A	7,173	7,173
Power tillers	N/A	N/A	409	409
Thresher	N/A	N/A	79	79
Rice huller	N/A	N/A	72	72
Rotary slasher	N/A	N/A	4	4
Hand duster	1,527	1,513	1,486	1,406
Hand sprayer	9,914	9,836	10,315	10,545
Power duster	57	65	71	61
Power sprayer	779	775	745	755
Power duster/sprayer	488	501	509	527
Other sprayers	964	941	921	1,078

Notes (1) Owned by the Myanmar Agricultural Corporation

(2) Provisional

Source: Ministry of Planning and Finance, Review of the Financial, Economic and Social Conditions for 1989/90 (pp.42 and pp.51)

Table: 18 b

Utilization of Sprayers owned by the Myanma Agriculture Service

Sr. No.	Particulars	1986/87	1987/88	1988/89 (Provisional actual)	1989/90 (Provisional)
1	2	3	4	5	6
1	Hand duster	1,513	1,454	1,376	1,301
2	Hand sprayer	9,836	10,039	9,911	9,848
3	Power duster	65	20	19	17
4	Power sprayer	775	728	679	657
5	Power sprayer and duster combined	501	551	538	503
6	Other sprayers	941	922	871	783
	Total	13,631	13,714	13,394	13,109

4. Infrastructural Support

a. Policy

Myanmar has implemented a series of four-year plans formulated within the framework of the guidelines for long and short term plans laid down from 1974/75 until 1988/89. However, the planned targets were not materialized and economic growth lagged much behind. Hence the political and economic reforms were undertaken in the latter part of 1980, replacing the socialist centrally planned economic system by liberalized and open door economic policy based on market orientation. A number of reform measures are being adopted: restriction of private participation in economic activities are being removed; trade is being liberalized allowing private and co-operative sectors to participate in foreign trade, where previously it was confined only to the state; farm prices and other prices are being decontrolled; planning of crop production has been removed and farmers are free to produce in time with the market demand; state subvention of agricultural inputs is being terminated, however, other extension services such as propagating quality seeds, introduction of new agricultural techniques and other supportive measures are continued. The foreign investment law has been endorsed to attract direct foreign investment. Border trade once termed as illegal, has been legalized.

Industrial Policy

Major investments have, since 1961/62, been confined to state-owned industries and all important means of production were state-owned. In an initiatve to rehabilitate State Economic Enterprises, they were given autonomy over their administrative and financial matters in the mid 1970s. To further improve the efficiency of public enterprise supervisors and workers, a system of incentives through a bonus scheme was introduced in the late 1970s. The price of commodities produced by the state industries was raised in order to cover the rising costs of domestic and imported industrial raw materials, other inputs and overhead costs.

The long-term objective of Myanmar's industrial development is to transform the predominantly agricultural economy into an agro-based industrial

economy, to give priority to the development of export-oriented industries based on domestic raw materials and to establish light and heavy industries to meet domestic demand and as a base for exports. Emphasis has been placed on the substitution of imported raw materials and spare parts with local produce; the introduction of quality control; the provision of technical training to promote labour productivity; and the formation of mutually beneficial economic co-operation with foreign entrepreneurs in accordance with the changes in the economic policy.

The foreign investment law of 1988 has empowered the Foreign Investment Commission to grant wide ranging investment incentives and since then several joint ventures have been undertaken. With a view to accelerating the growth of the manufacturing sector, private enterprises are being encouraged to invest extensively in the economy in consonance with the economic reforms. Joint Ventures are being formed with foreign private entrepreneurs with a view to mobilizing foreign exchange, encouraging the transfer of technology and creating job opportunities.

Trade Policy

Manufactured exports have not yet emerged as a major factor in Myanmar's foreign trade, and accounted in 1989 for only 6.1% of the countries total exports. Shortage of foreign exchange is reported (UNIDO, June 1989, pp.5) to have led to serious bottlenecks and constraints with regard to essential import requirements in the manufacturing sector.

Imports are subject to an ad valorem tariff, and a sales tax on goods imported for sale. The export and import trade is administered by the Myanmar Export-Import Corporation, but private traders can now engage in foreign trade after registering with the Ministry of Trade. Import licences are required for all goods except imports on Government account (EIU, 1989, pp.68) and authorized imports carry an automatic exchange permit. Foreign exchange transactions can be made only through the Foreign Trade Bank and there is a rigid system of exchange controls. To encourage capacity utilization, the Government is reported (UNCTAD, 1989, pp.145) to be giving foreign exchange priority to the import of industrial inputs.

According to the development plans, official imports have concentrated in the capital goods sector and imports are virtually determined in advance on the basis of anticipated export earnings.

In late 1988 new regulations were announced covering trade and investment, involving a return to a more open regime. Co-operatives and private entrepreneurs are now allowed to engage in domestic and external trading activities and official border trade has been initiated with China, immediately triggering off thriving trading activities. Private exporters have been allowed to retain 60% of their foreign exchange earnings to finance imports of any kind. Buy-back systems and counter-trade arrangements are being encouraged with the aim of promoting the export of manufactured goods.

As a result of the new economic policies, the private sector is expected to grow at a very fast rate. In the process, the whole range of enterprises, but mainly the small and medium sized ones, is expected to emerge.

Financial

The financial sector is managed by the state, and a serious problem for the economy is the inability of the state to mobilize domestic capital for investment. There is a large foreign currency black market which facilitates smuggling, mainly across the border to Thailand. It is reported (UNCTAD, 1989, pp.144) that the Government has maintained tight restrictions on capital expenditures, imports and non-concessional borrowing since 1983/84, in response to growing foreign exchange shortages.

For the development of economy, programmes have been laid down for the mobilization of financial resources from both internal and external financial resources. External financial resources are acquired through foreign loans and grants and also by introducing direct foreign investment in accordance with the Foreign Investment Law.

To mobilize domestic resources, efforts have been made to meet financial requirements through domestic savings, while additional requirements are financed through foreign loans and grants. The above mentioned programmes are

formulated for the allocation of funds to the SEE. Co-operatives and the private sector. It reflects the annual economic plan and the budget and takes into account the plan's priorities concerning investment and profitability. Credit is extended to the SEE after appraisal of projects. For Co-operatives. credit limits are set on the basis of their annual plans and project proposals. Loans to the private sector are sanctioned in accordance with the merits of each individual case.

Human

In 1989/90 technical education was catered for by the Institute of Technology. Yangon (enrollment 4.863). twelve Technical High Schools (enrollment 6.285). ten Technical Institutes (enrollment 6.493) and Thirty-five other vocational classes (enrollment 1.587). In addition. there were also different arrangements for seven Engineering Evening classes in which 2.278 students were enrolled. (Table: 20). A district Training Centre for middle school graduates is established with aid from the Federal Republic of Germany.

It is noted (UNCTAD. 1989. pp.145) that. to supply manpower for the manufacturing sector. a new education curriculum was introduced in 1986/87 with the aim of training technicians and skilled workers. Training programmes are being conducted for the improvement in production techniques. product quality and for promoting the efficiency of industrial workers. The National Vocational Training Centre under the Ministry of Labour has conducted courses. in co-operation with UNDP and ILO. to train supervisors and foremen of industrial establishments. They would in turn train other workers in their respective organizations. The Centre also has courses for training officers in management.

With the opening up of the economy and the creation of a favourable climate for foreign as well as for domestic investment. Myanmar may need to turn out qualified people in large numbers in a wide spectrum of subjects. A systematic assessment of manpower demand and supply should be made to entrance the manpower supply position and to facilitate mobility of labour in line with the changes in economic policy. The inservice training programmes and basic

Table: 20

Schools, Teachers and Students

(Number)

Sr. No.	Particulars	1987/88				1988/89 (Provisional actual)			1989/90 (Provisional)		
		Schools	Teachers	Students		Schools	Teachers	Students Enrolled	Schools	Teachers	Students Enrolled
				Total Enrolled	Final Year Passed						
1	2	3	4	5	6	7	8	9	10	11	12
1	Primary Schools	31499	166950	5046471	898008	31499	166850	5159930	33499	192630	6423040
2	Middle Schools	1702	44958	1094844	133498	1702	44958	1134303	1852	46707	1134303
3	High Schools	726	16536	241355	30813	726	16536	264892	763	17331	264892
4	Academy for Development of National Group	1	62	780	190	1	62	786	1	84	789
5	Teachers' Training Schools	14	271	2055	2052	14	271	2072	14	271	2072
6	Teachers' Training Institutes	4	185	1578	1572	4	185	1701	4	185	1781
7	Technical High Schools	12	366	4446	1272	13	369		13	376	5285
8	Technical Institutes	10	470	6493	1419	10	453	6459	10	477	6493
9	Agricultural High Schools	9	92	284	174	9	90		9	94	379
10	Agricultural Institutes	7	176	695	179	7	176	695	7	182	695
11	Other Vocational Schools	35	248	3776	2911	35	243	1526	35	245	1587
12	Engineering Evening Classes	7	93	3129	1992	7	93	1129	7	93	2278
13	Universities and Colleges	30	6251	256758	41666	30	6225	221979	31	6256	222295
1	Universities	3	3908	65421	14333	3	3201	78062	3	3284	78062
2	Degree Colleges	6	761	29228	2429	6	802	21301	6	805	21301
3	Colleges	11	742	20379	6489	11	707	12964	11	801	12964
4	Institutes of Medicine	3	612	4199	456	3	612	3762	3	612	3760
5	Institute of Dental Medicine	1	58	410	56	1	58	346	1	58	346
6	Institute of Animal Husbandry and Veterinary Science	1	48	849	157	1	44	820	1	44	828
7	Institute of Economics	1	173	5229	1030	1	155	5065	1	155	5065
8	Yangon Institute of Technology	1	233	5120	862	1	229	4863	1	225	4863
9	Institute of Agriculture	1	97	1919	564	1	105	1574	1	106	1574
10	Institute of Education	1	115	3241	1167	1	109	4015	1	105	4015
11	University Correspondence Courses			105587	14016			87881			87881
12	Institute of Foreign Languages	1	24	1166	163	1	44	1318	1	44	1318
13	Institute of Computer Science								1	17	322
	Total	34056	236658	6662664	616546	34057	236611	6814986	36265	264931	8145893

Note:- 1. The staff of the correspondence courses were included in the Universities' staff.
2. The number of students from schools, universities and colleges that had been closed as at of 1988/89 enrolment.

vocational training facilities need to be strengthened. Improvement of the managing skills of the middle and office class managerial personnel is also required. It is particularly desirable to train the personnel in Industrial Engineering. Education should be given to improve production control and supervision. Furthermore, should the necessity arise, new institutions may have to be conceived and more technical assistance sought from bilateral and multilateral sources (Ministry of Industry, Yangon, 1990).

Technological

The level of technology employed in the private and Co-operative industrial sector is generally of a medium-range. The agro-related metalworking sector of SEE, has been established with technology from developed nations which is of relatively high level. Today, linkages with industries from developing nations have been established. It is noted (UNIDO, 1989, pp.18) that Myanmar's first joint venture, Myanmar Fritz Werner Corporation, produces machine tools and metal fabrication equipment. Further, that in the agro-related metalworking sector various technical cooperation agreements were concluded (UNIDO, 1989, pp.24) with foreign partners from Japan (irrigation pumps and other equipment) and Czechoslovakia (50 horsepower tractors).

The Yangon Institute of Technology, through its research and development activities, contributes to the improvement of the levels of technology employed in industry. The Metallurgical Research and Developing Centre, under the Ministry of Mines and established under JICA assistance, is active in promoting technological advancement in the field of foundry work.

At a national level, Central Research Organization (CRO) under the Ministry of Education is the only industry-oriented research and development institute. CRO is charged with the responsibility for disseminating scientific and technological information, research on appropriate technologies and trouble-shooting services. As a multi-discipline organization, it comprises 10 technical departments and 6 supporting departments, with a total staff complement of about 65, in 1990. Technical Services are also provided under the Ministry of No. 2 Industry to assist in industrial consultancy for process

engineering, plant designs and transfer of technology, employing some 656 persons.

Quality control procedures in the agro-related metalworking sector is undertaken by SEE and Industrial Co-operative Societies. Dimensional inspection, visual inspection, mechanical properties inspection, analytical analysis inspection of cast parts, flow dection by ultrasound and magnetic flow detection methods are applied in the agro-related metalworks by Myanma Heavy Industries. Final inspection, sub-assembly inspection and finished products performance inspection systems are applied. In the co-operative, agro-related metalworking works, visual inspection and dimensional inspections are applied.

The Central Research Organization under the Ministry of Education is responsible at a national level for the establishment of standards and specification. Although the Myanma Heavy Industries have standard drawings of all basic metal parts which are based on major standards as JIS, DIN and ISO, until now National Standards have not yet been established. In view of future industrialization and increased domestic production, Myanmar is now at a point where it must determine how to proceed with standardization at national level.

Services

Myanmar still needs to improve the essential network of energy and infrastructure to meet the needs of the manufacturing sector.

a. Energy

The country is richly endowed with both renewable and non-renewable energy resources. In spite of this abundance, their exploitation is subject to many limitations. Foreign exchange constraints have hampered active drilling programmes, which requires a large number of consumables. This has resulted in decreased production of crude oil and natural gas, while inability to make heavy investments has prevented exploitation of abundant hydro-power resources. With the recent developments in the economic policy of Myanmar, external co-operation will increasingly be sought to strengthen this sector.

The overall strategy in the coming years will be to rehabilitate energy resources by injecting additional investment and to undertake exploitation of new energy resources.

Natural gas is now used in many areas, and the further development of on-shore gas resources is planned. The existence of a large off-shore gas deposit has already been established, and the development of this gas field could be another major venture.

In the power generating sector, the 1990s could see the construction of major hydroelectric power units in various parts of Myanmar. The near future will see the construction of one 11 MW and one 280 MW hydro-electric projects. The State is planning to supply electric power to industries, to extend installed capacity, to promote low cost technique generation in suitable regions and to systematically arrange for effective end use of power.

There is thus a potential for significant expansion in the energy sector, and the proper exploitation of that potential could result in not only an abundent domestic supply but even exports in the 1990s.

b. Infrastructure

Myanmar still needs to improve the communication network and the existing transport facilities. Rail, air and overseas transport are handled solely by the state. Road and inland water transports is operated mainly by the private sector which accounts for about 85% of transport volume. During the latter part of the 1980s, the sector suffered from inadequate spare parts and fuel. The physical infrastructure of Myanmar is in need of a drastic improvement in all areas.

5. Related or Relevant Programmes

Country Specific

UNDP/ILO: DP/BUR/007 "Small-scale Industry Development in the Co-operative Sector". US$ 274.000. 1986-1987.
UNDP/UNESCO: DP/BUR/78/002 "Development of Technician Training". US$ 933.900. 1979-1988. Objective: Technical support to selected regional Colleges. Assistance in development of technician training.
UNIDO: SI/BUR/86/811 "Training of 25 Welders from Burma Dockyard Corporation".
UNIDO: SI/BUR/86/863 "Solution of Shop-floor Casting Problems".
UNDP/UNIDO: DP/BUR/88/001 "Welding Techniques Burma Dockyard Corp." US$ 397.000. pipeline.
UNDP/UNIDO: DP/BUR/88/002 "Foundry Quality Control Laboratory". US$ 399.000. pipeline.
UNDP/UNIDO: DP/BUR/88/028 "Reconditioning of Machine Parts". US$ 1.400.000. pipeline.
UNDP/UNIDO: DP/BUR/88/9XX "Prototype Development. Tool Room and Engineering Services". US$ 1.470.000. pipeline.

Regional

UNDP/FAO: RAS/86/189 "Post Harvest Technology". US$ 722.551. Based in Bangkok.

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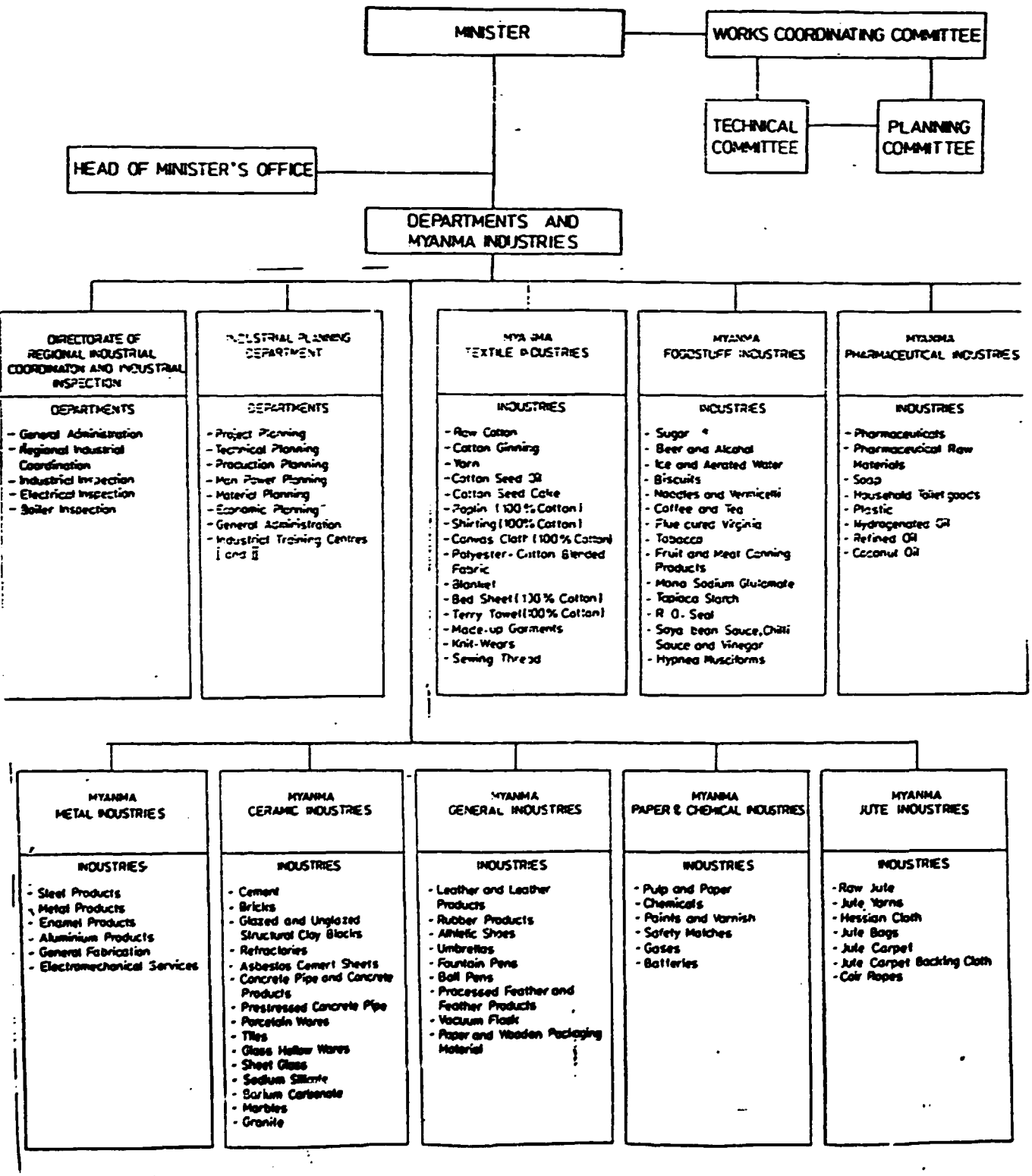
ORGANIZATION

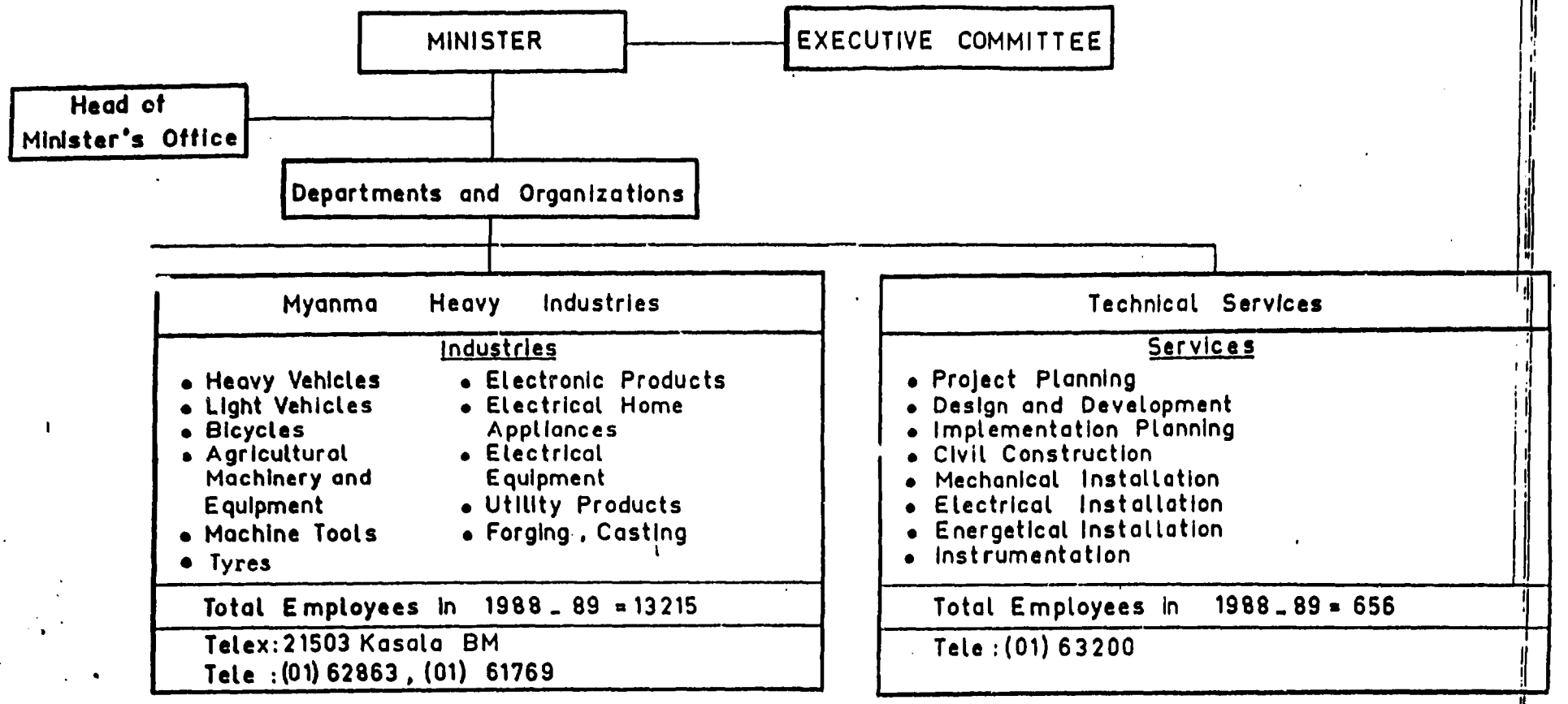
OF

MINISTRY OF NO.1 INDUSTRY

1989-90



ORGANIZATION
OF
MINISTRY OF NO.2 INDUSTRY
1989-90



OUTLINE OF

MYANMA HEAVY INDUSTRIES

MYANMA HEAVY INDUSTRIES

I. ORGANIZATION OF MYANMA HEAVY INDUSTRIES ✓

1. In May 1960, Home Utility Division was formed as the forerunner of Myanma Heavy Industries (MHI) to manufacture Bicycles and machinery spares for existing Industries of Myanmar.

2. Since 1975 Myanma Heavy Industries is a state owned, commercial enterprise formed under the Ministry of Industry (2). The main business activities are in the field of manufacturing, marketing and technical services.

3. Presently, Myanma Heavy Industries is operating with five divisions namely:

   (1) Vehicles Division

   (2) Agricultural Machinery and Equipment Division

   (3) Electrical Equipment and Electronic Products Division

   (4) Machine Tools Division

   (5) Engineering Services Division

4. In the Vehicles Division,

   (i) Trucks and Buses are manufactured in technical cooperation with HINO Motors, Ltd.,of Japan.

   (ii) Light Vehicles are manufactured in technical cooperation with MAZDA Motor Corporation of Japan.

   (iii) Automobile and Agricultural Machinery Tyres are manufactured in technical cooperation with TECHNOEXPORT Foreign Trade Co.Ltd.,of Czechoslovakia.

   (iv) Diesel injection pumps and nozzles are going to manufacture in technical cooperation with OMNIPOL Foreign Trade Corporation of Czechoslovakia.

5. In the Agricultural Machinery and Equipment Division,

(i) Light agricultural machineries and equipment, such as water pumping sets, power tiller, sprayer etc. are manufactured in technical cooperation with Kubota, Ltd., of Japan.

(ii) Tractor and trailer are manufactured in technical cooperation with Motokov Foreign Trade Corporation of Czechoslovakia.

6. In the Electrical and Electronic Products Division,

(i) Electrical and electronic products are manufactured in technical cooperation with Matsushita Electric Industrial Co.Ltd., of Japan.

(ii) PVC insulated electric cables are manufactured in technical cooperation with Fritz Werner International GmbH, Federal Republic of Germany.

7. In the Machine Tools Division,

(i) Machine tools are manufactured in technical cooperation with DIAG, Federal Republic of Germany.

(ii) Welding electrodes are manufactured in technical cooperation with OERLIKON Welding Division of Switzerland.

8. In the Engineering Services Division,

Services are offered in fabrication and installation works for industry and infrastructure such as installation of Water Supply Plant, Broadcasting Networks, Power Generation, Power Distribution and Industrial Systems.

9. At the present moment, under Myanma Heavy Industries there are six factories and one Technical Training Centre.

Name of Factory Location and Year of establishment	Project and activities	Production capacity per year	Local manufacturing percentage achieved (%)
No. (1) Factory Yangon. (1960) Employee = 2842	(1) Electrical Home Appliances and Electronic Products Manufacturing Project		
	- Incandescent lamp (4 types)	3,000,000	63 %
	- Fluorescent lamp (2 types)	500,000	71.2 %
	- Mercury lamp (3 types)		23.3 %
	- Lighting Fixture (4 types)	40,000	96.67 %
	- Fixture for mercury lamp (3 types)	4,500	42.0 %
	- Electric Iron (1 type)	24,000	87.57 %
	- Electric Hot Plate (1 type)		86.33 %
	- Rice Cooker (2 types)		74.11 %
	- Dry Cell Batteries (3 types)	24,000,000	81.85 %
	- Electric Accessories (32 types)	1,?50,000	96.56 %
	- Air conditioner (1 type)	1,200	CKD
	- Refrigerator (1 type)		CKD
	- Radios (5 types)	>0,000	59.68 %
	- Colour T.V. Receiver (2 types)		CKD
	- Electronic calculator (2 types)		CKD

Name of Factory Location and Year of establishment	Project and activities	Production capacity per year	Local manufacturing percentage achieved (%)
	(2) Electrical Home Appliances and Electronic Products Manufacturing Project		
	- Dry cell battery (1 type)	12,000,000 pcs	81.85 %
No. (3) Factory Sinde. (1965) Employee = 2804	(1) Agricultural Machinery and Equipment Manufacturing Project		
	- Water pumping set (4 types)	7,200	92.3 %
	- Pesticide equipment (4 types)	10,000	94.7 %
	- Powertiller (1 type)	600	70.9 %
	- Thresher (1 type)	500	67.2 %
	- Portable diesel generator (2 types)	300	78 %
	- Mamootie (3 types)	600,000	100 %
	- Hand tool (24 types)	400,000	100 %
	- Cast iron parts	3,456 tons	100 %
	(2) Electrical Home Appliances and Electronic Products Manufacturing Project		
	- Watt hour meter (2 types)	27,500	85 %
	- Electric motor (5 types)	1,500	95 %
	- Electric fan (3 types)	2,000	92.6 %
	- Torch lamp (3 types)	300,000	79.7 %

Name of Factory Location and Year of establishment	Project and activities	Production capacity per year	Local manufacturing percentage achieved (%)
	- Dynamo (1 type)	20,000	64.9 %
	- Lighting fixture	48,000	91.2 %
	(3) Light Vehicle Manufacturing Project		
	- Forged parts	400 tons	100 %
	- Ductile cast iron and maleable cast iron parts	518 tons	100 %
	(4) Welding Electrode Manufacturing Project		
	Welding electrodes	2,000 tons	100 %
No. (4) Factory Htonbo. (1970) Employee = 1737	(1) Light Vehicle Manufacturing Project		
	- Light vehicle (4 types)	1,200	78.25 %
	- Gasoline Engine		
	- 2000 cc	800	80 %
	- 600 cc	700	90 %
	- Piston (14 types)	167,000 pcs	100 %
	- Piston Ring (14 types)	1,361,000 pcs	100 %
	- Aluminium casting parts	300 tons	100 %
	- Bronze casting parts	120 tons	100 %
	- Die casting parts	68 tons	100 %
	(2) Electrical Home Appliances and Electronic Products Manufacturing Project		
	- Storage Battery (5 types)	38,200	95.7 %
	(3) Heavy Vehicle Manufacturing Project		
	- 140 H.P. Diesel Engine	1,200	91 %

Name of Factory Location and Year of establishment	Project and activities	Production capacity per year	Local manufacturing percentage achieved (%)
No. (5) Factory Myaung-chi-dauk. (1974) Employee = 508	(1) Machine Tools Manufacturing Project		
	- Machine Tools (6 types)	140	68.3%
	(2) Electrical Home Appliances and Electronic Products Manufacturing Project		
	- Distribution transformer (6 types)	360	68%
	(3) PVC Insulated Electric Cable Manufacturing Project		
	Electric Cable (9 types)	9,950 KM	100%
No. (6) Factory Thaton. (1979) Employee = 730	(1) Tyre and Rubber Products Manufacturing Project		
	- Tyres (18 types)	402,000	100%
	- Bicycle tyre (3 types)	294,000	100%

II. INVESTMENT AND WORKING CAPITAL

The invested capital of Myanma Heavy Industries is 5985 Million Kyats (US$ 855 Million). The working capital is 1385 Million Kyats (US$ 198 Million).

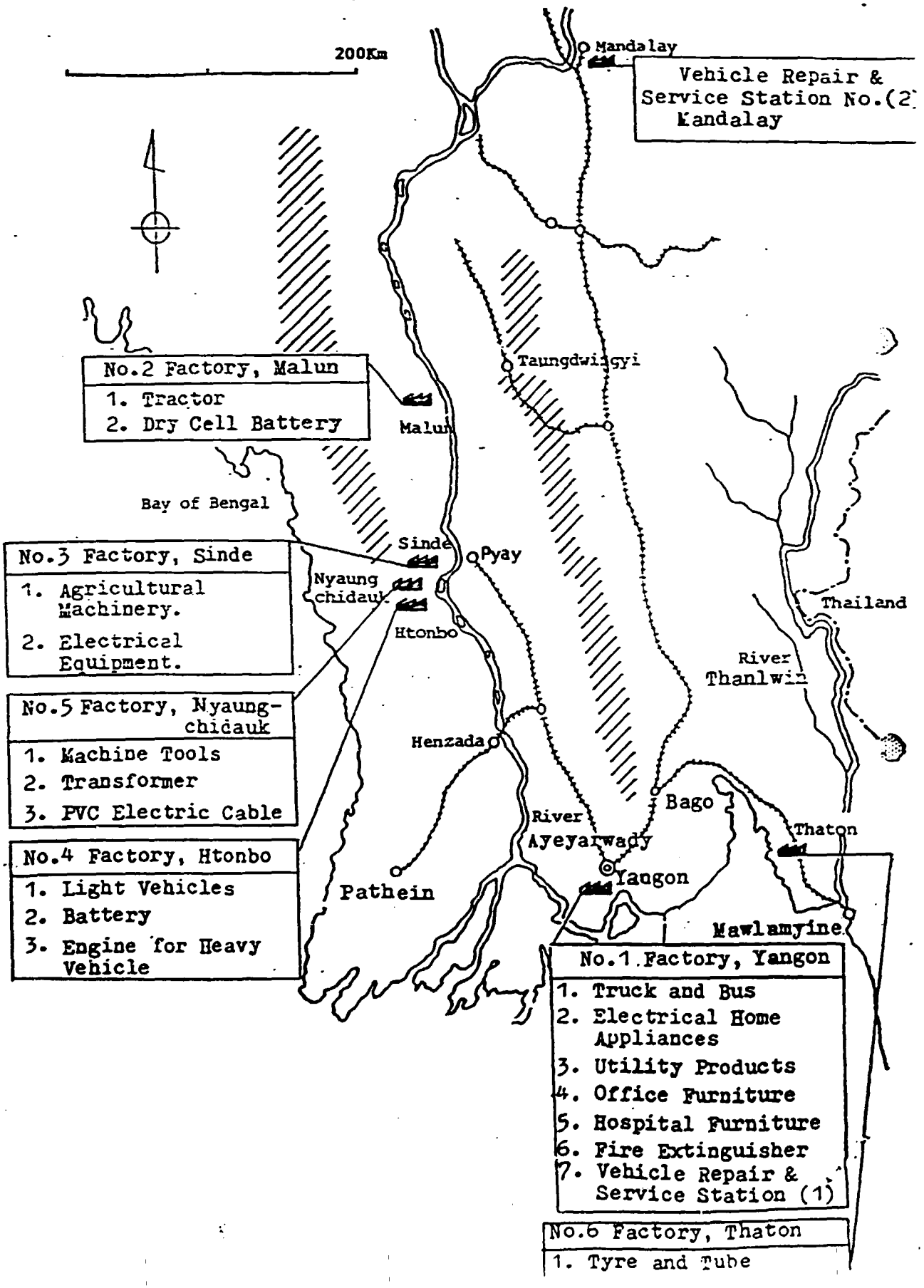
III. MANPOWER

The supervisory staff and workers employed by Myanma Heavy Industries at present being 12915 workers.

IV. ANNUAL SALES INCOME

Annual sales income of Myanma Heavy Industries is approximately Kyats 837 Million (US$ 125 Million).

Myanma Heavy Industries
Location of Factories



ANNEX IV

Two agro-related metalworking units in the Yangon area were visited by a UNIDO consultant in August 1990. These units are fairly representative of the average medium and small-scale types of local enterprises:

(i) Dagon Tin Factory & Engineering Co., located at No. 81, Yangon-Ynsein Road, Kamayut township, Yangon.

This enterprise started as a tin factory by the company's present Managing Director. Like so many metalworking industries, agro-related manufactured items only account for 20% of turnover, but could be substantially improved if the farming community had access to rural credit.

Mr. Aung believes that the country's private sector has the drive to emulate Thailand if the right economic atmosphere was established by the authorities. The Dagon Tin Factory has quite an assortment of metalworking machines, mostly bought prior to the socialist regime takeover in 1973. Although these machines are obsolete by today's standards, they are still running and kept in working condition for obvious reasons. The factory employs about 20 workers and has become specialized in small turn-key "paper recycling factories" providing all the necessary equipment and machinery or supplying parts for established ones.

In the field of agro-related metalworking, Mr. Aung would like to start producing 8 HP power-tillers locally. He has already imported two different models of power-tillers from Thailand and has been negotiating with a Singapore company for the supply of sets of gears for the units' gearboxes.

Although the technology to produce gears exists in the country, through a state-owned factory under MHI, Mr. Aung feels that it does not have the flexibility to produce limited batches of "tailor-made" gears at competitive cost and delivery dates. He plans to sell the power-tillers without engine, because the 8 HP KUBOTA KND 7 engine is already available in the rural areas coupled to waterpump and generating sets.

The Dagon Tin Factory & Engineering Co. also produces pedal operated paddy threshers and sold 1,000 units last year. In fact, most intermediate technology items could be manufactured, but the limitating factor is the scarce foreign exchange for importation of raw material.

(ii) Tin Win & Associates, Tractors & Farm Implements Production Works, located at 281 (A) Shwegondine Road, Bahan, Yangon. The name is rather misleading, as this enterprise is just a small scale metalworking unit, having only 5 permanent staff and surviving on producing "rubber hand mills", a mild steel 20 inch double roll lates squeezer, copied from a Malayan model imported in the 1920s. Its Managing Director, Mr. Tin Win, is a dedicated artisan with some technical background, who is committed to produce "iron buffalos" (power-tiller) locally much along the same lines as mentioned by Mr. Aung from the Dagon Tin Factory.

NEPAL - Kingdom of Nepal

1. Summary

Although agricultural potential in Nepal is limited by shortage of arable land and by population pressures, this sector accounts for two thirds of GDP and occupies an even larger part of the labour force. The sector has even had a tendency to gain slightly in relative importance over the last two decades, at the expense of the industrial sector. This being so, industrial production, which is almost synonymous with manufacturing production in Nepal, has grown very rapidly during the second half of the 1980s, if from a very small base.

The absence of comprehensive data on the role and demand for agro-related metalworking industries, and some discrepancies and ambiguity arising out of this data make an accurate assessment of this sector difficult. Although helpful, the information source on the main functionary in this sector, the Agricultural Tools Factory, should not be construed as necessarily representative. However, this organization's role, in conjunction with the Regional Network for Agricultural Machinery (RNAM), in formulating policy, developing this sector, introducing technologically appropriate equipment and generally augmenting the range and quality of products, including training, is extensive.

Further information is required on the structure and operation of the agro-related metalworking industries, but, it would appear, that there are two sectors actively engaged in this industry, namely, the formal manufacturing sector and artisans and workshops at the cottage industry or informal level. The manufacturing constraints identified would appear relevant to both sectors, encompassing design capabilities, product quality, raw material procurement and irregular power supplies. These latter two points would seem to have been exacerbated by the trade and transit impasse with India.

Apart from the statistical data on imports and the limited scope of the activities undertaken in the field of marketing, the total demand position for

agricultural tools, implements and machinery remains elusive. In the context of establishing clear direction for the development of this sector, further analysis is required.

The New Industrial Policy of 1987 has, apparently, brought new life to the industrial sector. The main emphasis centers around economic liberalization, development of small- and medium-scale industry, and the use of local resources. A major concern is to strengthen the balance of payments. Some small steps are being taken to upgrade and enlarge access to financial support for industry. In spite of a high percentage of unemployed there is a serious lack of local skilled manpower, for which training institutions are unable to satisfy the large demand.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

Real GDP grew by about 6% in 1987/88, against 4% in 1986/87 and 2.3% in 1985/86, and is largely explained (UNIDO, May 1988, pp. XV) by the varying performance of the agricultural sector. GDP per capita was US$ 144 in 1987 (Table: 1), as economic progress barely kept pace with the growth in population. Average annual per capita growth was 0.1% in 1970-1980 and 0.9% in 1981-87 (Table: 2).

b. Contribution to GDP

The Nepalese economy is basically agrarian and in the 1970s the performance of this sector was poor, when the contribution of agriculture to real GDP fell, relatively, from 72% in 1974/75 to 57% in 1979/80 (UNIDO, May 1984, pp.20). The cause of decline was largely due to reduction in productivity, caused by rapidly increasing population pressures on limited arable land and large-scale deforestation, causing erosion of the top soil. However, as indicated by Table: 3, from 1980 to 1983, there has been a rise in agriculture's contribution from 59.9% to 60.6% of real GDP whereas, since 1983, this percentage has remained at approximately 60%. In absolute terms,

growth in agricultural production fluctuates widely due to the vulnerability of this sector to periodic droughts, as shown by following figures:

Agricultural production growth rates(1)

1974/80	1983/84	1984/85	1985/86	1986/87	1987/88(2)	1988/89(3)
-1.1	9.5	2.4	5.1	0.6	8.7	6.8

Source: EIU, 1989 pp.64

Notes
(1) %, constant at 1974/75 prices
(2) Revised preliminary estimate
(3) Preliminary estimate

Industry's proportion of real GDP has remained relatively stagnant, reaching only 4.6% in 1987 (Tables: 2 and 3). The small internal market, lack of raw materials, the landlocked situation, lack of technology and lack of competitive ability on national and international markets have reduced the potential for a large industrial sector in Nepal. Industrial activity has grown by an annual rate of 3.9% over the period 1970-80 and 4.3% over the period 1980-87. However, in a preparatory note for the Fifth Country Programme in Nepal (January 12, 1990), it was noted that the production of principal industrial goods increased by an average rate of 17.3% per year from 1985 to 1987. This satisfactory rate of progress can be attributed to the establishment of some new industries, an increase in the utilization of installed capacity in existing industries and liberal industrial policy. The formal industry sector is dominated by food and allied products, drinks and tobacco, whilst industries such as metal products are, as yet, not important contributors.

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: NEPAL

Indicator	Year or period_	Country	South- and East Asia
GDP per capita (US$)	1970	138	373
	1975	133	452
	1980	131	499
	1986	144	580
	1987	144	601
MVA per capita (US$)	1970	5	49
	1975	5	65
	1980	5	89
	1986	6	116
	1987	6	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): NEPAL

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	-5.1	2.8
	1981-1987	3.8	1.8
	1970-1987	-1.1	2.8
Total Industrial Activity (incl. MVA)	1970-1980	3.9	4.7
	1981-1987	4.3	6.0
	1970-1987	3.6	3.9
Manufacturing	1970-1980	3.6	9.0
	1981-1987	4.3	7.5
	1970-1987	3.5	8.0
GDP per capita	1970-1980	0.1	3.3
	1981-1987	0.9	2.4
	1970-1987	0.4	2.7
MVA per capita	1970-1980	1.0	6.6
	1981-1987	1.7	5.0
	1970-1987	0.8	5.5

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: NEPAL

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	98.2	3.8	3.7	1584.3
1971	101.3	4.1	3.9	1565.4
1972	115.7	4.4	4.3	1614.1
1973	107.6	4.7	4.5	1606.4
1974	136.1	4.2	4.0	1708.2
1975	68.7	3.9	3.7	1733.1
1976	66.2	4.9	4.7	1809.3
1977	61.6	5.0	4.8	1863.9
1978	59.0	4.6	4.4	1946.0
1979	59.4	4.3	4.1	1992.1
1980	57.9	4.3	4.0	1945.9
1981	59.0	4.3	4.1	2108.2
1982	59.4	4.0	3.7	2187.9
1983	60.6	5.0	4.7	2122.8
1984	60.5	5.1	4.8	2328.3
1985	60.1	4.5	4.2	2397.1
1986	60.4	4.3	4.0	2494.2
1987	60.3	4.6	4.4	2554.3

Source: As Table: 8-1
Notes: As Table: 8-1

Manufacturing constituted the quasi-totality of the industrial share of real GDP (Table: 3), with 4.4% of GDP in 1987, whilst the index of manufacturing output (EIU, 1989, pp.77) has risen at an annual average of 8.8%. In 1988 and 1989, trade and transit problems that emerged had some adverse effects on manufacturing, without which growth would have been even higher.

Manufacturing valued added per capita grew at an annual rate of 0.8% from 1970 to 1987, rising in monetary terms from US$ 5 to US$ 6, per capita (Table: 1). The manufacturing sector is generally characterized by a large proportion of small manufacturing firms, which are mainly in the private sector. However, it is reported (EIU, 1989, pp.75) that the size of manufacturing firms has increased between the census of 1981/82 and the census of 1986/87, and that the importance of larger firms (ten or more workers) has risen considerably. MVA per worker in 1977/78 is reported (UNIDO, May 1988, pp.16) as being over twice as high in larger manufacturing units than in organized cottage industry sector, with MVA per worker in this sector being 40 times higher than that in the household sector (where workers are in most cases only employed on a part-time basis). It should be noted that higher MVA per worker does not necessarily imply greater efficiency as larger scale units needed almost 6 times the amount of capital goods than the organized cottage industry sector.

c. Employment by Sector

The total population of Nepal is reported (EIU, 1989, pp.60) as being 18.3 million. According to the National Planning Commission, 6% of rural labour force is unemployed and about two-thirds are under-employed. It is noted (EIU, 1989, pp.67) that the extent of unemployment is likely to grow as landlessness increases and new employment is not created in the rural areas, and that this will also induce a drift of population to the urban areas where 6% of the labour force is unemployed and 45% under-employed.

The distribution of the active labour force appears to have undergone some change between the census of 1971 and that of 1981, where the drop in

agriculture's share from 94.4% to 91.4% was absorbed by a small rise in "organized production" (2.2% to 3.1%), and a more important rise in trade and services (3.4% to 5.4%).

In 1986, 92% of the active labour force was dependent on agriculture. This proportion was higher than the sector's share of GDP (62%), implying low labour productivity in agriculture (UNCTAD, 1988, annex). The situation has not changed notably since the 1970s.

In 1976, manufacturing industry's share of total non-agricultural employment was only 6.7%, corresponding to about 0.7% of the active population (UNIDO, May 1988, pp.63). Manufacturing employment in cottage industries accounted for almost 95% of the industrial workforce in 1977/78 (ILO, May 1987, pp.109). It was reported (UNIDO, May 1988, pp.16) that during the period 1971/72 - 1981/82, manufacturing employment more than doubled. As this growth was higher than that of MVA, labour productivity must have declined for the manufacturing sector as a whole.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

The most recent statistical data available, relating to the importation of agricultural tools, implements, machinery and food processing equipment is given in Table: 4. The monetary values quoted give a guide to the financial considerations but the absence, in the main, of any reference to physical numbers can lead to some distortion in interpretation. For example, the value of grain milling and other food processing equipment represent the most significant sectors in 1985 and 1986 and in the context of small-scale equipment this could represent significant potential for import substitution. However, should these figures relate to medium/large-scale units, then the numbers, and hence potential, would be very limited. It is also perhaps worthy of mention that the true level of imports may be further distorted by the movement of goods, without formal documentation, notably from India and China.

b. **Statistical Data on Local Production**

It is reported (UNIDO. April 1983. pp.17) that at that time domestic production of agricultural tools and implements amounted to approximately 10% of consumption. It has not been possible to verify this statement from the information available. Information on the production performance of the agro-related metalworking industries is limited to one specific manufacturer. the Agricultural Tools Factory (ATF), Birganj[1/], Central Development Region. The production figures for the period through 1985 to 1988 are provided in Table: 5. It was however noted (Pari-ar. M.P.. 1989. pp.7) that. under a

1/ A UNDP supported project. through the Economic and proposal Social Commission for Asia and the Pacific (ESCAP)/Regional Network for Agricultural Machinery (RNAM)

Table: 4 Import Statistics: Nepal - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excl. tractors)

SITE Code	Description	1983		1984		1985		1986	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/forestry	202,930	N/A	264,560	N/A	331,910	N/A	258,400	N/A
7121	Soil cultivation equipment	87,010	N/A	N/A	N/A	109,220	N/A	119,180	N/A
7122	Harvesting/threshing/sorting equipment	1,115,010	N/A	81,760	1,060	198,890	N/A	233,740	N/A
7129	Agricultural machinery and appliances	940,150	N/A	477,500	N/A	731,440	N/A	256,680	N/A
71831	Machinery for milling grain	1,452,440	N/A	1,346,960	N/A	1,282,110	N/A	2,077,180	N/A
71839	Other food processing equipment (excl. domestic)	245,110	N/A	232,420	N/A	2,009,240	N/A	1,280,650	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

Table: 5 Local Production: Nepal - Agricultural Tools Factory, Birganj

Description	1985/86	1986/87	1987/88
Pedal Paddy Thresher	167	281	160
Hand Maize Sheller	432	860	1,226
Hand Tools(1)	3,972	13,398	13,450
Animal Drawn Vehicle Set	605	521	499
Animal Drawn Disc Plough	226	155	88
Animal Drawn Plough	2,127	1,975	3,247
Animal Drawn Cultivator	14	21	6
Tractor Trailers	96	23	40
Wheat Thresher	97	211	84
Disc Harrow	1	5	2
Cultivator	41	20	41
Diesel Pumpsets	N/A	N/A	715(2)

Source: Williams, D.A. (ESCAP/RNAM Expert), Agricultural Tools Factory, Birganj, RAS/86/135 Report, Birganj 1990

Notes

(1) Not further sub-categorized

(2) Figure for 1988/89. "Kirloskar" pumpsets produced under a licensing agreement with "Kirloskar" Puna, India.

programme initiated by the Regional Network for Agricultural Machinery[1]. ATF are currently in the process of undertaking an assessment of the existing manufacturing capabilities and capacities within Nepal. When completed, this document should provide a better understanding of the local production potential.

c. **Company Structures and Operations**

Of the total of 5,033 registered industries scheduled in the 1988/89 Annual Industrial Statistics, only three factories are officially designated (Ministry of Industries, 1989, pp.55) under the category of agricultural tools and as having manufacturing capabilities for the production of agricultural equipment. Of these three, only the Agricultural Tools Factory is listed as operational whilst one factory in the Eastern Development Region is cited as under construction and another, in the Mid-Western Development Region, is cited as closed.

This contrasts with a report (Karki A.B. 1988, pp.6) which refers to a total of eleven manufacturers engaged in the production of agricultural equipment, although only four of these are subsequently identified, that is, i) Agricultural Tools Factory, ii) Energy and Agro Developer, Kathmandu Metal Industries and iv) Balaju Yantra Shala[2]. This assessment is more closely

1/ The Agricultural Tools Factory is the designated Regional Network for Agricultural Machinery National Institute, in Nepal, for implementing and coordinating policy.

2/ Reference is made to this company in an earlier report (UNIDO, April, 1983, appendix), but at that time was not engaged in the agro-related metalworking sector, being primarily involved in the provision of metal products to the construction and bridge building industry. It was, however, at that time reported to be the largest general manufacturing company in the Kathmandu Valley. Established in 1960 with assistance from the Swiss Association for Technical Assistance the company was reported to employ 116 persons in 1983.

aligned to an earlier report (UNIDO. 1984. pp.85) which identified thirteen small- and medium sized factories. although not exclusively agro-related. as having engineering capabilities. This discrepancy may be due to some of the smaller facilities being registered under the Department of Cottage and Village Industries. or those industries where no formal registration process has been undertaken. The most recent available figure (UNIDO. 1988. pp.68) indicates that the Department of Cottage and Village Industries has registered 10.988 such industries through the period 1974 to 1987. however. data relating to the definitive role of agro-related metalworking industries in this sector is not available.

There is obviously some ambiguity surrounding the actual number of companies participating in the agro-related metalworking industries sector. but. again. this situation will hopefully be clarified upon completion of the ATF assessment study of the existing manufacturing capabilities and capacities in Nepal.

Accordingly. the only company specific information relates to the structure and operations of the Agricultural Tools Factory. The Factory is wholly owned by Government and was reported (Karki. A.B. 1984. pp.8 + 9) to have run at 50% capacity from establishment in 1969 through to mid 1982. resulting in losses equivalent to 60% of the paid-up equity capital. Following a change in management at that time and the introduction of a multipurpose production approach the situation was reversed in two years with a capacity utilization factor of 95%. More recent figures (Ministry of Industry. 1989. pp.35) quote capacity utilization. during the financial year 1988/89. of some 66%. and employing in the order of 273 persons. The level of utilization would appear to be very much in line with the target figures stipulated under the Seventh Plan (1985 - 1990) of 70% and. by this criteria. operating satisfactorily.

Manufacturing operations are centred at Birganj. with subcontractors undertaking some production work both at the factory site and at other locations. The plant is equipped with a foundry. machine shop. forge. press shop. fabrication and assembly sections. although in a recent report (Williams. D.A.. 1990. pp.12-22) all but the forge and press shop are

Table: 6 Schedule of Installed Equipment-Agricultural Tools Factory, Birgani

Description	No.
1. Lathe	9
2. Shaper	1
3. Drill	5
4. Cylindrical Grinder	1
5. Surface Grinder	1
6. Tool Grinder	1
7. Bench Grinder	7
8. Milling Machine	2
9. Power Hacksaw	2
10. Hydraulic Press	2
11. Crank Press	3
12. Friction Press	2
13. Pneumatic Hammer	2
14. Plate Shearing Machine	1
15. Combination Punch and Shear	1
16. Air Compressor	2
17. Electric Welding Set	9
18. Polisher	2
19. Carpentry Lathe	3
20. Wood Planer	2
21. Slotting Machine	1
22. Carpentry Band Saw	1
23. Compartmental Furnace	1
24. High Frequency Hardening unit	1
25. Salt Bath Furnace	1
26 Rotating Shaft Furnace	1
27. Cupola Furnace	1

Source: Parivar, M.P., Country Report of Nepal - ESCAP/TAC for the RNAM Fourteenth Session, Birganj, December 1989.

considered appropriately equipped to meet the production needs (see Table: 6 for the schedule of installed equipment). Details are provided on the need to update the foundry, machine shop, fabrication and assembly sections, and suggests establishing a much needed tool room, pattern shop and product/tooling design facilities. Additional foundry capacity was also identified as an immediate need and it was suggested that the equipment from the Foundry Development Project[1/] be requisitioned. It is understood, however, that the unit is now to be privatized, with Government retaining a 51% share-holding.

Raw material supplies for the factory operations are source primarily from overseas markets, for example, component parts for the "Kirloskar" pump sets, steel, furnace coke, tools and equipment, etc. Small steel rolling mills are operating (UNIDO, 1984, pp.87) in Nepal, but mainly for the production of mild steel reinforcing rods for the construction industry, although these units were reported to be running at only partial capacity due to raw material supply problems. The effects of the trade and transit impasse between India and Nepal are not reflected in the ATF production figures in Table: 5. It is, however, noted (Williams, D.A., 1990, pp.4) that these restrictions have necessitated improvisation and the use of inferior quality material. The full impact of these constraints has yet to be assessed in terms of production, raw material lead times, or the likely cost implications.

From the information reviewed, the Agricultural Tools Factory appears quite advanced in its approach to quality control and standard of service, with products subjected to control standards during production and through the provision of after sales service and warranty cover. It is also participating (Pariyar, M.P., 1989, pp.9), in its capacity as the RNAM National Institute, in the establishment of agricultural machinery standards with the Nepal Bureau of Standards and Metrology. It is anticipated that these standards, for selected machines, will be formulated during the coming year.

1/ Established with the assistance of UNIDO and UNDP

d. Markets: Domestic and Export

Little information is available on the current extent of the market potential for products produced by the agro-related metalworking industries. However, from the import statistics scheduled in Table: 4 there would appear to be some scope, at least initially, for an import substitution programme. It is reported (Pariyar, M.P., 1989, pp.8) that a market demand survey of agricultural machinery has been completed, but that the scope of the survey was limited to three selected items of equipment, namely, wheat threshers, rice transplanters and pumpsets. An extract from this report (Karki, A.B., August 1989, pp. viii) is provided in Table: 7, which indicates the projected demand potential for threshers and pumpsets. The projections (Karki, A.B., August 1989, pp.55-56) for rice transplanters indicate a total potential serviceable demand of 33,000 units although this must be considered a very much theoretical estimate as rice transplanters have not yet been fully introduced, or accepted, in Nepal.

The question of the competitive situation between manufacturers was reviewed from the available information, but the only qualifiable reference (Karki A.B., 1989, pp.37) made was to the sale of pumpsets. Sales of the Agricultural Tools Factory assembled "Kirloskar" pumpset attained the best market share, 37%, of pumpsets distributed by the Agricultural Development Bank, Nepal, under the 4th Credit Programme. This was attained irrespective of the fact that the unit cost was the second most expensive overall, and most expensive in its size category. This was attributed to the pumpsets' historical place in the market and brand loyalty.

Statistical data obtained on the exports of agricultural equipment from Nepal, between 1976 to 1986, indicate that no export potential has been realized. However, it was noted that Nepalese manufacturers were proposing to exhibit equipment at the Agrimach Exhibition, Bangkok, in 1989. No data is available to indicate the outcome of this exercise.

Table: 7 Projected Demand: Nepal - Threshers and Pumpsets

	Threshers		Pumpsets	
	Project Annual Demand based on Past Trend(1)	Projected Annual Service-able Demand(2)	Projected Annual Demand based on Past Trend(1)	Projected Annual Serviceable Demand(2)
1990/91	394	950	2,510	5,400
1991/92	399	1,070	2,650	5,400
1992/93	403	1,200	2,800	5,400
1993/94	407	1,350	2,940	5,400
1994/95	413	1,520	3,080	5,400
1995/96	420	1,700	3,220	5,400
1996/97	425	1,900	3,360	5,900
1997/98	432	2,100	3,500	5,760
1998/99	435	2,350	3,650	5,600
1999/2000	444	2,600	3,790	5,900

Source: Karki, A.B., Demand Study of Selected Agricultural Machines in Nepal, Nepal, August 1989

Notes: (1) Extrapolation of past trends

(2) Serviceability Factor - determinants of purchase decisions

4. Infrastructural Support

a. Policy

Industrial Policy

A policy of planned industrialization (EIU. 1989. pp.75) has been pursued by the Government since the 1960s. where the industrial development objectives have been: maximisation of output. creation of employment opportunities. improvement of the balance of payments position through increased exports and import substitution and self-reliance on essential consumer and construction goods. Subsequently. a major review of industrial policy was undertaken during 1986/87 and the New Industrial Policy was announced in October 1987. The Eighth Plan (1990-1995) calls for fresh and effective approaches in the development process. including active participation of the private sector and Non-Governmental Organizations. The main features are summarized (UNIDO. December 1989. pp.2 and UNIDO. May 1988. pp.41). as follows:

- Liberal policies are being implemented to stimulate healthy competition. If any industry is nationalized. compensation will be paid on the basis of an equitable evaluation. and foreign investors will be allowed to repatriate their shares in foreign exchange on a tax-free basis;

- Cottage and rural industry will be provided with special arrangements for marketing and raw material procurement;

- Licences are no longer required for cottage industries. as well as for industries with a maximum fixed capital of Rs.10 million. providing they do not need foreign exchange for their input purchases;

- Industries using domestically produced raw materials and contributing positively to GDP will be promoted. Optimal utilization of production capacity of already existing industries will be stressed;

- Industrial policy is now taking into account the facilities required by foreign investors:

- A 30% rate of protection will be allowed to import-substitution and export-promotion industries over a period of five years.

Trade Policy

Imports represented about 17.7% of GDP in 1987 and export's share of GDP was about 13.3% (UNIDO Data Base. 1990).

A trade and transit agreement with India. until March 1989. had established 15 transit points that were crucial from the point of view of obtaining essential imports as well as routing exports. The subsequent reduction of the number of transit points to two. by India. has gravely effected Nepal by cutting off essential supplies and generating shortages (ESCAP. December 1989. pp.17). Recent press reports suggest that agreement may be reached on resolving this impasse and further discussions are scheduled for March 1990.

In the Eighth Plan. it is stipulated that protection will be provided for the development of import substituting and export promotion industries at the initial stages of industrialization. An export processing zone is planned to encourage exports.

b. Financial

It is reported (UNIDO. May 1988. pp.55) that almost 58% of industrial credit was provided by commercial banks in July 1985. whilst Nepal Industrial Development Corporation accounted for about 34% of industrial loans sanctioned in 1985. From 1978 to 1985. the share of manufacturing in industrial loans increased from 47.4% to 81.3%. and in 1986 there was a marginal decline in the share of the manufacturing sector.

According to the Eighth Plan, credit and extension facilities provided for cottage industries will be better coordinated. Industries will be allowed to obtain loans from external sources with the approval of the Government, who might guarantee such loans (UNIDO, Country Report, December 1989, pp.2)

c. Human

A report (UNIDO, May 1984, pp.63) notes that in 1976, professional/technical workers comprised 3.7% of the economically active population and production workers accounted for 5.3%. The findings of a UNDP/ILO project (UNIDO, January 1990, pp.15) refers to the fact that there is a shortage of technical personnel and training capacity in Nepal in general, and that the available technical personnel are over-concentrated in Kathmandu Valley. During the period of the Sixth Plan (1980-1985), few workers received training in mechanical or electrical engineering.

It was reported (UNIDO, May 1988, pp.49) that in 1983, only about 6% of university students followed courses in agriculture or engineering-related subjects. There was also a serious shortage of facilities for medium and basic-level vocational training with some industries having to rely on skilled immigrant labour from India. Under the Seventh Plan (1985-1990) the demand for engineering personnel of all levels has been established at 7.880, of which the country was only able to supply 4.800. Unemployment among university students was over 10% in 1987.

The Eighth Plan proposes to improve the supply of qualified labour through, among other things:

- On-site training in a wide variety of skills to be carried out by Labour Supply Centers. At the basic level, these centers have been given the task of training 4.740 persons, including 650 women;

- In Rani Vocational Training Center, a one-year vocational training programme for 300 persons in skills, including welding, machine repair and electric installations.

- The establishment of a National Training Center for vocational training.

A report (UNIDO. May 1988. pp. xv) notes that assistance needs to be provided for skills upgrading. particularly within the cottage and small-scale industry sector. Productivity could be greatly improved with the enhancement of administrative. accountancy and managerial skills.

d. **Technological**

Since 1987. a primary role in fostering a greater awareness of development. testing. evaluation. manufacture and commercial introduction of technologically appropriate agricultural machinery has been played by RNAM. through the designated National Institute. the Agricultural Tools Factory. With strong regional linkages in ten Asian countries. and international linkages in Africa and Latin America. RNAM have instituted a programme of regional seminars and workshops to promote these activities. In addition. the former Agricultural Implement Research Centre was formally amalgamated with the Agricultural Tools Factory in 1986. and subsequently handed over in 1987. It is also reported (Pariyar. M.P.. 1989. pp.10-11) that under the RNAM programme. as an extension and enhancement of these facilities. a National Agricultural Machinery Test Centre is to be established in 1991. and that a mobile demonstration and training unit is to be employed to assist in the transfer of technology to village artisans in the agro-related metalworking sector. Apart from the substantial linkages under the RNAM umbrella. the Agricultural Tools Factory is also liaising nationally with institutions such as the Royal Nepal Academy of Science and Technology.

With the exception of the activities and proposed developments at the Agricultural Tools Factory. including the proposed introduction of computer aided design. there would appear to be some considerable opportunities for improving the technological base of the agro-related metalworking industries in Nepal. This situation may be greatly enhanced if the proposed Establishment of the Engineering Prototype Development and Training Centre project is implemented.

e. **Services**

Intermittent power supplies are quoted in much of the material reviewed as a constraint on manufacturing capacity, a problem further compounded by the reported (UNIDO, 1984, pp.54) voltage fluctuations of apparently considerable magnitude.

Apart from the obvious constraints of transportation to remote areas with formidable physical barriers, little direct emphasis, in the data reviewed, was placed on transportation as a major obstacle. The major reported (Williams, D.A., pp.6) constraint was an acute fuel shortage brought about as a result of the trade and transit impasse between India and Nepal.

5. Related or Relevant Programmes

Country Specific

UNDP/UNIDO: DP/NEP/86/005 "Assistance to Industrial Planning and Monitoring". US$ 1.089.000. 1986-1990.

UNDP/UNIDO: DP/NEP/84/031 "Assistance to the Nepal Bureau of Standards and Metrology". US$ 1.791.000. 1986-1990. Will be followed by Phase II.

UNDP/UNIDO: DP/NEP/89/010 "Establishment of an Export Processing Zone". US$ 235.000. 1989-1990.

UNIDO: XP/NEP/88/113 "Technical Analysis on the Establishment of an Engineering Prototype Development and Training Center: Immediate Assistance for Policy/Investment Decision Making". US$ 41.000. 1988-1990.

UNDP/UNIDO: DP/NEP/79/011 "Pilot and Demonstration Foundry". 1979-1988. US$ 2.239.000.

UNDP/OPS: DP/NEP/86/007 "Cottage and Small Industries Development". Phase II. 1987-1990. US$ 1.970.000.

UNDP/World Bank: DP/NEP/79/033 "Agriculture Extension". 1981-1987. US$ 725.000.

Objective: Reorganize and strengthen the agricultural extension service.

UNDP/World Bank: NEP/80/016 "Cottage Industry Commercial and Technical Services". 1980-1987. US$ 1.929.000.

Objective: Expert services and study tours.

UNDP/ILO: DP/NEP/84/039 "Basic Vocational Training". 1987-1990. US$ 799.000.

Objective: To plan and implement vocational training programmes and establish eight Labour Supply Centers and one Vocational Training Center.

Regional

UNDP/ESCAP: RAS/86/135 "Regional Network for Agricult[illegible]ery" (RNAM). Phase IV. US$ 1.862.500, duration 1987-1991, based in Manila.

Objective: To provide advisory services in improving design, selection, adaptation and increased use of suitable agricultural machinery, and to promote local manufacture of local machinery.

UNDP/ESCAP: RAS/86/143 "Promotion of Technology Utilization" (APCTT). US$ 1.510.040. duration 1987-1991. based in India.
Objective: To increase the utilization of indigenous and imported technologies in the region.
UNDP/FAO: RAS/86/040 "Agricultural Demonstration Centers". US$ 1.348.000. whereof US$ 152.000 approved for preparatory assistance. Duration 5 years. host country unknown.
Objective: To strengthen the role of local level agricultural research and development stations/centers and rural extension services.
UNDP/FAO: RAS/86/189 "Post Harvest Technology". US$ 722.000. Duration 1987-1990. based in Bangkok.
Objective: Provision of training and consultancies to strengthen the network established under Phase I to make it a sustainable coordinating programme for transfer of post-harvest technologies and experience.

Others

FRG: "Small Farmers Development Project". 1987-1991. US$ 125.000.
Objective: Training/advisory services for small farmers.
EEC: "Gulmi Arghakhanchi Rural Development Project". 1987-1989.
Objective: Strengthening the technical know-how of the service sector.

6. Reference Material: Nepal

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SAMOA - Independent State of Western Samoa

1. Summary

The economy of Samoa is highly dependent on the primary sector, accounting for half of GDP and engaging three quarters of the population. The manufacturing sector is small but increasing in importance, as agricultural production falls.

Whilst the fall in agricultural production is relevant to the agro-related metalworking sector there would, in the apparent absence of any existing activity, appear to be some scope in this sector. This sectors potential is, on the basis of the information available, quite small and would possibly be best considered at an artisan level, or as an ancillary activity of one of the existing fabricated metal products enterprises. The viability of developing this concept further would need to be carefully considered in the context of Samoa's limited raw material resource base, human resource base, domestic market and relative insularity from other major markets.

Government policy aimed at motivating export and import substituting industries, promoting private sector development, liberalizing trade policy and controlling inflation is encouraging. However, institutional support is insufficient, especially concerning the provision of financial assistance to industry and technical education.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

Economic growth has been modest, with an average real GDP growth of 2% per annum over 1975-1980 and -0.2% over 1980-1986 (UNIDO, January 1989, annex table 2). This last figure covers large variations, with a low of -9.0% in 1980/81 and a high of 6.0% in 1984/85 (UNCTAD, 1989, annex). Moderate growth was essentially due to the fact that GDP originating from agriculture had declined markedly, in fact growth in agriculture dropped from an average of 2.2% in the period 1970-1980 to 0.0% in the period 1980-1987 (Table: 2).

Total industrial activity grew by an average yearly rate of 1.7% in the 1970's and 2.1% in the period 1980-1986. However, it was reported (UNIDO, January 1989, annex table 2) that the UNCTAD annual average growth rates for industry, during 1981-1983, was as high as 10.3% (incorporating a growth rate of 10.4% for manufacturing activity). The EIU (1990, pp.59) reports an average industrial output growth of 7% between 1982 and 1986, and an annual growth of only 2% in 1987-88.

Per capita GDP in 1987 was US$653, and had not grown significantly over the last decade (Table: 1), with average yearly growth rate of GDP per capita being only 0.6% from 1970 to 1987 (Table: 2). UNCTAD had a different figure, estimating per capita income to be US$350 in 1981.

b. Contribution to GDP

A report notes (ESCAP, 1990, pp.9) that agriculture accounted for between 20 and 30% of GDP in the 1980's. However, according to UNIDO (Table: 3), agriculture's share of GDP was 52.5% in 1987, a level around which it had fluctuated since 1970. The same source cites industry's share at 3.1% in 1987, remaining approximately the same since 1970. A completely different picture is given by ESCAP (January 1990, pp.8), who noted that the manufacturing sector accounted for up to 13% of GDP, Samoa being the only Pacific LDC where manufacturing has made relative progress.

c. Employment by Sector

The subsistence sector of Samoa is particularly productive, and in 1981 about 70% of the labour force was engaged in subsistence agriculture with the rest being in the formal monetised employment sector (EIU, 1990, pp.57). There is a large pool of available labour but a shortage of managerial and technical skills, and many skilled workers have migrated, especially to New Zealand.

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: SAMOA

Indicator	Year or period	Country	South- and East Asia
GDP per capita (US$)	1970	574	373
	1975	637	452
	1980	718	499
	1986	654	580
	1987	653	601

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): SAMOA

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	2.2	2.8
	1981-1987	0.0	1.8
	1970-1987	1.1	2.8
Total Industrial Activity (incl. MVA)	1970-1980	1.7	4.7
	1981-1987	2.1	6.0
	1970-1987	1.5	3.9
Manufacturing	1970-1980		9.0
	1981-1987	10.4[A]	7.5
	1970-1987	...	8.0
GDP per capita	1970-1980	2.3	3.3
	1981-1987	0.4	2.4
	1970-1987	0.6	2.7
MVA per capita	1970-1980	...	6.6
	1981-1987	...	5.0
	1970-1987	...	5.5

[A] figures for 1981-83. Source UNCTAD Secretariat

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: SAMOA

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	53.6	3.1	...	82.7
1971	54.7	3.1	...	85.2
1972	57.2	3.1	...	87.9
1973	55.1	3.2	...	90.5
1974	55.8	3.0	...	93.4
1975	5..5	2.9	...	96.2
1976	54.1	2.9	...	99.2
1977	54.5	2.8	...	102.3
1978	52.2	2.8	...	105.4
1979	50.3	2.8	...	108.8
1980	50.2	2.8	...	112.1
1981	55.7	3.2	...	102.0
1982	54.7	2.9	...	101.0
1983	53.8	3.0	...	101.4
1984	54.3	3.1	...	103.6
1985	53.4	3.1	...	106.3
1986	49.7	3.2	...	107.9
1987	52.5	3.1	...	109.0

Source: As Table: 1
Notes: As Table: 1

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

According to the Government of Samoa (Ministry of Trade, Nov. 1990), virtually all agricultural tools, implements machinery and related equipment are imported. The majority of these items are sourced from Australia, New Zealand, USA and Europe. Detailed statistics from 1980-1983, on the importation of agricultural tools, implements and machinery are presented in Table: 4. The figures are fairly consistent for the period with the exception, in 1980, when they were distorted by a large reported importation of agricultural machinery and appliance (SITE Code 7129) to the value of US$0.275 million.

The major proportion of the import statistics under general agricultural tools and machinery for the period 1987-1989 given below would be post harvest processing equipment. These types of machinery are concentrated in the area of processing coconuts.

	1987	1988	1989
General Tools&Machineries	253,085	551,330	859,455

The quality and reliability of these agricultural tools, equipment and machineries is generally of high standard and, depending on the brand, the availability of service and spare part facilities is fairly restricted.

b. Statistical Data on Local Production

In the review undertaken there was no published information to suggest the level of local production capabilities in the agro-related metalworking sector, either in the formal or informal sectors.

It is reported (Ministry of Trade, Nov. 1990) that the scope for import-substitution of some of the agricultural tools and equipment is rather limited given the size of the local market for such products as mentioned earlier. There is, however, potential for production locally of hand tools

especially parts of such implements that can be made out of hardwood. There are already some attempts, even though on a cottage basis, in the production if axe handles. This is an area that can be expanded to include handle related products, but would definitely need assistance both in technical and financial terms.

c. **Company Structures and Manufacturing Operations**

In 1983, it was reported (UNIDO, July 1986, pp.131) that there were establishments operating in the fabricated metal products and structural engineering sector, employing 83 persons. Subsequently, it was reported (Department of Economic Development, 1987, pp.76) that in 1985 there were 9 establishments, operating in the fabricated metal products, electrical appliances and structural engineering sector, employing 123 persons. In 1986 the number of establishments had increased to 10, employing 140 persons.

According to the Ministry of Trade (Nov. 1990), medium to large scale enterprises or any size of operations in the agro-related metalworking sub-sector is basically non-existent. However, in the fabricated metal products and structural engineering sector there are 7 establishments operating, employing 74 locals, according to the Industrial Survey carried out by the then Economic Development Department. These operations are registered ones operating in the formal sector of the economy.

The breakdown of employment by these operations into three categories of skilled, semi-skilled and unskilled are 30%, 50% and 20%, respectively. Generally availability of technical expertise in all sectors is one of the major constraints faced by the industrial sector, despite Government efforts in upgrading the only technical institute in the country.

Of interest in this sector is the proposed (Department of Economic Development, 1987, pp.84) establishment of an ADB Funded Small Industrial Centre at the Industrial Zone of Vaitele, where it is intended to provide factory space and utilities for local entrepreneurs to establish and expand industrial enterprise. The Centre is expected to be operational in 1991. This

may very well be a starting point for promoting the agro-related metalworking industry in identifying local entrepreneurs already engaged on a cottage basis in the production of wood handles for agricultural implements and then promoting them and encouraging them to expand to include other related products.

d. **Markets: Domestic and Export**

Apart from the import statistics (Table: 4) there is no further information to indicate the potential domestic demand, although given the relatively small population and limited purchasing power it is unlikely to be significant.

The types and sizes of agricultural equipment and implements depend very much on agricultural practices and composition of crops grown. The majority of the population engaged in agriculture are small holders and therefore equipment is limited to chainsaws, knives, taro planting implements and knapsack sprayers. WSTEC, a Government corporation engaged in agriculture, and fairly few individuals with relatively large size holdings tend to use such machinery as tractors and vehicles for transporting produce and workers. In some WSTEC coconut plantations donkeys are used for collecting coconuts. In summary, farms that are run on a commercial basis employing workers (these are few in numbers) on a continuous basis, tend to use modern equipment and machinery. Export potential would appear equally precarious given the need to import the major component parts in the agro-related metalworking sector and the geographic insularity from potential market opportunities.

4. Infrastructural support

a. Policy

Industrial policy

It is reported (UNIDO, 1986, pp.139) that the basic aims of Samoa, with regard to the manufacturing industry, are:

Table: 4 Import Statistics: Samoa - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding tractors)

SITC Code	Description	1980		1981		1982		1983	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/forestry	77,958	N/A	57,758	N/A	N/A	N/A	48,899	N/A
7121	Soil cultivation equipment	31,128	N/A	26,824	N/A	N/A	N/A	98,663	N/A
7129	Agricultural machinery and appliances	275,858	N/A	43,804	N/A	N/A	N/A	2,874	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990.

- Promoting exports by creating industries producing for export:

- Reducing the level of imports by supporting enterprises producing for the domestic market:

- Encouraging industries with a high labour content, thereby creating employment and a better qualified workforce:

- Increasing the processing of raw materials.

The 1984 amendments to the Enterprises Investment Act of 1965, rationalized the incentive system, covering tax, import duty and protection from foreign competition, and also provided improved incentives for new industries. Import tariffs were revised, establishing the lowest rate at 20% for capital equipment and finished goods at 50%, in order to protect local industry. The government has proceeded with a policy to privatize selected public sector enterprises, and joint ventures are encouraged.

Institutional facilities for promoting private sector development are fairly well developed in Samoa and comprise a development bank, an industrial estate, and an export processing zone (ESCAP, 1990, pp.25). The recent establishment of a Small Industries Center and an Export Processing Zone are meant to foster increased investment and entrepreneurial activity in light manufacturing, both for import substitution and for export (ESCAP,1990.pp.24).

Trade policy

Samoa has a small open economy, heavily dependent of foreign trade, and suffers from depressed international market prices for major export commodities. Agricultural exports fell off sharply after 1984, and nearly all consumer goods are imported.

As a measure of policy support, an approved enterprise is entitled to import free of duty for a wide range of items, including plant and machinery, vehicles and raw materials. In the Export Processing Zone, particularly

attractive tax and other incentives are available to new enterprises whose principle objective is manufacturing, processing or assembling goods for export. They benefit from wide spread benefits, such as: a five-year exemption from income tax; 30 years' lease of a site in the Zone; an unrestricted repatriation of capital, profits, dividends, etc.

As a member of the South Pacific Commission, Samoa has access to preferential trade concessions. It also enjoys tariff advantages for its exports to the EEC under the Lomé Convention and negotiations are being held with Australia and New Zealand on tariff and licencing advantages for exports to those c untries.

b. Financial

A Central Bank is established in Samoa, as well as a number of commercial banks: the Bank of Western Samoa, the Pacific Commercial Bank, and the Development Bank of Western Samoa. The latter, as well as the National Provident Fund, provides long term investment funds of up to 15 years. Investment in industry by commercial banks amounted to only 2-3 per cent of their total loan portfolio in the early 1980s (UNIDO, 1986, pp.137). The country also operates offshore banking facilities, essentially as tax haven (EIU, 1990, pp.57 and ESCAP, 1990, pp.14).

To keep inflationary pressures low, the government has imposed high interest rates and kept tight control over commercial bank lending to the private sector (ESCAP, 1990, pp.17).

Fairly liberal financial incentives are given to eligible foreign investment projects, including tax holidays, exemption from import duties for capital equipment and materials, and accelerated depreciation (ESCAP, 1990, pp.20). As in the other Pacific LDCs, the servicing of credit needs of the rural population could be considerably improved. Commercial banks could be encouraged to play a more active role in industry.

c. **Human**

There is only one Government-owned technical institute known as Western Samoa Technical Institute (WSTI). Unfortunately, the institute is not currently providing any training for metalwork-related activities including tools related to agriculture.

Literacy rates are very high at 98% in 1986 (UNIDO, 1986, pp.127). However, shortage in skilled manpower at all levels represents a major obstacle to development. This is partly a result of the outward migration of skilled personnel from the country. Attempts to integrate the trainees from technical institutions in the industrial sector through on the job training schemes have not been successful (UNIDO, July 1986, pp 136).

The situation calls for expanded manpower development programmes and vigorous training programmes that take into account the priority needs of the economy (ESCAP, 1990, pp.29). Government policy is now committed to keeping government employment down and stimulating the creation of jobs in the private sector. As a member of the South Pacific Forum and its Secretariat, Samoa has access to vital technical information, to training in technical fields, and access to advisory services.

d. **Technological**

It has not been possible to determine, from the information available, the level of technology employed or the capabilities and mechanisms for transfer of technology in the agro-related metalworking sector, or for that matter the metalworking sector.

e. **Services**

The service facilities available are quoted (Government of Western Samoa, 1988, pp.31-32) as basically well established. The structure and status of these facilities are described in a report (Department of Economic Planning, 1987, pp.100-151) and summarized, as follows:-

- The road network in 1986 extended to some 2.100 km. comprising 900 km of permanent national highway and 1.200 km of village/plantation roads and programmes are in hand to upgrade these facilities and improve maintenance.

- Electricity in industry accounts for 11.6% of power consumption. and no major supply problems are reported.

- Piped water supply was estimated to be available to 90-95% of the population in 1985. although this should be interpreted as supply to an area. not necessarily individual households. However, due to supply problems only about 30-40% of the water supply network is considered reliable. Water quality. due to salinity and bacteriological contamination. is a problem.

- Newly installed (1987) telecommunications equipment at the chief Post Office in Apia provides a total of 4.360 lines. There are 4174 subscribers with a further 600 on the waiting list. Accordingly, there are constraints on this service.

From the published information reviewed. services were not considered a major constraint to development of the manufacturing sector.

5. Related or Relevant Programmes

Country Specific

UNIDO: RP/SAM/80/001 "Assistance in Welding of Aluminium" (completed).
UNDP: DP/SAM/86/005 "Strengthening of Technical Institution". US$200.000. 1987-1990.
FAO: TCP/SAM/... "Formulation of Long Term Strategy for Farm Power and Mechanization" US$30.000. Pipeline.

Regional

UNDP/UNIDO: RAS/86/075 "Small and Medium Scale Industries and Entrepreneurship Development". US$800.000. 1987-1991. Based in the Fiji Islands. Covering Pacific Island Countries.
Objective: Provision of extension services. specialists and short-term consultants to carry out in-service training and organize study tours.

Others

Australia: "Technical Institute Study" US$217.494. 1987-1990.
Objective: Development of human resources.
Australia: "Assistance to Western Samoa Technical Institute". US$647.482. Planned.
Objective: Provision of equipment and staffing/consultants to assist with the upgrading of the WSTI.
Australia: "ASAU Workshop Equipment" US$33.134. Planned.
Objective: Provision of equipment to the Australian Staffing Assistance Unit.
New Zealand: "Technical Education", US$23.026. Duration unknown.
Objective: Improve technical and vocational training, through provision of cash grants to enable the construction of buildings and to purchase equipment.

6. Reference Material

Country Specific

Economist Intelligence Unit (EIU). Country Profile 1989-90. Western Samoa. London. 1989.

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Government of Western Samoa. Western Samoa: Socio-Economic Situation Development Strategy and Assistance Needs. Vol I + II. Apia. October 1988.

Ministry of Trade. Commerce and Industry. Country Statement. presented at the Workshop on Agro-related Metalworking Industry. Bangkok. Nov. 1990

UNCTAD. The Least Developed Countries: 1988 Report. Samoa. New York. 1989.

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Regional

ESCAP. Report on the Expert Group Meeting in Preparation for the United Nations Conference on the Least Developed Countries. Vienna. January 1990.

UNCTAD - Import Policy and Import Operations in the Least Developed Countries of the Asian and Pacific Region, Vol I + II. Geneva. 1981.

UNIDO - Industrial Development Profile of the Island Developing Countries of the South Pacific Region. Vienna. February 1980.

UNIDO - Industrial Development Review Series. Pacific Island States: Selected Countries, Vienna, July 1986.

UNIDO - A Review of the Manufacturing Sector in the Least Developed Countries - The Implementation of SNPA in the Eighties and Proposals for Further Action. Vienna. January 1990.

TUVALU

1. Summary

Tuvalu gained independence from the United Kingdom in 1978. It is one the worlds most disadvantaged nations being extremely isolated, with a very limited revenue base. Little information is available on the economy or institutional support facilities, but the country is very dependent upon foreign aid.

The very minimal level of imported agricultural tools and implements, coupled with the apparent absence of any local production capabilities, are perhaps indicative of a limited demand in Tuvalu. Considered in the context of an extremely small population base; limited natural resources; the limited contribution of the agricultural sector to GDP; and, the large sector of the population outside the cash economy, would seem to counter any prospects for the development of a viable agro-related metalworking sector, even at an artisanal workshop level.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

There are no detailed figures available on GDP growth in Tuvalu, however, it is reported (ESCAP, 1990, pp.8) that between 1981 and 1985 real GDP declined.

Tuvalu's resources are extremely limited as is its domestic market. National accounts are not available but revenue is derived from the sale of licences, to fish in Tuvalu waters, from transfers from Tuvaluans working abroad and limited contribution from the very small manufacturing sector. In 1983 GDP was estimated (EIU, 1989, pp.100) as being US$3.8 million, with per capita GDP being US$450. Another source (ESCAP, 1990, pp.1) reports that in 1988 GDP per capita was US$490, having fallen over recent years.

b. Contribution to GDP

Agriculture. including fishing. accounts for just under 10% of GDP and it is estimated (ESCAP. January 1990. pp.8) that over 60% of GDP originates from the service sector. including 44% from government services. Manufacturing and tourism activities are negligible.

c. Employment by Sector

Agriculture is the major source of income for people on the outer islands. who account for 70% of the population (EIU. 1989. pp.100).

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

The most recent import statistics. 1981 and 1982, for agricultural tools. implements and machinery are presented in Table: 1. It can be noted that these are virtually nonexistent for the years recorded.

b. Statistical Data on Local Production

There is no information to suggest any activity or capabilities in this area.

c. Company Structures and Manufacturing Operations

There are reported (UNIDO. 1988. pp.217) to be no manufacturing activities in Tuvalu except for a small number of family enterprises producing garments, printing and coconut timber processing. In the same report the development constraints are cited as the limited raw material resource base and deficient technical and production skills.

d. **Markets: Domestic and Export**

Apart from the information provided in Table: 1. there are no other indications to suggest the full extent of the domestic market. Given the lack of a manufacturing base. and the relative isolation of Tuvalu. export opportunities are highly improbable.

4. **Infrastructural Support**

a. **Policy**

Industrial policy

There are only a few small manufacturing activities. all situated on the main island of Funafuti. The Business Development Board was set up in 1981 to encourage new local and foreign investment, but no firm policy has been established for investment incentives.

Trade policy

Tuvalu is a small open economy, heavily dependent of foreign trade. As a member of the South Pacific Forum, Tuvalu has access to preferential trade concessions. A cooperative wholesale society is established to carry out importation on behalf of the island cooperative societies.

b. **Financial**

The Australian dollar is legal tender and The National Bank in Tuvalu is 75% owned by the government and 25% by Barclays Bank. As the other South Pacific LDCs, Tuvalu is a member of the South Pacific Forum and the South Pacific Commission. Through regional cooperation, these countries have been able to gain access to external resources. Through regional cooperation, Tuvalu has been able to project its development needs and aspirations in a wider scale, and benefits have accrued.

Table: 1 Import Statistics: Tuvalu - Agricultural Tools, Implements and Machinery

SITE Code	Description	1981 US$	1981 No.	1982 US$	1982 No.
6951	Hand tools for agriculture/forestry	4,605	N/A	2,400	N/A
7122	Harvesting/threshing/sorting equipment	N/A	N/A	637	N/A
7129	Agricultural machinery and appliances	2,124	N/A	N/A	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

c. **Human**

In 1984 the estimated (EIU. 1990. pp.100) population of Tuvalu was 8.400. It is noted in the same source that population will increase in the next few years as many Tuvaluans. employed in the declining phosphate mining industry of Kiribati. continue to return home and there will be an excess of manpower in the economy. Overseas training and scholarships are a large part of grants and loans from external assistance sources. The development of new opportunities for overseas employment is vital.

d. **Technological**

Information on the technological capabilities and possible linkages in Tuvalu is not available.

e. **Services**

Lack of essential services. notably electricity. piped water and sewage are cited (UNIDO. 1986. pp.217) as major development constraints. Of interest. however. was another source (ESCAP. 1990. pp.8) which indicated that in 1985 some 95% of the population had access to safe drinking water.

5. **Related or Relevant Programmes**

There are no programmes related or relevant to the agro-related metalworking sector.

6. Reference Material

Country Specific

Economist Intelligence Unit (EIU) Country Profile. 1989-90. Tuvalu. London 1989.

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UNIDO. A Review of the Manufacturing Sector in the Least Developed Countries - The Implementation of SNPA in the Eighties and Proposals for Further Action. Vienna. January 1990.

VANUATU - Republic of Vanuatu

1. Summary

Vanuatu (formerly known as the New Hebrides) became independent, from joint British and French rule, in 1980. The economy is mainly agrarian based, and heavily dependent on the export performance of a few key commodities, although agriculture is giving way to financial services, tourism and an underdeveloped but fast growing manufacturing sector.

Whilst import statistics show demand for agricultural tools, implements and machinery, particularly in 1983, insufficient data was available to determine a trend in this respect. Manufacturing activity in the metalworking sector is evident, albeit small, but in the agro-related metalworking sector this seems to have been limited to the fabrication of copra dryers. The general constraints identified are essentially the limited availability of serviced premises, lack of natural resources and the narrow range of manpower skill. A further point which may affect the creation of a viable agro-related metalworking sector is the dramatic decline in agriculture's contribution to GDP and, despite the fact that agriculture is still a major activity, over two thirds of this activity is at a subsistence level.

Although general objectives are given in the Development Plan, there is little information on implemented industrial policy and its effects. The local private sector receives few incentives and domestic financial support to small industry is rare, and training inadequate.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

The growth rates for GDP in Vanuatu are not available prior to 1980, but over the period 1980-86 recorded an average yearly growth in real GDP of 2.2%. This growth accelerated over the period to reach 4.6% in 1984-84.

falling sharply to a negative growth of -1.0% in 1985-86 (UNCTAD. 1989. annex). Another source (EIU. 1989. pp.67) notes that GDP fell by 2% in 1986.

Growth in agriculture over the period 1970-80 was on average slightly negative at -0.3%. and showed little improvement (0.4%) over the period 1980-86. By comparison, growth in industry was very high. averaging a yearly rate of 18.4% over the period 1970-86. This was due largely to an extremely dynamic manufacturing sector whose average growth rate averaged 25% over GDP period 1970-1980. falling marginally to 20.2% over the period 1980-86 (Table: 2). Growth has also been helped by "trade, hotels, etc" with a large and growing proportion of GDP (UNIDO Data Base).

Growth in per capita GDP averaged 3.5% over the period 1970-80. but only averaged 0.5% in the 1980's, due to the declining situation in agriculture. Average growth in MVA per capita was, however, high (19.6%) over the period 1970-86, falling to 16.0% over the period 1980-86. The GDP per capita for 1987 is shown in Table: 1 to be US$1,014 and is as some variance to another source (ESCAP, 1990, pp.6) which indicated a figure of US$499 in 1989. The same source (ESCAP, 1990, pp.1) estimated the figure for 1990 as US$500.

It is noted (UNDP, October 1988, pp.3) that the distribution of wealth is very uneven, with urban per capita income being ten times higher that of rural areas, where 80% of the population live.

b. <u>Contribution to GDP</u>

Agriculture's contribution to real GDP has more than halved from 1970 to 1987, dropping from 60.6% in 1970 to 26.2% in 1987, of which two thirds is subsistence farming. Industry's contribution of real GDP has grown steadily from a small 1.6% in 1970 to 9.4% in 1987. These figures incorporate manufacturing activity which itself grew from 0.6% in 1970 to 7.4% in 1987 (Table: 3). Wholesale and retail trade,hotels and other services are noted (UNIDO Data Base) as contributing over 50% of GDP in 1987, whilst another source (EIU, 1989, pp.74) notes that in the same year a finance center (tax haven) contributed 10% of GDP.

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices: VANUATU

Indicator	Year or period_	Country	South- and East Asia
GDP per capita (US$)	1970	781	373
	1975	1071	452
	1980	961	499
	1986	993	580
	1987	1014	601
MVA per capita (US$)	1970	4	49
	1975	12	65
	1980	29	89
	1986	89	116
	1987	75	126

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices): VANUATU

Sectors	Period	Country	South- and East Asia
Agriculture	1970-1980	-0.3	2.8
	1981-1987	0.4	1.8
	1970-1987	-0.2	2.8
Total Industrial Activity (incl. MVA)	1970-1980	17.6	4.7
	1981-1987	17.2	6.0
	1970-1987	18.4	3.9
Manufacturing	1970-1980	25.0	9.0
	1981-1987	20.2	7.5
	1970-1987	24.2	8.0
GDP per capita	1970-1980	3.5	3.3
	1981-1987	0.5	2.4
	1970-1987	1.2	2.7
MVA per capita	1970-1980	20.9	6.6
	1981-1987	16.0	5.0
	1970-1987	19.8	5.5

Source: As Table: 1
Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: VANUATU

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	60.6	1.6	0.6	65.6
1971	58.9	1.8	0.7	67.3
1972	57.1	2.0	0.8	69.2
1973	48.7	2.0	0.9	80.9
1974	36.1	1.7	0.8	108.9
1975	37.7	2.1	1.1	103.9
1976	36.9	2.5	1.3	105.9
1977	37.1	2.9	1.7	104.9
1978	31.5	3.0	1.8	123.3
1979	30.2	3.4	2.2	128.1
1980	34.1	4.6	3.0	113.4
1981	32.6	5.3	3.7	118.1
1982	29.4	5.8	4.1	130.7
1983	28.2	6.5	4.8	134.3
1984	27.4	8.4	6.4	142.8
1985	25.3	8.7	6.8	148.5
1986	25.8	11.1	9.0	147.0
1987	26.2	9.4	7.4	154.1

Source: As Table: 1
Notes: As Table: 1

c. **Employment by Sector**

There were reported (EIU. 1989. pp.69) to be 46.000 economically active non-europeans ir 1979. of which 80% were engaged in agriculture. fishing and forestry. 5.4% engaged in professional and technical work and 9.8% in production. transport and labouring. From 1981 to 1984. it is noted (UNIDO. 1986. pp.152) that employment in manufacturing activity had increased by 38%. This trend is confirmed by another source (EIU. 1989. pp.69) which estimated that almost 600 people were employed in manufacturing activities in 1982. rising to 976 in 1986.

The results of an urban census of 1985 in two towns. Port Vila and Luganville. were reported (EIU. 1989. pp.61) to have shown that of the economically active population 42% were employed in services. 19% in tourism and retail trade and 105 in transport and communications. It was also observed that some 12% were non-Vanuatu citizens. No specific reference was made to the percentage employment in the manufacturing sector but it is assumed that this sector is embraced with the remaining. unclassified. 17%.

3. **Agro-related Metalworking Industries**

a. **Statistical Data on Imported Products**

Figures for 1981 to 1983 are presented in Table: 4. and whilst the level of imports for both 1981 and 1982 are minimal. the 1983 figure reflects a marked increase to a significant level. to a total of some US$0.38 million. Discounting the category of other food processing equipment. which may be distorted by a small number of relatively expensive machines. still leaves imports in this sector in the order of US$0.24 million. It has not been possible to determine if this level of imports has been sustained but a report (UNIDO. December 1986. pp.29) provides details on the level of hand tools (only) imported in 1985. This information is summarized in Table: 5; and indicates that a total of 3,795 hand tools were imported during that year. It is also observed from the same report (pp.31) that 13 copra driers were imported in 1985. which are compatible with the type of equipment to be produced in the agro-related metalworking industries.

Table: 4 Import Statistics: Vanuatu - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding tractors)

SITE Code	Description	1981		1982		1983	
		US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/forestry	N/A	N/A	N/A	N/A	119,372	N/A
7121	Soil cultivation equipment	N/A	N/A	N/A	N/A	31,260	N/A
7122	Harvesting/threshing/sorting equipment	52,612	N/A	41,688	N/A	88,692	N/A
7129	Agricultural machinery and appliances	N/A	N/A	N/A	N/A	4,692	N/A
71839	Other food processing equipment (excl. domestic)	N/A	N/A	N/A	N/A	135,439	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990.

Table: 5 Imports Statistics: Vanuatu - Agricultural Hand Tools - 1985

Description	Importer						
	SMET	B.P. Hardware	SNAP	V. Hardware	P.V. Hardware	Ballande	Total
Yam spade	10	-	-	40	48	24	122
Burr hoes	10	-	-	-	-	-	10
Garden hoes	-	20	40	20	20	-	100
Nail rakes	15	-	40	20	20	24	119
Leaf rakes	25	120	40	-	100	48	333
Light shovels	15	16	40	200	20	-	291
Heavy shovels	40	-	40	-	20	-	100
Forks	10	20	52	36	60	24	202
Picks	10	-	40	48	25	15	138
Light spades	-	30	80	36	40	24	210
Axes 4 lbs	-	-	12	36	-	-	48
Axes 3 lbs	10	40	120	36	-	-	206
Matchets	-	-	-	36	-	-	36
Crow bars	5	20	12	36	25	-	98
Bush knives	-	100	144	120	100	1,200	1,664
Copra knives	-	100	-	-	-	-	100
Weed cutter	-	-	-	-	-	24	24
Shackles	-	-	-	12	-	-	12
Trench spade	-	-	12	-	-	-	12
							3,795

Source: UNIDO, (Consultant Kherdekar, D.N.) Terminal Report on Production of Hand Tools, Vienna, December 1986.

b. Statistical Data on Local Production

It was noted (UNIDO. December 1986. pp.10) that there are no facilities for manufacturing agricultural hand tools in Vanuatu. Indeed the report (Terminal Report on Production of Hand Tools - AU/RAS/85/004). was specifically recommending the establishment of a pilot workshop to develop the concept of agricultural hand tools and related equipment manufacture. It was recently reported. however (Government of Vanuatu. Nov. 1990). that there are at present three small metalworking related industries in operation in Vanuatu. These are privately owned and located in Vila Santo where power is available.

In 1989 a total employment of 84 was recorded. however. with over 50% of activities covering welding and jobing. About 20% of total activities is diverted to the producing of agricultural tools/equipment such as copra dryers. The total turnover of the metalworking industry sector was Vt 142 million in 1989. 100% of the raw materials were imported at a duty rate ranging from 10-40%.

Most of the raw materials are imported from Australia and New Zealand and to a lesser extent from Hong Kong. Japan. Taiwan and China. Most materials are of good quality and these supplies are realiable. although at times late arrivals of supplies due to transport arrangements. or other industrial disputes in the supplying countries are experienced.

As the tastes of local people on agricultural tools favour imported agricultural implements. this has not been any particular encouragement for local production of these farm implements.

c. Company Structures and Manufacturing Operations

It was reported (UNIDO. June 1987. pp.10) that in 1985 a Business Establishment Survey recorded 67 enterprises in the manufacturing sector. employing a total of 557 employees. It was also noted (UNIDO. July 1986. pp.151) that there is only one large-scale manufacturing enterprise and a number of small enterprises producing a variety of consumer goods. including metal products. No further information is available on the nature of these enterprises except (UNIDO. July 1986. pp.152) that there are some 40 persons engaged in the fabricated metal product sector. comprising in the order of 4.6% of those employed in manufacturing.

A number of constraints are identified. the most important (Government of the Republic of Vanuatu. 1988. pp.49) being diseconomies of scale. limited natural resources. distance from foreign markets and a narrow range of manpower skills. Another source (UNIDO. December 1986. pp.32) refers to the fact that there is a core of some 100 welding and fabrication workers in Vanuatu but advocates that due to the shortage of trained labour a manufacturing industry should not be labour intensive.

Raw material inputs for the manufacturing industry are not cited. in general. as a problem area but given the limited raw material resource base this should not be overlooked.

The Department of Industries has attempted to establish an artisan workshop on metalworking industry. but the progress of this project is continuously constrained by the lack of sufficient skills for the training of entrepreneurs. Considering the local cost structure at present. it may be less costly to rely on imported metal products and even if cheaper agricultural implements are produced locally. the added complexity of customer preference for imported products has to be overcome. Besides. the local skills for simple blacksmithy or related activities are non-existant in Vanuatu. so that to justify efforts in this direction before a complete package of training in blacksmithy. welding. jobing and finishing for high quality workmanship skills is launched.

Besides the Agricultural Training Centre, there are no other repair facilities for most agricultural implements. There is at present one artisan workshop in the whole of Vanuatu employing two people. Most raw materials used in this small production facility are obtained from local metal/wire suppliers and partly are scraps from other bigger metal workshop industries. Very simple equipment is used in this workshop, including a drilling machine, electric welding set, gas welder set, a grinder machine and some hand tools. The range of products currently produced include: hoes, nail racks, window grills, barbeque racks, and coconut scrapers. Because of the somewhat low quality items currently being produced, the owner/worker definitely needs further training in improved processing method, newer technology and other general finishing operation techniques.

d. Markets: Domestic and Export

In Vanuatu subsistence farmers depend on bush knives, yam spades and forks for their subsistence farming activities. Today some farmers are acquiring fuel run chain saws substituting axes. There is a very small group that turn to the use of tractors for field ploughing. Such equipment is mostly hired from the Agriculcure Department or expatriate farmers whose main use of this equipment is other than farming related.

4. Infrastructural Support

a. Policy

To overcome the problems of a backward, dualistic economy, economic policies of the Second National Development Plan (1987-1991) aim at achieving a greater degree of economic self-reliance. The government emphasized balanced regional and rural development, a more intensive utilization of the country's natural resources, accelerated human resource development and the promotion of the private sector (UNCTAD, 1989, pp.219).

Industrial policy

In Vanuatu there is reported (UNIDO, 1986, pp.151) to be a lack of

serviced industrial premises, long delays in constructing new buildings and lack of security in tenure.

A finance center in Vanuatu has attractive incentives for foreign business, such as absence of income-, company- or capital gains tax, and no exchange controls. New legislation in 1985 and The Companies Act of 1986 further simplified and liberalized provisions, and efforts are made to stimulate investment that utilized domestic resources for export production. The country's investment code contains protection against expropriation (UNCTAD, 1989, pp.220). The Development Plan stresses the importance of both domestic and foreign investment and government plans to strengthen its services to support indigenous entrepreneurs.

Trade policy

Vanuatu's trade deficit grew sharply in 1987 when imports expanded by 25%, due to cyclone damage and two devaluations in 1986 (EIU, 1989, pp.75).

Vanuatu has maintained an open-economy policy, with only a few restrictions on exports and imports, and the exchange system is free of any restrictions on payments. In 1987, the government took measures to raise the tax revenue, including a reduction in the number of customs exempt imports (UNCTAD, 1989, pp.219).

b. Financial

There were 88 banks registered in Vanuatu in September 1988, being well developed but primarily oriented to offshore activities. There are few dispersed banking outlets and few financial instruments to attract long term savings and provide appropriate credit facilities (UNIDO, 1986, pp.151). Vanuatu Development Bank can grant loans of up to approximately US$300,000 for approved industrial projects.

It was noted (UNDP, October 1988, pp.6) that there were no incentives for the local private sector to utilize domestic savings, and that public sector investments could have a more enhanced effect on private sector investment.

Domestic savings have not been channelled into investment in the private sector.

c. Human

A shortage of skilled manpower in professional, technical, vocational and managerial fields has affected Vanuatu's economic performance. It threatens to undermine the maintenance of the existing economic infrastructure, and the effectiveness of investment programmes.

While some training at the vocational level has been provided, high level training has been limited because of the lack of people qualified for training at the professional level. Donor assistance for training and manpower development is a matter of high priority.

As the size of the modern sector is small and prospects for employment creation are limited, only part of secondary-school leavers find adequate job opportunities. The government is now following policies aimed at limiting the number of educated unemployed.

d. Technological

Technology appears to be a particularly weak area, both in terms of technically competent personnel and access to technology. The Vanuatu Technical Institute would appear to be the only formal establishment catering for this need, but details of the resources available are unknown.

e. Services

The standard of services and facilities is quoted (UNIDO, July 1986, pp.151) as reasonable but with the qualifying statement that the manufacturing sector faces difficulties in securing serviced industrial premises. It is proposed (Government of the Republic of Vanuatu, 1988, pp.76) to establish small scale manufacturing and processing units at Santo Industrial Estate to provide an incentive to the private sector which will no doubt go some way to alleviating this problem.

5. Related or Relevant Programmes

Country Specific

UNDP/UNIDO: DP/VAN/88/004 "Establishment of Ni-Vanuatu Small and Medium Scale Industries". US$325.000. 1988-1991.

Regional

UNDP/UNIDO: DP/RAS/86/075 "Small and Medium Scale Industry" US$798.200. 1989.

Others

Australia: "Technical and Vocational Training" US$17.498. 1987.
Objective: Review study.
United Kingdom: "Mechanical Workshop and Training" US$71.613. 1986-1987.
USA: "Private Enterprise Development" US$388.400. 1985-1987 (Regional).

6. Reference Material

Country Specific

Economist Intelligence Unit (EIU), Country Profile 1989-90. Vanuatu. London 1989.
Government of the Republic of Vanuatu, Socio-Economic Development Strategies and External Assistance Priorities (Vol I), Development Cooperation and Aid Coordination (Vol II). Sectoral Strategies and Priority Development Projects (Vol III), Port Vila, October 1988.
UNCTAD, The Least Developed Countries: 1988 Report, Vanuatu, New York. 1989.
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UNIDO. Industrial Development Review Series - Pacific Island States: Selected Countries (Vanuatu). Vienna. July 1986.

UNIDO. Industrial Development Profile of the Island Developing Countries of the South Pacific Region. Vienna. February 1980.

UNIDO. Small- and Medium-Scale Enterprises Promotion and Development (DP/VAN/79/001 and DP/VAN/85/002) - Report of the Evaluation Mission. Vienna. June 1987.

Regional

ESCAP. Report of the Expert Group Meeting in Preparation for the United Nations Conference on the Least Developed Countries. January 1990.

UNIDO. A Review of the Manufacturing Sector in the Least Developed Countries - The Implementation of SNPA in the Eighties and Proposals for Further Action. Vienna. January 1990.

REPUBLIC OF YEMEN

At the time of the preparation of the country briefs early 1990, the former People's Democratic Republic of Yemen and the Yemen Arab Republic had not yet been united. Finding consolidated statistics or other information covering the united Republic as a whole is still quite problematic. The reviewed country brief for the Republic of Yemen therefore still consists of two sections as before the reunion (see pp. 2 and 18).

During the UNIDO/ESCAP Regional Workshop on Agro-related Metalworking Industry, held in Bangkok in November 1990, some further information was obtained from the three delegates from Yemen, concerning the newly united country as a whole. The essence of their country statement presented at the Workshop is as follows:

Some 20 companies currently produce agro-related tools and spare parts among other metal products. The value of their production is estimated at US$ 2.4 million per year. Their production grew at an average of 5% per annum between 1985 and 1988. The six largest companies are:

1) Yemen Factory for Agricultural Machinery;
2) Al-Baham Agricultural and Household Tools Factory, Al-Beida;
3) Arab Company for Steel and Iron (small foundry producing spare parts);
4) Guman Workshop (assembly of motor pumps);
5) Athban Factory (pumps);
6) Factory for Harvesting Machines (spare parts).

These six factories together engage approximately 500 employees.

Iron ore is imported. Scrap melting is done by some factories.

Local consumption of imported agricultural tools ard equipment as well as spare parts averaged US$ 18 million in 1988 (agricultural tools and implements: $2.2 million; machinery and post harvest processing $11.9 million;

spare parts $3.7 million). Imports are financed mostly by agricultural loans advanced by credit banks. Imports grew by 15% per year from 1985 to 1988.

Imported products are of better quality, but more highly priced than locally produced agro-related metal products. They are also of a higher technological level.

It was also reported that the Bank of Agriculture in Sana'a offers loans to new projects that are obliged to import machinery (such as trucks and bulldozers, etc.). In 1988, loans amounted to $2.1 million. The Bank has pronounced its intention to offer financing of industries producing spare parts locally.

In general, the Industrial Policy to be adopted by the Republic of Yemen, will be that of an indicatively planned, mixed economy. Private industrial operations are to be encouraged. Loss making public enterprises are considered for privatization. The Ministry of Supply and Trade will be responsible for the remaining public industrial sector.

YEMEN - Yemen Arab Republic

1. Summary

Although agriculture is by far the most important sector in the (former) Yemen Arab Republic economy, the industrial sector is growing rapidly, especially due to the very labour productive manufacturing sector. Over the most recent years industrial performance has been greatly influenced by the oil industry.

Whilst somewhat dated the general trends shown in the import statistics indicated a very significant and consistent level of imports of agricultural tools, implements and machinery. The general metalworking sector maintains a prominent position in the manufacturing sector although with the exception of an agricultural implements factory, established in 1987, there appears to have been no activity at a formal level in the agro-related metalworking sector. Some activity is evident at an artisan/blacksmith level but it has not been possible to determine the extent of these activities or the methods and technology employed. As stated, the domestic market does show some positive signs although the capability of local industry to meet these needs seems impeded by constraints. Characterized by shortages of skilled labour, high labour cost, poor product design and quality, raw material shortages, these problems need to be addressed. Some export achievements are recorded but it is less than clear as to whether they were Yemeni produced or re-exported imports.

Until the reunion with the PDRY, infrastructural support to industry appears to have been deficient in a number of key areas, and particularly to the relatively important private sector small scale industries. Some incentives were provided by reducing trade restrictions, the creation of industrial estates and financial support, although the lack of funds for industry was still a constraint in 1990. Further emphasis was required on technical education and technological support, as was the need for improved essential services.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

Real GDP grew at an average annual growth rate of 9.7% over the period 1970-1980, but from 1980 to 1986 experienced a lower average growth of 4.4%. This figure covered a rapid growth of 7.5% in 1980-81 and 8.1% in 1981-82 (UNCTAD, 1989, annex). Economic activity slowed down after 1982-83 (1.3%), but surged in 1986 to reach a real GDP growth rate of over 9% (EIU, 1989, pp.38). It is estimated (UNCTAD, 1990, pp.223) to have increased by 5.0% in 1987, and in 1988, the country is estimated by the World Bank to have registered real growth of 19.2%, largely due to the beginning of large-scale oil exports (EIU, 1989, pp.39).

Agricultural production grew by an annual average of 2.2% over the period from 1970 to 1987, whilst over the period 1980-1987, it averaged 2.7% annually. Total industrial activity registered an average growth of 14.9% from 1970 to 1987, accelerating in the 1980s to a yearly average rate of 22.0%. This growth was, to a large degree, due to manufacturing activity which experienced an average growth of 26.0% from 1980 to 1987. MVA grew by 22.4% from 1980 to 1987 (Table: 2), and stood at US$87 in that year.

Real GDP per capita growth averaged 4.9% annually from 1970 to 1987 (Table: 2), with per capita and being US$637 in 1987.

b. Contribution to GDP

Agriculture contributed 44.0% to real GDP in 1970 but its share has fallen quite regularly until 1987, when its percentage was 19.9% (Table: 3). The industrial sector's share tripled from 1970 to 1987, representing 14.4% of real GDP in 1987. The performance of the manufacturing sector was even more impressive, rising regularly from a low 3.95 in 1970 to 8.1% in 1984, after which an even faster relative growth brought it to stand at 13.7% in 1987, constituting almost all of industry's contribution. After the start of oil exploitation in 1987, the relative contribution of manufacturing to industry, and to real GDP, has fallen.

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices.
YEMEN ARAB REPUBLIC

Indicator	Year or period_	Country	Western Asia
GDP per capita (US$)	1970	270	2276
	1975	394	2867
	1980	462	3484
	1986	627	2521
	1987	637	2525
MVA per capita (US$)	1970	10	193
	1975	17	257
	1980	27	281
	1986	83	339
	1987	87	347

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices).
YEMEN ARAB REPUBLIC

Sectors	Period	Country	Western Asia
Agriculture	1970-1980	2.6	3.7
	1981-1987	2.7	2.9
	1970-1987	2.2	3.4
Total Industrial Activity (incl. MVA)	1970-1980	12.6	6.0
	1981-1987	22.0	-4.4
	1970-1987	14.9	0.0
Manufacturing	1970-1980	11.9	7.2
	1981-1987	26.0	5.4
	1970-1987	15.4	6.4
GDP per capita	1970-1980	5.8	4.4
	1981-1987	5.0	-5.0
	1970-1987	4.9	0.5
MVA per capita	1970-1980	9.5	4.1
	1981-1987	22.4	2.3
	1970-1987	12.5	3.3

Source: As Table: 12-1
Notes: As Table: 12-1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: YEMEN ARAB REPUBLIC

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	44.0	5.0	3.9	1305.6
1971	41.1	5.1	4.1	1399.8
1972	40.9	5.3	4.2	1594.9
1973	36.6	5.9	4.7	1684.0
1974	38.7	5.4	4.4	1876.9
1975	35.9	5.4	4.4	2083.9
1976	31.4	5.6	4.5	2189.8
1977	25.9	6.2	4.7	2371.0
1978	28.3	6.8	5.1	2528.5
1979	28.0	7.4	5.6	2667.8
1980	28.3	7.6	5.8	2767.9
1981	26.8	8.0	6.2	2981.6
1982	24.6	8.3	6.3	3279.4
1983	21.0	9.7	7.5	3402.6
1984	20.5	10.5	8.1	3484.5
1985	18.5	13.8	11.9	4194.4
1986	20.3	15.7	13.2	4446.0
1987	19.9	14.4	13.7	4655.3

Source: As Table: 12-1
Notes: As Table: 12-1

c. **Employment by Sector**

The FAO estimated the share of economically active population in agriculture at 76.4% in 1970 and 65.2% in 1986. whilst for the same year the Central Planning Organization puts it at 58.6%. according to the latest census. which took place in 1975. manufacturing represented 3.0% of total employment and agriculture 73.6% (EIU. 1990. pp.38). Manufacturing employment was reported (Kolstee. Th.H. et al.. 1986. pp.v) to be about 5% of the labour force in 1986. It is clear that capital intensity is high and that labour productivity is high in the private manufacturing sector. Metal products is. after the food subsector. the largest sector in terms of employment.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

The most recent detailed import statistic. scheduled in Table: 4. for agricultural tools. implements. machinery and food processing equipment are virtually a decade old. Some scepticism has to be expressed on the reported level of imported soil cultivation equipment in 1978 as. at US$31.3 million. this equated with an equivalent of some 4% of the total GDP from agriculture and fisheries at that time. It is not known whether these general trends have prevailed but. taken at face value. expenditure on imported agricultural equipment was considerable. A recent report (Kolstee Th.H. et al.. 1986. pp..) suggests that 40% of farms are using custom hiring. primarily for cultivation. and that 80% of farms are using draught animals. so it may be reasonable to presume that considerable amounts of agricultural equipment are still being imported. or perhaps fabricated locally.

b. Statistical Data on Local Production

Information relating to the local production of agricultural equipment is not available although it is reported (UNIDO. 1989. pp.61) that an agricultural implements factory was established in 1987.

Table: 4 Import Statistics: Yemen Arab Republic - Agricultural Tools, Implements, Machinery and Food Processing Equipment (excluding tractors)

SITE Code	Description	1978		1979		1980		1981	
		US$	No.	US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/forestry	N/A	N/A	8,871,000	N/A	2,914,200	N/A	3,553,300	N/A
7121	Soil cultivation equipment	31,327,100	N/A	10,881,500	N/A	13,271,700	N/A	7,762,400	N/A
7122	Harvesting/threshing/sorting equipment	400,200	N/A	991,100	N/A	436,800	N/A	248,500	N/A
7129	Agricultural machinery and appliances	N/A	N/A	229,300	N/A	792,300	N/A	345,900	N/A
71831	Machinery for milling grain	1,624,100	N/A	5,044,600	N/A	2,065,300	N/A	1,528,300	N/A
71839	Other food processing equipment (excl. domestic)	4,147,300	N/A	2,833,300	N/A	1,513,400	N/A	883,900	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990.

c. Company Structures and Manufacturing Operations

The total number of medium- and large-scale enterprises, classified as employing 5 to 9 employees and 10 and over respectively, was reported (UNIDO, 1989, pp.39) to be 433 in 1984. Of this total 340 were classified as medium-scale and 93 as large-scale with the metalworking sector forming the second largest sector with 112 enterprises. The main activities of which were the production of household utensils, barrels, batteries, beds, window and door frames, etc.

The establishment of the agricultural implements factory in 1987 corresponds to an entry (Industrial Bank of Yemen, 1987, pp.6) in the Tenth Annual Report which indicates the provision of a loan of YRL's 1.5 million to the Al-Behani agricultural and household tools factory, Al-Beida. This was placed in the large and medium scale project category having a total investment of some YRL's 4.33 million. Further details on the company, with regard to employees, manufacturing operations, product range, etc., are not available.

The general constraints identified in the manufacturing sector are numerous but, apart from possible priority ranking, all the sources reviewed reiterate the same constraints. These are summarized as follows:-

- The acute shortage and high cost of semiskilled and skilled labour. Quoted (UNIDO, 1989, pp.31) as having a cost factor some 50% higher than the Republic of Korea in 1980, although in real terms declining subsequently by some 18% from 1980 to 1984.

- High turnover and levels of absenteeism amongst workers.

- Capacity underutilization due to overbuilding of capacity, duplication of capacity, raw material shortages, technical malfunctions, intermittent power supplies and limited markets. In the case of private industry capacity utilization was quoted (UNCTAD, 1989, pp.222) to have fallen, in some instances, to a level of only 30%.

- Poor product quality and exceedingly limited design capabilities and lack or non-availability of appropriate technologies.

- Lack of integration and linkages between manufacturers and the apparent absence of any subcontracting arrangements.

- Generally poor infrastructure, high transportation costs and inadequate institutional support.

- A reluctance ot expend time, energy and money on training workers for fear of losing them later to other industries.

- Minimal attention to product standardization and quality control.

Little current information is know about the role of small-scale industries, classified as employing less than 5 persons, but a recent report (UNIDO, 1989, pp.40-41) quotes the findings of a 1975 survey. The total sector comprised of some 11,067 enterprises of which 1,120 (10.1%) were involved in metalworking activities. Details on the full extent of the activities undertaken are not apparent but some of the blacksmiths/artisans are engaged in the production of agricultural and construction tools.

d. **Markets: Domestic and Export**

A study undertaken in 1986 (World Bank/UNDP, 1986, pp.108) identified an agricultural machinery factory as having potential for development, and may not be unconnected with the physical establishment of such an enterprise in 1987. It indicated a notional capacity of 2,000 pieces per annum, although further details relating to this estimate are not available. Apart from the somewhat dated information on import statistics (Table: 4) little further data is available, except to say that the feasibility study, if undertaken, for the Al Behani factory should have addressed this issue.

Despite the apparent absence of any agricultural equipment manufacturing capabilities prior to 1987, the most recent detailed statistics (Table: 5) show activity in the export sector. In view of this situation it is assumed

Table: 5 Export Statistics: Yemen Arab Republic - Agricultural Tools, Implements, Machinery and Food Processing Equipment

SITE Code	Description	1979		1980		1981	
		US$	No.	US$	No.	US$	No.
6951	Hand tools for agriculture/forestry	16,400	N/A	N/A	N/A	188,500	N/A
7121	Soil cultivation equipment	N/A	N/A	53,300	N/A	233,000	N/A
71831	Machinery for milling grain	N/A	N/A	N/A	N/A	35,100	N/A

Source: UNIDO (Industrial Statistics and Sectoral Surveys) February 1990

that the figures relate to the re-export of imported equipment, even possible secondhand. The views expressed on export potential (World Bank/UNDP, 1986, pp.35) for manufactured goods would indicate little potential for exports due to skill shortages, high labour costs, the geographical location of the country and the absence of preferential access to neighbouring markets. However, later in the same report (pp.54) the promotion of exports to these countries is encouraged as there are quoted to be no barriers to trade and the impact of Yemen exports on their respective economies would be minimal.

4. Infrastructural Support

a. Policy

The Third Five Year Plan (1987-1991) emphasized the need to attain self-reliance, with special attention to agriculture and industries that use local raw materials. Austerity measures were imposed in 1986, but have recently been eased as Yemen became an oil exporter in 1987 and Government revenue increased (UNCTAD, 1990, pp.221). In 1987, the Government adopted an expansionary fiscal policy.

Industrial policy

At the time when the two Yemens were united, most large industrial enterprises in the Yemen Arab Republic were owned by the State or under mixed ownership, whilst most private industry was concentrated in the light industrial sector. Productivity in industry had been low, caused by shortage of foreign exchange for the import of raw materials, lack of manpower and trained managers, and limited local demand. To remove existing bottlenecks, the Government was setting up industrial estates in Sana'a, Hodaida and Taiz, and the Industrial Bank of Yemen (IBY) was encouraging more private sector participation in industry. The Government was giving local industry a 25% rebate on duties for all imported industrial raw materials, and a five year tax holiday (EIU, 1989, pp.45). Small-scale industry had basically been neglected (World Bank, 1986, pp.51).

Trade policy

Parastatal trading organizations participated in the procurement, stock management and distribution of commodities. Limited supply of domestic inputs, due to poor endowment of natural resources, had made the country very dependent on imports, with 80% of raw material for industry being imported in 1989 (EIU, 1990, pp.45).

Severe import restrictions were introduced in 1986, as the Central Bank assumed control over foreign exchange dealings, offering importers rates of exchange closer to the official rates, making imports more expensive. In the same year imports were also restrained by stricter rules on import licences, and imports of luxury goods were suspended. Since 1987, the application of import licences has been extended to all goods. Thus, after 1986, various protected local industries have expanded. However, imports were allowed to grow in 1988, as private sector imports were permitted to increase substantially so as to increase capacity utilization, which was reported to have declined in certain cases to a level of only 305 (UNCTAD, 1989, pp.222).

b. Financial

According to a mission report (Kolstee, Th.H., 1986, pp.viii) the further development of manufacturing activity was constrained by, amongst other things, scarcity of public funds and limited control over investable funds in the private sector, and limited availability of foreign exchange.

Commercial banks' ability to extend overdrafts had been increased, as the limit was extended to 25%. To mobilize the commercial banks' excess liquidity for economic activity, the Central Bank had reduced interest rates. These new policy directives were expected to enhance the role of the private sector through the provision of increased resources for investment (UNCTAD, 1989, pp.221).

The Yemen Company for Investment and Finance (YCIF) extended terms and working capital loans, took equity participation in, and offered guarantees to

investment projects. It extended assistance in local currency only (World Bank/UNDP. 1986. pp.11).

The Central Bank alone was authorized to deal in foreign currency. Commercial banks could buy foreign exchange domestically but had to sell it to the Central Bank.

c. Human

The population was estimated at 9 million in 1986 (EIU. 1990. op.34). In 1986 there was an estimated one million Yemeni workers abroad. and their remittances have brought benefits to a high proportion of the population. but emigration has also created a lack of manpower inside the nation. and caused labour costs to rise (EIU. 1990. pp.36). Many companies are employing foreign labour. and employment of local women is increasing.

Direct industrial training is provided by four Vocational Training Centers (VTCs) in the former Yemen Arab Republic. offering a two year programme in subjects including mechanics. to students who have completed primary education. Another VTC is being established. Two Technical Training Schools (TTSs) in Sana'a and in Taiz provide training at a higher level. offering three year programmes to students having completed the preparatory level. Two more TTSs are being established. one in Sana'a and one in Hodaida. A two-year polytechnic institution is planned and will produce technicians that will fall in the skill level between the high school vocational training graduates and the university science and engineering graduates (World Bank/UNDP, 1986. pp.45). The Polytechnic Institute will provide courses in engineering. with specialization in. amongst other subjects. metalworking and mechanics. and will enroll 216 students per year (UNIDO, 1989. pp.96).

There was still a need in 1986 for improvement of the quality of the formal vocational training and technical education. and there was a need for more training efforts in the non-formal technical education level (World Bank/UNDP. 1986. pp.45). It is reported (UNIDO. 1989. pp.93) that students

enrolled in the VTCs represented only 0.2% of the total number enrolled in educational establishments in 1986/87, as they suffered from low esteem in the eyes of potential students. This was considerably lower than the amount needed to meet the demand on the labour market, nevertheless, the number of students enrolled exceeds classroom capacity. The Faculties of Science and Engineering represent only 2.6% and 2.8% of the total number of students enrolled at the University of Sana'a or at institutions abroad.

d. **Technological**

Whilst it is reported (World Bank/UNDP, 1986, pp.28) that there is fairly sophisticated manufacturing technology available in the former Yemen Arab Republic, the low level of operator experience causes frequent breakdown and there is reliance upon foreign technicians to supervise and maintain such equipment. At a national level there appears to be no effective institution ot assist with the development and transfer of appropriate technology to the manufacturing sector in general. Assistance in this respect, by UNIDO, should assist in alleviating some of these problems through the i) National Institute for Standardization, Quality Control and Metrology (DP/YEM/87/003) and, more importantly, ii) Engineering Industries Prototype Development and Training Center (DP/YEM/88/017).

e. **Services**

The availability of essential services are cited (World Bank/UNDP, 1986, pp.8) as inadequate with manufacturers having to establish alternative or backup facilities at their own cost. Cleared sites with essential services are reported (UNIDO, 1989, pp.79) as being in short supply and commanding high prices. Efforts have been made to assist entrepreneurs with the provision of serviced industrial estates. The Al Thowra Industrial Complex on the outskirts of Sana'a is now full, an estate at Taiz now houses 114 small-scale enterprises and a similar 20 hectare workshop estate at Hodeidah is still under construction. Further industrial sites are proposed.

Significant steps have been taken to improve the standard of essential service with installed electricity supply capacity being increased (EIU. 1989. pp.44) fourfold from 109mw to 467mw between 1981 and 1987. An extensive improvement to water supply was commenced in 1982 but it is reported (UNIDO. 1989. pp.109) that water quality is a major problem with high saline levels and, as a result, 68% of samples taken in 1986 were classified as unsuitable for consumption.

5. Related or Relevant Programmes

Country Specific

UNDP/UNIDO: DP/YEM/87/021. "Industrial Management and Rehabilitation". US$795.643. 1988-1991.
UNDP/UNIDO: DP/YEM/87/003. "Establishment of the National Institute for Standardization. Quality Control and Metrology". US$1.661.354. 1987-1991.
UNDP/UNIDO: DP/YEM/88/017. "Establishment of and Engineering Industries Prototype Development and Training Center. Preparatory Assistance". US$2.213.800. Preparatory assistance given 1988-1989. Pipeline.
UNDP/UNIDO: DP/YEM/89/005. "Yemen Tool and Die Company: Comparative Techno-Economic Study". US$230.900. pipeline.
UNDP/UNIDO: DP/YEM/87/020. "Strengthening the Appraisal and Registration Capacity of the Ministry of Economy. Commerce and Supply". US$640.035. 1988-1990.
UNDP/UNIDO: DP/YEM/86/003. "Promotion of Small-Scale Enterprises". Allotment unknown. Expected to start 1989. duration unknown.
UNDP/UNIDO: DP/YEM/88/xxx. "Establishment of a Pilot and Demonstration Foundry". US$1.600.000. Pipeline.

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Former People's Democratic Republic of Yemen

1. Summary

Industry has not increased its relative performance in spite of the fact that industry had been assigned top priority in development efforts. Nevertheless, even with the many and formidable constraints, a significant industrial production base has been created.

The lack of market intelligence data on imports and the closure of the Agricultural Implements Factory, over a decade ago, make it very difficult to assess where over half the active workforce, engaged in agriculture, obtain the necessary agriculture tools and implements. The manufacturing sector would seem constrained by relatively high labour costs, over capacity and inappropriate equipment selection, poor maintenance, limited availability of skilled personnel and raw material shortages. The failure of the Agricultural Implements Factory provides a cautionary indication as to the limited domestic market but warrants further examination to determine if this failure was due to demand or product mix. There appears to be little prospect, in the medium-term, for exports given the uncompetitive manufacturing sector.

The industrial structure until the reunion with the Yemen Arab Republic mainly consisted of relatively inefficient public enterprises. Private initiative was tolerated but no given much incentive, although it had potential for development and fulfilling the overall economic aims of the Government. Participation of foreign investment was encouraged although the economy remains closed, with trade and transactions well controlled. Limited resources and support, insufficient training and inadequate essential services rendered difficult the Government's strategy of industrial development.

2. Performance of the Agricultural and Manufacturing Sectors

a. GDP

Real GDP grew by a yearly average of 2.6% in the 1970s, but fell on average by -0.2% from 1980 to 1986 (UNCTAD, 1989, annex) due to extensive floods in 1981-82. However, there were years with high growth in the 1980s (6.6% in 1980-81 and 4.0% in 1982-83), with the political unrest of 1985-86 (-9.7%) being mostly responsible for bringing down the average. In 1987 a recovery was recorded (UNIDO, June 1989, pp.xiii) as growth was estimated at about 3.5%, but GDP remained below the 1985 level.

Agriculture grew regularly, with an acceleration in the 1980s (Table: 2). Annual growth in total industrial activity was rather low (1.2%) in the 1970s, but accelerated in 1980-1987 to an average annual rate of 8.9%. Manufacturing activity grew faster, with an average growth of 10.4% in 1980-1987.

After a moderate average growth (1.9%) of real GDP per capita in 1970-1980, growth per capita fell by an average of -1.3% annually from 1980 to 1987 (Table: 2). Real GDP per capita was US$369 in 1987 (Table: 13-1).

b. Contribution to GDP

Agriculture, and fisheries, contribution to GDP was 10.4% in 1970, and, after a rise to 18.1% in 1975, fell regularly to a contribution of 9.5% in 1987 (Table: 3). Another UNIDO source (1989, pp.xii) estimates the share of agriculture at 15.1% in 1986.

Industrial activity represented 10.7% of GDP in 1970 and, developing parallel to agriculture, attained only an 8.0% share of GDP in 1987 (Table: 3). However, another UNIDO source (1979, pp.1) indicated an industrial contribution to GDP of 22% in 1970, and still another (UNIDO, 1989, pp.xii) indicated a contribution of 20.9% in 1986. The recent discovery of oil will probably further increase the industrial sector's share of GDP.

TABLE: 1 International Comparisons of Economic Performance at constant (1980) prices.

DEMOCRATIC YEMEN

Indicator	Year or period	Country	Western Asia
GDP per capita (US$)	1970	327	2276
	1975	197	2867
	1980	359	3484
	1986	368	2521
	1987	369	2525
MVA per capita (US$)	1970	28	193
	1975	27	257
	1980	18	281
	1986	28	339
	1987	24	347

Source: Industrial Statistics and Sectoral Surveys Branch, UNIDO. Based on data supplied by the UN Statistical Office, with estimates by the UNIDO Secretariat.

Notes: i) Data given for sector components may sum to an amount differing from data given for GDP total. Due to this difference arises a statistical discrepancy. The sources of this discrepancy are specific to each country and are rarely documented. They may include differences in valuation (e.g. while sectoral data is reported in factor cost, total GDP is in market prices); distortions generated when deflating data at current prices to derive estimates at constant prices.

ii) Total Industrial Activity comprises of Mining and Quarrying, Manufacturing, Electricity, Gas and Water.

TABLE: 2 Comparative Average Annual Rates of Growth by Economic Sector (at constant 1980 prices).

DEMOCRATIC YEMEN

Sectors	Period	Country	Western Asia
Agriculture	1970-1980	3.2	3.7
	1981-1987	4.6	2.9
	1970-1987	2.9	3.4
Total Industrial Activity (incl. MVA)	1970-1980	1.2	6.0
	1981-1987	8.9	-4.4
	1970-1987	1.2	0.0
Manufacturing	1970-1980	1.5	7.2
	1981-1987	10.4	5.4
	1970-1987	1.4	6.4
GDP per capita	1970-1980	1.9	4.4
	1981-1987	-1.3	-5.0
	1970-1987	3.5	0.5
MVA per capita	1970-1980	-0.7	4.1
	1981-1987	7.3	2.3
	1970-1987	-1.0	3.3

Source: As Table: 1

Notes: As Table: 1

TABLE: 3 Distribution of GDP at Constant (1980) Prices: DEMOCRATIC YEMEN

Year	Agriculture	Total Industrial Activity	Manufacturing	GDP
	% of GDP			(million $)
1970	10.4	10.7	8.5	489.9
1971	12.2	12.3	9.7	431.0
1972	12.7	12.6	10.0	424.9
1973	15.5	15.1	12.0	358.8
1974	16.4	15.6	12.5	349.9
1975	18.1	17.0	13.5	326.1
1976	14.7	13.5	10.8	412.8
1977	13.6	12.7	10.3	491.9
1978	11.5	12.9	10.7	569.9
1979	11.4	11.8	9.8	582.3
1980	10.1	6.4	5.0	668.4
1981	9.3	5.9	4.6	721.2
1982	7.6	6.0	4.7	832.8
1983	8.4	6.4	5.1	867.8
1984	8.4	6.8	5.5	918.8
1985	9.4	8.3	6.9	891.6
1986	10.6	9.0	7.5	811.3
1987	9.5	8.0	6.6	837.5

Source: As Table: 1
Notes: As Table: 1

Included in the industrial sector, manufacturing activity's share of GDP was 6.6% in 1987 (Table: 1). Both agriculture and industry seem to have given in to a thriving service sector which contributed 63% to GDP in 1984 (UNIDO, 1987, pp.7).

c. **Employment by Sector**

Out of the economically active workforce, 52% were working in agriculture in 1986, compared to 56.6% in 1980 (EIU, 1989, pp.60). Industry employed 14% of the economically active workforce in 1986, whilst 11.7% of the total labour force was unemployed. When related to corresponding shares of GDP, the distribution of employment implies that labour productivity is extremely low in the agricultural sector, and in the industrial sector it roughly equals the national average. Small scale industry is thought to account for more than a quarter of total employment in the PDRY.

3. Agro-related Metalworking Industries

a. Statistical Data on Imported Products

Detailed information is not available to indicate the extent and range of agricultural tools, implements, machinery and food processing equipment imported into Democratic Yemen.

b. Statistical Data on Local Production

There is currently no information to evince any major activity in the agro-related metalworking sector at a formal level, although further background data on the past and current performance of this sector is provided in the following paragraph.

c. Company Structures and Operations

A primary role in the production of agricultural implements was played by the Agricultural Implements Factory, established in the public sector in 1976 through bilateral cooperation with the People's Republic of China but which subsequently closed in 1979. The envisaged capacity utilization never materialized and it is reported (UNIDO, April 1983, pp.4) that in 1978 only 27% capacity utilization was attained, summarized as follows:-

	Digger hoes	Hoe/spade	Sickle	Knife	Scissors
Installed capacity	300.000	100.000	300.000	300.000	200.000
Actual production	76.000	41.500	92.000	16.700	101.000
Capacity utilization	25%	42%	31%	6%	50%

The same report cites the lack of market and marketing skills, coupled with poor product design, quality and limited technical capabilities as the major reasons for failure. As a consequence a total inventory of 91 pieces machinery and equipment were reported idle, and possibly out of order. A three phase rehabilitation and diversification programme was proposed at an estimated cost (UNIDO, June 1989, pp.52) of US$3.5 million. The factory was reported (Government of Yemen, Nov. 1990) to be still producing drawn wire and aluminum door and window frames, with some 150 employees in 1990.

Another company which has peripheral involvement in the agro-related metalworking sector is Revometal[1/]. Its original production was agro-machinery spare parts. However, based on information provided in the Terminal Report (UNIDO, May 1988, pp.67-68 and pp.378) this appears to be confined to materials handling equipment (trolleys and sack trucks) and wheelbarrows. A more recent report (Government of Yemen, Nov. 1990) informs that Revometal currently employs about 350 workers, produces mainly metal furniture, but also produces some spare parts for simple agricultural machinery.

1/ UNIDO assisted project, under UF/PDY/78/051, DP/PDY/81/006, DP/PDY/85/006, SI/PDY/87/801, SI/PDY/87/802 and DP/PDY/85/006.

It is reported (UNIDO. June 1989. pp.29) that a 1981 survey revealed a 46% capacity utilization in the public sector and 62% in the mixed sector. with the engineering sub-sector attaining 62% capacity utilization. Low capacity utilization. in general. is attributed to over capacity. inappropriate equipment selection. poor maintenance. lack of skilled repair personnel and raw material shortage. Little development is reported (UNIDO. June 1989. pp.63) to have taken place in the creation of linkages between industrial plants. There is. however. inter-linkage on the supply of raw materials to the manufacturing sector. It is further noted (UNIDO. June 1989. pp.54) that the recent and planned expansion at Revometal will provide an opportunity for integration through the development of metalworking and engineering skills. production of basic metals and the provision of centralized engineering workshop.

Information relating to the informal small industry sector is limited. Preliminary findings (UNIDO. June 1989. pp.35) of the 1988 census indicated that this sector encompassed 26,030 private establishments. employing 27.930 persons. of which blacksmiths. amongst others. are likely to form a major part. The role which these blacksmiths play in the agro-related metalworking industries is not apparent. neither is the level of technology employed nor the capabilities available in this informal sector.

d. Markets: Domestic and Export

Information of the full extent and potential of the domestic market is not known. neither in terms of product mix nor numerically. Part of the reasons for failure of the Agricultural Implements Factory was attributed to the lack of market demand. however. it is not clear how the very limited product range reflected the needs of the agriculture sector. In the absence of any significant domestic production capability it is not possible to envisage an export scenario. as the competitiveness of the industry would have to be considered in context of potential markets.

4. Infrastructural Support

a. Policy

In theory, the economy was, until the Union with the Arab Republic of Yemen, planned along "scientific socialist" lines, but in effect, planning capacity was severely restricted (EIU, 1989, pp.57). Development expenditure in the Third Five Year Development Plan directed about 46% of expenditure to the industrial sector. Some leeway was given to private initiative, but only in the production of agricultural and fisheries products. From 1988 to 1990, there had been some attempts as a partial opening up of the economy, and import-substitution and local raw material exploitation are Government priority.

Industrial policy

The public sector was the backbone of the PDRY's industrial development, based on collective ownership as the means of production and a centralized planning system. The Ministry of Industry, Trade and Domestic Supply played a crucial role for the country's largely public sector-driven industrial development, as it controlled about half of total manufacturing output. Plants under public or mixed sector ownership were mostly large or medium-scale. Small private industrial operations came under the responsibility of municipalities (UNIDO, 1987, pp.31). They are reported (UNIDO, 1989, pp.xv) to have accounted for some 25% of the total industrial output in 1989. Few attempts were made to enhance productivity in the private sector.

An effective moratorium was put on new public industrial projects, and absolute priority was given to rehabilitation and consolidation after the events of 1986 (EIU, 1989, pp.6)). From 1981 to 1990, the new Investment Law offered incentives to companies willing to enter into joint ventures as junior partners, such as: freedom to remit hard currency; income tax exemption for five years; exemption or reduction of taxes and duties on raw materials for up to three years and on imported equipment/materials, and spare parts not

produced locally, for up to two years. It was noted (UNIDO, 1987, pp.32) that the Investment Law had limited success, and that the Government was eager to increase its effectiveness. It therefore undertook to attract wealthy expatriated Yemenis by proposing development projects for them to finance. Small-scale projects, which were attractive to the majority of migrant workers, were to be facilitated through the liberalization of the licencing procedures.

Trade Policy

To protect domestic industry, regulations were imposed to prohibit the import of certain products which could be produced locally. The National Company for Foreign Trade controls imports of all consumer goods except drugs. In 1986 severe import restrictions were introduced with all imports requiring individual licences, except for goods from North Yemen. In most cases, payments for imports required prior approval from the Director of Exchange Control.

The Government imposed tight control on all transfers and foreign trade. The domestic prices of export and import commodities were determined by the Government on the basis of cost and subscribed profit margins. Difference between domestic and international prices was financed through the Price Stabilization Fund. It appears that measures had been initiated to increase industrial exports, but no information was available on their content. To improve the performance of the manufacturing sector, wage incentive schemes were being introduced and small-scale industrial enterprises were being established (UNCTAD, 1990, pp.157).

It was noted (UNIDO, 1987, pp.36) that PDR Yemen domestic enterprises were not likely, in the near future, to become competitive in export markets and foreign firms were not likely to use the country for export-oriented assembly-type operations, given existing conditions.

b. **Financial**

The country suffered from a general scarcity of financial resources. Credit controls had been introduced in order to contain monetary expansion. thus limiting the banking system's role as a financial intermediary. Shortage of financial facilities discouraged private investment and controls were also imposed on foreign exchange allocation.

Apart from the Bank of Yemen (Central Bank). the only bank in the PDRY was the state owned National Bank of Yemen. a commercial bank representing nationalized activities.

c. **Human**

Of a population of 2.345.266 in 1988. some 238.150 lived abroad representing about one third of the men in the economically active age group. This generated large remittances but has led to labour shortages in the 1980s. particularly in rural areas and agriculture (EIU. 1989. pp.57). The exodus of refugees since the fighting in 1986 was still causing labour problems in 1988, and to fill the vacancies women have been drawn into the labour force. Their participation rates increased from 13% in 1973 to 20% in 1984 (UNIDO. 1989, pp.77). Labour costs were high compared to other developing countries (UNIDO. 1987. pp.36). and unemployment among the young was paralleled by chronic shortages of experienced technical and professional personnel.

The PDR Yemen had five new Industrial Training Centers and a Faculty of Engineering at Aden University in 1990. Vocational institutes lagged behind the growth in demand for skilled labour. Technical and vocational institutions enrolled 3,144 students in 1981-82 and 2,902 in 1986-87. The level of skills acquisition and the versitality of vocational training graduates were limited. This reflects the shortage of facilities, textbooks and equipment, the low general standard of the students enrolled and the narrow scope of the training provided (UNIDO. 1989. pp.80). In-service training and apprenticeships are organized at the plant level. but most enterprises pay little attention to training.

d. Technological

The Faculty of Engineering at Aden University was quoted (UNDP, April 1989, pp.44) as being the only existing centre of excellence in technology outside the formal Government structure. However, it was also reported that both the capabilities and financial resources were limited, with very limited linkages with industry. Technological support appears rather to have been provided on an industry by industry basis, as is the case with the UNIDO assisted Revometal project.

e. Services

Specific information on the availability, or lack of essential services to the agro-related metalworking industries is not available, although in general terms industry suffered from the quality or availability of services. It is noted (UNIDO, June 1989, pp.90-95) that electricity was restricted to the urban areas and the flat tariff structure dictated relatively high energy costs for industry. Qualitative and quantitative supplies of water were also a constraint forcing industry to depend on independent, uncontrolled supplies, with quality sensitive industries having to install plant to reduce saline content. Transportation was considered difficult.

5. Related or Relevant Programmes

Country Specific

UNDP/UNIDO: DP/PDY/81/006 "Training in Management and Performance Improvement of Industries" US$1.717.434. 1981-1989.
UNDP/UNIDO: SI/PDY/87/802 "Assistance for the Establishment of a National Metal Scrap Enterprise" US$55.000. 1989.

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