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**BASIS FOR STRATEGIC PLANNING OF AGRO-INDUSTRIAL DEVELOPMENT**

**REPORT ON MISSION TO VIET NAM, 24 OCTOBER - 14 NOVEMBER 1988**

by Björn Almquist

## 1. INTRODUCTION

This report is concerned primarily with the agro-based industries, and the food processing sub-sector in particular. Industries related to fishery and forestry are also discussed but to a lesser degree. In addition, different types of small-scale cottage and handicraft industries, based on agricultural waste products, are included to obtain a first-hand idea about its importance within the context of the development potential of agro-based industries.

The findings and recommendations will ultimately be incorporated in the final report "Viet Nam Industrial Strategy Paper" which will suggest guidelines for the long-term strategy and priorities for industrial regeneration and development.

Data and information were obtained during discussions in Hanoi with representatives of the State Planning Committee, the Institute for Long-Term Planning, the Ministry of Foreign Affairs, the State Committee for Science and Technology, the Ministries of Agriculture and Food Industry, Fishery, Forestry, Light Industry, Engineering and Metallurgy, General Department for Chemistry, the Central Union of Small Industry and Handicraft Co-operatives, Ho Chi Minh City, various individuals in connection with plant visits and visits in agricultural production areas, and local representatives for UNDP, UNIDO and SIDA.

During the visits to the different enterprises and production areas, assessments have been made regarding the technical standard of the operations, the performance and major shortcomings.

The findings from studies of selected areas and enterprises and information on the overall national situation, which has been obtained through numerous discussions with Ministries and Government officials are used as a basis for the subsequent suggestions related to an agro-industrial development strategy.

The two-member team started the study with discussions in Hanoi from 28 to 30 October, followed by a tour with field trips in the Ho Chi Minh City and Hanoi areas from 31 October to 14 November 1988.

### 3. AGRICULTURAL PRODUCTION: PRESENT SITUATION AND FUTURE OUTLOOK

#### 3.1 General

Agriculture is the mainstay of the economy of Viet Nam. It provides food for the population, raw materials for agro-based industries - some of this for export - and it provides job opportunities for the majority of the Vietnamese people.

According to the State Planning Commission, food production should be increased from the 1985 level of 18.2 million tonnes of rice equivalent to 25 million tonnes by 1990, 36 million tonnes by 2000 and should reach the plan target of 45 million tonnes by 2010.

This substantial increase in food production, in addition to the future growing demand for industrial crops for processing, is a tremendous and challenging task for the agricultural sector.

The Vietnamese farmers must be given the opportunity to develop and improve their standard of living and social status. This will require all the essential inputs to increase their productivity including extension services, credit facilities, improved crop varieties and animal stocks and, last but not least, modified agricultural technology where modern techniques, adapted to the particular conditions in Viet Nam, can be used for tilling the soil, irrigate the land, harvest the crops and reduce the losses during and immediately after harvesting.

#### 3.2 Present situation and plan for development

The agricultural sector provides 50 per cent of the national income. In 1986 72.3 per cent of the total social work force, or 16.6 million people, were engaged in agriculture, working on 325 state farms, 16,743 production co-operatives, 39,529 production collectives and 1,794,415 households (30.7 per cent of the total number of households).

The average size of the state farms is approximately 1,000 hectares, and that of production co-operatives and production collectives ca. 150 and 40-50 hectares, respectively.

The area cultivated area has increased from 8.25 million hectares in 1980 to 8.56 million hectares in 1985. In 1990, 1995 and 2005 the total arable land will be 9.75 million, 10.8 million and 12.6 million hectares, respectively, according to the current development plan.

Table 3-1 gives the past and projected total production of paddy and paddy equivalents where subsidiary sample crops such as maize, cassava, potatoes and sweet potatoes are included. One paddy equivalent equals 1 kg of maize or 3 kg of tubers.

Table 3-1 also shows average production per capita which has increased about 2.4 per cent per annum between 1980 and 1985.

Appendix 2 gives the production figures for all major crops except paddy in 1985 and the projection for 1995 and 2005.

In general, the production targets for most of the industrial crops are exceedingly optimistic also in the light of the improvements in agricultural output which have been experienced recently.

The growth of agriculture in the past has been 1.6 per cent per year during 1976-1980, and 4.8 per cent from 1980-1985. This should be compared with the plans up to 1995 which envisage an annual growth of approximately 20 per cent per year, for instance for soybeans, sugarcane and pineapple.

Similarly, the production of slaughter animals in terms of live weight will have to increase on average by 12 per cent in the period 1985-1995.

There are no substantive statistics available for 1987 and an assessment of the performance in the late 1980s cannot be made. However, in the light of the existing constraints (shortage of inputs such as fertilizers, pesticides, fuels etc., the present system of trade in agriculture, lack of easily available credit facilities for co-operatives, collectives and households) the envisaged growth of the agricultural sector output cannot be attained.

The future development of agriculture is focused on an orientation towards a more commercial attitude. The policy is summarized as follows in four target plans:

Table 3-1. Total production of paddy

	<u>Actual Production</u>		<u>Projection</u>		
	1980	1985	1990	1995	2005
Total food production (paddy equivalent)	14,406	18,200	22,000	25,000	32,000
Paddy	11,657	15,875	19,000	21,000	26,000
Subsidiary crop	2,749	2,325	3,000	4,000	6,000
Average kg feed products per capita	268	304	330	342	376

Source : Ministry of Agriculture and Food Industry

- (1) Self-sufficiency in food, viz. 350-400 kg/capita and year.
- (2) Increase in tropical crops to ensure sufficient raw materials for the export-oriented food processing industry.
- (3) Substantial increase in investments in R&D for agriculture and agro-industry.
- (4) Job opportunities for the whole population, improved standard of living and gradual expansion of rural development including services in these areas.

Industrial establishment will be directed to rural areas, hence a decentralization from the main cities.

### 3.3 Input supply

The mission has investigated, on a reconnaissance basis, the supply situation of agricultural equipment, fertilizers and pesticides.

To fully assess constraints affecting agricultural growth would have required in-depth studies of all aspects of input and support such as seed, genetic improvement of stock, resources and capacities for research, extension services for dissemination of innovations and new techniques etc.

#### 3.3.1 Agricultural equipment

Farming today uses almost entirely traditional methods. Draft animals are used for soil preparation but hand tools are also used for seed bed preparation. Planting, weeding, harvesting, and for paddy also threshing, cleaning and drying, are hitherto manual tasks. Although they are incredibly hard-working, the productivity of the farming population is low. An increase in productivity is essential for both improvement in the standard of living for the individual households and fulfilment of the plan targets for agricultural production.

Agricultural machinery, equipment and tools are manufactured by state enterprises on central and provincial levels under the Ministry of Engineering and Metallurgy. Co-operatives and other enterprises under the Central Council of Co-operatives and non-governmental organizations also play an important role.

Manufacturing in the public sector is not co-ordinated and monitored on a national level, hence detailed information on manufacturing capacity is not available.

R&D is focused on a 50 kp four-wheel tractor, vegetable oil extraction units, hand tools, etc. (ref. Appendix 1: 13). The present product range manufactured by state enterprises includes a two-wheel 12 kp tractor (2,500 units in 1987), pumps, carts for draft animals, cleaning machines, rice driers, rice mills, etc. Table 3-2 gives an account of available information regarding equipment believed to be in use and present production. It should be stressed, however, that the figures may not even reflect the actual situation in many cases and only roughly indicate what is used at present.

The table is informative only in the sense that it shows the very limited manufacturing capacity that is available and the absence of labour-saving equipment.

Apart from being labour-saving, the appropriate equipment also shortens the time to complete different tasks. Timely soil preparation and subsequent planting gives better yields. If the harvesting procedure can be speeded up, losses due to weather conditions could be reduced, and the appropriate cleaning and drying facilities reduce post-harvest losses.

The returns from efforts to reduce the post-harvest losses will be substantial. Experiences from other rice producing countries should be exploited for development of systems suitable to Viet Nam. Initially, comprehensive literature studies would be a cheap instrument to identify possible alternatives. The scope of using solar energy should be considered - Appendix 3 gives some quick meteorological information.

It is concluded that the availability of equipment and existing registered capacity for manufacturing of agricultural equipment is a considerable constraint for increased agricultural production.



### 3.3.2 Fertilizer

The present fertilizer consumption in Viet Nam is approximately 1.5 million tonnes of nitrogenous fertilizer, 1 million tonnes of phosphate fertilizer and 100,000 tonnes of compound fertilizer. The application of fertilizer is about 35 kg of fertilizer products per hectare. (See Table 3-3).

The nitrogen fertilizer plant producing urea has a designed capacity of 110,000 tonnes per year but for several years the actual production has been around 30,000 tonnes, giving a utilization rate of 27 per cent.

The mixing plant, with a capacity of 100,000 tonnes per year is fully utilized using urea, single super phosphate and potash.

Viet Nam is producing three types of phosphate fertilizers, i.e. single super phosphate, thermo phosphate and natural phosphate powder.

Single super phosphate production has a designed capacity of 400,000 tonnes per year. The production target for 1988 is 340,000 tonnes or a capacity utilization of 85 per cent. The processing line for thermo phosphate has a designed capacity of 200,000 tonnes per year and has for several years been at around 50 per cent of capacity utilization. In 1988, the production target is 95,000 tonnes giving a utilization rate of 47.5 per cent. The third type of phosphate fertilizer produced is natural phosphate powder where Viet Nam uses around 90,000 tonnes every year for direct application to the fields.

The urea plant was designed and constructed in close cooperation with China, and the low capacity utilization is mainly due to problems with the coal used for processing and shortage of spare parts, mainly from China.

The single super phosphate plant was designed, constructed and managed with assistance from the Soviet Union and is operating without major difficulties.

The low capacity utilization of the thermo phosphate plant, producing at about 50 per cent, is mainly because of its dependency on raw materials, which have to be imported and problems with the coal used in the process.

Table 3-3. Fertilizer manufactory

Fertilizer type	Per cent			Cap 1) T/yr .000t	Prod 2) T/yr .000t	Utilization per cent	Total tonnes		
	N	P	K				N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Urea	45			110	30	27	13500	-	-
Compound	5	10	3	100	100	100	2300	1650	300
Single Super Phosphate		16.5		400	340	85	56100		-
Thermo- Phosphate 3)	-	15.5	-	200	95	47.5	14725		-
Natural Phosphoric powder	-	10.12	-	90	90	100		9-11	-
TOTAL							15800	72485	300

## Notes:

- 1) Designed Capacity in Tonnes per year
- 2) Production target for 1988 in tonnes per year
- 3) 10% Mg is included in the product

The local production of fertilizer is well below the local demand. Projections up to the year 2000 show a further increase of fertilizer consumption and the Vietnamese Government is planning to increase production of fertilizer up to 1995.

Viet Nam has a large reserve of phosphate rocks, estimated at more than 2 billion tonnes, with an industrial reserve of 400,000 million tonnes. This can be divided into 4 categories - depending on the  $P_2O_5$  content:

Grade I	32 per cent of $P_2O_5$	10 per cent of total reserve
Grade II	20-24 per cent of $P_2O_5$	] 70 per cent of total reserve
Grade IV	8-10 per cent of $P_2O_5$	
Grade III	15 per cent of $P_2O_5$	20 per cent of total reserve

The Vietnamese plan for an increased production of phosphate includes expansion in the north from 400,000 tonnes per year to 500,000 tonnes of single super phosphate and a new plant in the south with a capacity of 100,000 tonnes of single super phosphate per year. The plant in the north is implemented in close co-operation with the Soviet Union, while the plant in the south is designed by Vietnamese engineers using imported equipment. Both projects are intended to be commissioned by 1990. For 1995 the General Department for Chemistry has planned to commission a new factory, either in the north or in the south, with a capacity of 500,000 tonnes per year of single super phosphate, but preferably in the south where 50 per cent of the phosphate fertilizer is used.

For the nitrogen fertilizer, the Government intends to increase the actual production at the urea plant to 600,000 tonnes per year in 1990 by using better quality coal. The increased offshore exploration in the south with scope of producing 1 billion cubic meters of natural gas by 1990 have made the Government explore the possibility of investing in a plant with a capacity of 600 tonnes of ammonia per day. This gives the option of producing either 600,000 tonnes of ammonium phosphate per year or 270,000 tonnes of urea per year. A state enterprise in Ho Chi Minh City is trying to obtain the approval for constructing its own urea plant, using its own financing sources.

Actual demand for fertilizer for 1988 is projected at 1.5 million tonnes of urea and 1 million tonnes of phosphate fertilizer. On top there is a demand for 100,000 tonnes of compound fertilizer. The difference between demand and actual local production will be met by imported fertilizers.

### 3.3.3 Plant Protection

Viet Nam with its tropical climate is conducive to heavy infestation by insects, weeds and plant fungi. The crop losses are evaluated by the Ministry of Agriculture at about 20 to 25 percent, but in recent years even higher due to pests destroying the total crop in many regions. Viet Nam still relies on import of the active ingredients for pesticides for its eight mixing plants (two units in the north, two units in the central area and four units in the south) with a total capacity of 40,000 tonnes per year. In the past, pesticides accounted for 75-80 per cent of the production and herbicides and fungicides for 20-25 per cent.

Most of the pesticides include M. Parathion, Dision, Carbofuran, Metamiclophes, Morocrotaphes, Sumishion, Lumicidin, Sherpes and Dimshoate. Only two herbicides are used, 2,4 D amine and ester. Common fungicides are Kitasin, Zineb, Miresan, Validacin and copper oxychloride.

The most popular formulations are solution and emulsifiable concentrate, wettable powder and granulated products.

Viet Nam also imports formulated products, and after 1988 the total value of import for plant protection accounts for US\$ 20 million.

In 1988 the estimated production of formulated products will only reach 25 per cent of the total capacity due to problems with spare parts and hard currency for import of raw material.

The largest formulating company in Viet Nam is the Southern Pesticide Company with a total capacity of 30,000 tonnes per year. The Southern Pesticide Company has a Research and Production Center providing technical management assistance on production technology, quality control and safety problems, not only to the other three Southern District factories, but to all light blending units in Viet Nam.

The centre is also engaged in the research of using local raw material for the production of pesticide active ingredients. "Rubber oil" and other vegetable oils could be used for producing surfactants and emulsifiable substances, but also mineral resources could be changed into inert ingredients for pesticide formulations. At the moment the center is producing small quantities of a dual purpose agent for treatment of paddy seeds. The company aims at a production of 500 tonnes per year with their present low technology production methods. One of the problems for the pesticide industry in general is the simple technology and equipment used for production; quality control is far from satisfactory and there seem to be no rules and regulations for the safety of the workers and the handling and disposal of the waste.

The equipment at the Research and Production Center at the Southern Pesticide Company servicing other factories in the country is outdated and basic documentation, manuals and handbooks for the formulation and production date back to between the 1950s and early 1970s. The centre receives no technical information, research documents or scientific information from anywhere. They operate in complete isolation from the outside scientific world.

With a minimum use of one kg of active ingredient per hectare per year, the need of active ingredients is 10,000 tonnes per year equivalent to 30,000 tonnes of formulated product. The projection for 1995 shows a demand of 40,000 tonnes per year of formulated products.

Viet Nam has plant varieties which could be used to extract active substances for the production of pesticides. Research and experience are being undertaken but it still remains to formulate the pesticides in detail, continue tests on a larger scale and adopt the appropriate techniques for industrial production.

The Research and Production Center is responsible for the future strategy of introducing human and environmental protection in all areas of the society. The numerous disasters in the past caused by accidents or human errors in connection with handling and processing of crop protection agents are a note of warning.

### 3.4 Pricing and payment

The price for the producer is determined by the Price Commission. The price of rice, the major commodity, is increased largely in steps according to the inflation rate. From that point of view, rice is comparatively safe to use as a barter commodity.

Whether or not the price for the producer is reasonable cannot be assumed easily. The barter system has penetrated now to the farm level. Paddy is delivered according to a quota in exchange for inputs which have been supplied during the cropping season. Fertilizer and pesticides are in this context overruling all other input costs but the actual value is difficult to determine, at least for the producers of farm commodities.

Co-ordination between the price level for e.g. pig feed and slaughter pigs is non-existing and the rearing of pigs is a poor production alternative today. This would indicate that prices are set without due consideration to the cost of production and the rationale in leaving a margin for the producers as an incentive to continue, and possibly expand, the production.

Sugarcane is at present evaluated at the equivalent of 200 kg of paddy per tonne. 50 per cent of this is paid with paddy in some areas, in other areas 30 per cent. The rest is made up from the value of fertilizers supplied during the season by the sugar factory and cash. The interest in growing sugarcane is decreasing and presumably not without reason. Other alternatives are better and the sugar industry is left without sufficient raw material supplies.

The barter principle is used universally. The system may have certain advantages in a period of roaring inflation, but is inflexible, leaves few, if any, alternatives to the farming community that has to generate sufficient funds for small-scale investments to improve the efficiency of all operations.

It is concluded that the present barter system is not conducive to better performance of agriculture. The system also tends to increase the interest of many enterprises engaged in receiving and distributing farm produce to enter the fertilizer trade. These enterprises should rather devote their resources in product development, manufacturing/processing and marketing of their products.

### 3.5 Conclusions and recommendations

#### Conclusions

The plan targets for increased agricultural output by 1995 and 2005 are over-optimistic. Although it was not specifically investigated, the mission has obtained the impression that the resources to provide sufficient extension services to agriculture need to be strengthened.

The productivity of the agricultural sector is low and the Government is well aware of the need for additional quantities of fertilizers and pesticides in particular. However, it is vital to introduce improved agricultural practices including gradual adoption of suitable implements and equipment to increase productivity, crop yields and reduce harvest and post-harvest losses to order to reap the full benefit of increased fertilizer application.

There are no credit facilities easily available to the farming community. In a period of dynamic expansion, the processing of credits is vital for development of an individual farm enterprise - state owned, co-operative, collective or household. Failure to provide these investments that are essential in a responsibility system would seriously hamper development.

Furthermore, the current pricing policy, the lack of co-ordination between different commodity price levels and the system of payment do not provide any incentives for increased agricultural production.

#### Recommendations

- (i) Strengthen the extension capacity with a view to dissemination of improved agricultural practices.
- (ii) Increase, and extend, the manufacturing capacity of agricultural equipment and tools.
- (iii) Strengthen the resources, within the framework of international co-operation, for development of suitable equipment for paddy harvesting/drying (follow-up of Cuu Long Post Harvest Pilot Project VIE/86/012/A/01/12).

- (iv) Set up the appropriate credit facilities for farming enterprises.
  
- (v) Review and modify the pricing policies and the system of payment to comply with the requirements for flexibility and to provide incentives for increased production of quality commodities.



#### 4. AGRO-BASED INDUSTRIES: PRESENT SITUATION, CONSTRAINTS AND OPTIONS

##### 4.1 Overall situation

There are only 128 food processing enterprises registered by the Ministry of Agriculture and Food Industry but the list is not complete (see Appendix 3). For the vegetable oil, animal feed and fibre processing branches, for instance, only overall capacity figures are given. Many smaller enterprises, especially on a provincial level, are not included and the co-operative and non-governmental sector is heavily engaged in different kinds of food processing.

The Ho Chi Minh City Food Company which is a provincial state enterprise has 1,700 partner enterprises, mostly rather small, engaged in a wide range of food stuffs manufacturing and processing.

No complete register exists. It may be summarized, however, that there is a fair number of medium-size and small enterprises in the food processing subsector in addition to the registered larger state enterprises. They are concentrated in particular in the Ho Chi Minh City area, to some extent in Hanoi and also in other larger urban centres, here mostly for local consumption.

Rice milling operations are by far the most common.

##### 4.2 Rice milling

###### 4.2.1 Present situation and future development

The present rice milling capacity in central and provincial state enterprises is 2.4 million tonnes, which basically supply the urban areas. In 1987 the total production of paddy was 17.5 million tonnes, hence the 963 registered state-owned rice mills processed 14 per cent of the total harvest. Other sources claim that 70-80 per cent of the paddy is processed in small mills on a co-operative or village level. There is no information available on total processing capacity but it is reasonable to assume that the rural rice milling capacity is gradually increasing as required and that the actual throughput very often could be higher by simply operating the units for longer hours.

The larger and medium-sized rice mills are getting old, the mechanical installations are worn out and are kept running with minimum maintenance. Spare parts are sometimes short in supply but local workshops appear to make the most essential parts.

There are no overall statistics showing the capacity utilization of the state-owned rice milling enterprises. In view of the average poor state of repair of the plants, it is safe to assume that capacity utilization may be 70-80 per cent and that the capacity quoted in Appendix 4 is probably what is actually milled, hence the very exact figure.

To cope with the future paddy quantities according to the plan target (see Table 3-1), about 200 rice mills with an average output of 10 t/shift, operating on two shifts, will have to be installed and put into operation in the rural areas every year between 1990 and 2005.

On the assumption that the central and provincial state rice mills are rehabilitated soon, the 80 per cent average capacity utilization will be maintained in the early 1990s, falling gradually to 70 per cent during the latter part of the 1990s with an ultimate capacity utilization of 30 per cent. This scenario takes into account that some mills will have to be closed down as of a certain point of time due to irreparable technical and economic inefficiency.

Therefore, up to 2005, 45 new rice mills with a capacity of 180,000 t/year will be needed. These mills would have an average capacity of 600 t/24 hours:

early 1990s	7 mills
middle 1990s	13 mills
end 1990s -	
early 2000s	25 mills

The rehabilitation of the existing rice mills should focus also on the quality performance of the equipment. Rural mills supplying processed rice to the cities have up to 30-40 per cent broken kernels. Particles of rice are also lost in the process. According to assessments made in the UNDP/FAO Post-Harvest Protection Project (VIE/86/012/A/01/12), the overall milling

recovery is anticipated to increase by 1-2 per cent if a mill is properly rehabilitated. For the country as a whole about 2 million tonnes of rice per year could thus be salvaged for human consumption. Hence, rice recovery is expected to increase by 3-5 per cent and final mill output is expected to increase by a minimum of 15 per cent.

Storage facilities for paddy are reportedly sufficient for the present level of production but it is expected that the standard leaves much to be desired. However, the above-mentioned UNDP/FAO project embraces all aspects of rice post-harvest activities from harvesting-threshing-drying to storage-pest control-processing. The very important issue of grading and quality control, also with reference to farming systems, are included. This is a basic work of tremendous importance for future activities to make rice handling more efficient.

#### 4.2.2 Conclusions

In summary, it is essential to determine a realistic investment plan for rice milling facilities to process paddy according to the plan target.

Year	1990	1995	2000	2005
(1) Rehabilitation of existing "urban" rice mills	=====			
(2) New "rural" mills 200 x 10 t/shift/year	=====			
(3) "Urban" mills 600 t/24h	7	13	25	
Total capacity (million tonnes)				
"Rural"	15.6	16.8	20.8	
"Urban"	3.4	4.2	5.2	
TOTAL	19.0	21.0	26.0	

The rehabilitation of existing rice mills, the manufacturing of new equipment for both rural and urban mills, the very strong need for future supply of spare parts and periodic expert maintenance services to the rice mills provides a substantial basis for industrial development in the steel manufacturing subsector.

Different avenues for implementation may be considered such as licence agreements including technical assistance, joint ventures where the foreign partner supplies certain qualified components according to predetermined principles for costing and subsequent pricing of the final equipment.

## 5. FISHERY-BASED PROCESSING INDUSTRIES

### 5.1 Natural resources, raw material supply

The sea surrounding Viet Nam and accessible to Vietnamese fishing vessels is estimated at about 1 million sq.km. These waters have a very rich marine fauna. About 1,700 different species of fish have been identified, 2,500 species of molluscs, more than 1,600 crustacean species and also at least 600 species of seaweed, some of which can also be harvested and utilized in processing industries.

The total fish resources in Viet Nam are divided into four main areas along the coast and inland.

- |      |   |
|------|---|
| No.1 | From 100 m depth and outward                |
| No.2 | From coastline to 100 m in depth            |
| No.3 | Coastal cultivation of sea foods            |
| No.4 | Fresh water fishing including fish farming. |

The Viet Nam fishing fleet can presently utilize only the second area where the total fish resources are estimated at 3-4 million tonnes, with a harvesting potential of 1.3 to 1.4 million tonnes per annum.

Two estimates regarding the total marine fish resources in the first area are available. One study suggests 6-7 million tonnes and one has arrived at 2-3 million tonnes with a harvesting potential of 1 million tonnes.

From an administrative viewpoint, fishing is divided into three zones:

- |        |   |
|--------|---|
| Zone 1 | From 17 degrees north to the Chinese border       |
| Zone 2 | Between 17 and 12 degrees north                   |
| Zone 3 | From 12 degrees north to the border of Kampuchea. |

In 1976, a total of 1 million tonnes of fish were caught in Viet Nam, 70 per cent from the sea and 30 per cent from fresh waters. This quantity was adopted as a plan target for the period 1975-80. However, the catches in the sea dropped from 610,000 tonnes in 1975 to 390,000 tonnes in 1980 with similar

decline from 210,000 tonnes to 160,000 tonnes for fresh water fish. The system of relying on state and co-operative enterprises to meet the demand was unrealistic and turned out to become a type of subsistence occupation. Since 1981, a reorientation has taken place implying that the production system starts from the individual fishermen serviced by state enterprises which also collect, process and market the fish. With the new system, the catches started to increase. In 1987, they amounted to 870,000 tonnes and will exceed 900,000 tonnes in 1988 with expectations to reach the target of 1 million tonnes in 1990. In general terms, the ratio between marine and fresh water fish is maintained.

Although Viet Nam is not fishing in the first area, unknown quantities of fish are harvested by others.

The second target for the fishery sector has been set at 1 million tonnes from the sea and 500,000 tonnes from lakes, rivers and fish farming.

The importance of cultivated fish and sea foods is expected to increase in the future. 300,000 hectare of salty and/or "brackish" waters are used for cultivation of sea food at present.

Efforts will be made to interest foreign partners in participating in the expansion of cultivation of fish and other sea foods, especially shrimp, on an industrial scale.

While embarking on large scale commercial fish cultivation, the necessity to consider conservation of the environment is fully realized. In fact, a major policy issue is to coordinate development efforts in all sectors, agriculture, forestry, fishery and industrial, to ensure that negative ecological effects are not created by one sector which are detrimental to the development of another. It goes without saying that this should apply also to the population which must be protected from pollution.

## 5.2 Fishing capacity

The national fishing fleet has a total of about 50,000 boats with motors and about 10,000 which are man-powered. Over 70 per cent of the motor-powered fishing vessels have less than 22 hp engines, with some of up to 140 hp and

very few with 200-400 hp. Many of these are quite old with an estimated average age of around 15 years.

The main methods used for catching fish include trawling, pure seiners, gill nets and deep nets. Pelagic species reportedly account for 67 per cent of the total catches.

The total work force engaged in fishing amounts to 214,000 but due to deficient fishing boats and equipment 12-15 per cent have to stay ashore. There is no information available regarding the number of state enterprises still engaged in fishing, but they are reportedly not very successful.

Improvement of the fishing fleet is essential regarding vessels, equipment and fishing methods. This is also part of the strategy in order to utilize the potential of the waters to create job opportunities, to increase the supply of fish and fish products for the domestic market, and to increase the quantities of fish for export.

There is an awareness of the large percentage of small fish landed. The quantities of fish of suitable quality for export is comparatively low but the traditional methods of drying fish and produce fish sauce probably reduces the present negative effects.

However, regulations exist, e.g., with regard to fishing methods and mesh size of the equipment used in an effort to reduce the catches of juvenile fish of different species. Enforcement and control that the regulations are adhered to has not been effective hitherto.

### 5.3 The processing industry

#### 5.3.1 Organizations

Seaprodex, the National Union of Viet Nam Fishery Producers and Import, Export Corporation is the apex organization for the fish processing industry which is also the owner of 12 out of the total 65 food processing plants in the fishery sector.

They are located along the coastline in 22 different provinces but with a concentration of 20 plants in the Ho Chi Minh area.

Out of the 53 plants not owned by Seaprodex, 2 belong to Ho Chi Minh City and the rest to provincial authorities.

In addition to this, there are two fish meal plants, one in Hai Phong in the north and one in Rach Gia in the extreme southwest.

Technical assistance to the entire fish industry is provided by Seaprodex which is also responsible for overall production and investment plans. These have to be approved by the administrative council. The members in this council represent branches, professional management groups, production groups and transaction groups.

Export of fish products is done through Seaprodex which is also an importer since barter trade is almost universal.

#### 5.3.2 Industrial processing

Processing of frozen products for export is done in 60 plants, while 5 plants are specializing in dried products.

The freezing capacity ranges from 1 or 2 tonnes to 30 tonnes per day in each plant and the total national freezing capacity for fish amounts to 350 tonnes per day. Only contact freezers are used requiring 4-5 hours for freezing in most of the plants although as much as 8 hours are necessary in some of them.

A system of about 100 ice-making plants produces 1,800 tonnes of ice per day. The capacity of each plant varies considerably where the large ones have imported installations and the low capacity units use local equipment or installations assembled from parts of foreign origin.

At present, the ice-making capacity meets only about 50 per cent of the requirement.

The processing of the seafood prior to freezing is entirely manual. All plants have premises for filleting fish for instance, but considerable quantities are frozen after cleaning only.



Based on 300 working days per year, the total maximum output from the fish freezing industry is approximately 100,000 tonnes of final products per annum.

The dried seafood products are prepared from, e.g., fish and shrimp which have been cleaned and dried previously by the fishermen. The procedure for preparation of the fish includes sorting, dry brushing, washing, roasting, rolling (using cut-rollers), ultra-violet radiation and packing. Total annual production volume of dried sea products is approximately 14,000 tonnes. Quality control is carried out from random samples of the final product but not on the line.

Each fish processing plant is equipped with cold stores of varying capacities. They are of Japanese or Scandinavian origin and can accommodate a total of 8,000 tonnes of products.

Canning of fish on a pilot scale has been established with the assistance of UNIDO. This product is intended mainly for the domestic market.

### 5.3.3 Local cottage type processing

This includes cleaning and drying of fish and shrimps in the open air for supply of semi-finished products to the dried fish industry. There are no specific figures for the annual output but this ought to correspond reasonably well with the total production from the industrial dried seafood industry, viz. at least 15,000 tonnes per year, taking into account some losses in the process.

Fish sauce is processed in the traditional manner using mostly trash fish. This is a process where fish and salt are used in the ratio 2:1. The product is cured in the sun and left to ferment several months before the liquid is drained off and filtered.

It has been estimated that the annual production approaches 100,000 tonnes of fish sauce per year.

These small-scale ventures are mostly private, some are co-operatives. They are important not only as suppliers of semi-finished dried products but also since they provide a large number of job opportunities and a reliable income to the small-scale entrepreneurs.

#### 5.4 Future plans

The creation of job opportunities, provision of sufficient food and processing of products for export is guiding the future actions.

Joint ventures are seen as an essential element in obtaining foreign funds for future investments which should be associated also with transfer of technology. This would be required to improve the quality of products as well as widening the type of products for export, governed largely by market requirements.

As regards fishing vessels, there is expected to be an orientation towards techniques using refrigerated vessels, especially in more distant waters.

Recently, a joint venture agreement was signed between Seaprodex and Seaprimfico from the Soviet Union. The agreement includes elements of counter-trade and is focused on four areas: (i) exploitation of the sea resources, (ii) sea transport of export products, (iii) marine cultures, and (iv) fishery services including supply of fishing equipment, fuel, machinery, consumer goods and fertilizer.

Lobana, an Australian private investor with long-lasting ties with Seaprodex, has also concluded a joint venture agreement geared towards boosting exploitation, cultivation and processing of marine products and development in other economic sectors. Discussions with other potential partners have also been initiated.

#### 5.5 Conclusions and Recommendations

Expansion of international economic relations is hampered by the inflation which has harassed Viet Nam for so long. A reasonable and early settlement of this and related issues is vital for a sound pluralistic development of the industry.

In the absence of a strategic plan for fishery and fish industrial development investments hitherto have been made on an ad hoc basis in areas believed to be most urgently in need of improvement.

6. FOREST-BASED INDUSTRIES6.1 Present raw material supply base

A total area of 15.6 million hectares are considered forest land but only half of it, 7.8 million hectares, actually carry trees. According to the Ministry of Forestry, the total quantity of trees of different age groups is estimated at 565.6 million m<sup>3</sup> (solid), an average of 72,5 m<sup>3</sup>/hectare. Average annual growth is quoted at 2 m<sup>3</sup>/hectare/year for natural forests, 3 m<sup>3</sup>/hectare for eucalyptus and pine and 15 m<sup>3</sup>/hectare per year in intensive agro-forestry plantations.

The afforestation programme hitherto has covered 160,000 hectares annually planted with eucalyptus or bamboo. Until the year 2000, industrial planting is intended to be increased to a maximum of 200,000 hectares per year, including 20,000 hectares for fuel wood and 40,000 hectares for agro-forestry using eucalyptus spp.

Although the fuel wood forestry will be extensive, improved varieties are to be used for planting.

It is expected that agro-forestry eucalyptus plantations will be harvested after 10 years followed by about three crops with 8-year intervals grown from coppices.

In addition 500 million trees per year will be planted on a village level; assuming an average of 2,400 trees per hectare, private sector afforestation will cover about 200,000 hectare annually.

The annual felling amounts to 1,5 million m<sup>3</sup> distributed as follows on major product groups.

<u>Items</u>	<u>m<sup>3</sup></u>
Sawn products	1,000,000
Pulp	200,000
Pit props	100,000
Poles etc	100,000
Miscellaneous	100,000

The present allocation of wood to the pulp industry represents an average per capita consumption of paper of 0.9 kg. The first target for the pulp and paper industry is to supply twice the present quantity, or 1.8 kg per capita per year.

The existing plans envisage the annual felling to increase to 2.5 million m<sup>3</sup> from 1995 and 4.2 million m<sup>3</sup> from the year 2000. In reality, the prospect of providing the plan target quantities may prove not to be realistic. According to the Report of the UNDP/FAO Forestry Programming Mission (VIE/085/003), forestry in Vietnam is in a crisis situation, with rapidly diminishing natural resources that are below the limits necessary for sustained productivity and environmental protection. Plantations so far have not been very successful and the average survival rate is estimated at 40 per cent.

The natural forestry resources are reportedly being lost or badly degraded at a rate of 150,000 to 200,000 hectares per year. In addition, limited sampling suggests that the volume of the standing timber is decreasing at a rate of 7 per cent per year due to overcutting.

## 6.2 Industries

### 6.2.1 Saw mills

There are 600 saw mills in Viet Nam with a capacity of 2,000-3,000 m<sup>3</sup>/year for each unit if operated two shifts per day. They are reportedly not provided with mechanical feeding of the logs. Studies by FAO of the saw mills in Viet Nam concluded that " all saw mills seen are in a very poor condition. The majority of mills are beyond economical use". The setting is simple and the quantity of the sawn timber with regard to uniformity of dimension is not up to standard, and wastes are above what is normally accepted. Although the saw milling capacity is sufficient, the supply to the secondary wood industry suffers from unreliable supply of timber. The major reason for this appears to be insufficient logging and transport capacity from the felling area. Another reason may be the lack of adequate and timely planning.

The present output from the saw mills indicate that they generally operate during one shift only or less.

#### 6.2.2 Pulp and paper industries

The pulp and paper industry under the Ministry of Light Industry has a total capacity of about 200,000 tonnes/year.

Bai Bang, which was built in the late 1970s and early 1980s in cooperation with SIDA, has a designed capacity of 55,000 t/year but is only achieving 30,000 tonnes.

Some ten old mills produce currently 40,000 t/year and a new paper mill of French design at Ten Mi is expected to be commissioned in 1989. The designed capacity is 48,000 t/year.

Provincial enterprises produce 30,000 tonnes of paper annually but no detailed information is available.

The present overall capacity utilization of the pulp and paper industry is about 50 per cent.

The pulp and paper industry suffers from raw material shortage like several of the other forest-based industries. In addition, the supply of essential chemicals, such as caustic soda, is irregular and insufficient.

The total population is expected to reach 66.4 million by 1990. Existing capacity in the pulp and paper industry is sufficient to supply 3 kg of paper per capita, given the availability of inputs. Adequate quantities of pulp wood is secured according to the plan for annual harvest from the forests. The reality may be different. The reasons for shortcomings in supply of raw materials to virtually every branch of forestry-based industry is not clear.

#### 6.2.3 Plywood, veneer and chipboard plants

Plywood is produced in three plants, each with a capacity of 6,000 m<sup>3</sup> timber input per year. The present capacity utilization is 30 per

cent mainly due to shortage of timber. The reason for this may also be associated with logging, transport and/or planning problems.

One of the plants was built in 1958 using equipment from Czechoslovakia and the other two are of American manufacture, presumably established in the early 1970s.

Three veneer plants with French installations were put up in 1979. The capacity of each plant is 3 million m<sup>2</sup>/year using timber with a diameter of minimum 60 cm. At present only 30 cm diameter logs are available which accounts partly for the unsatisfactory utilization of the plant estimated at 40 per cent. Other contributing reasons are general shortage of logs and lack of spare parts.

A chipboard plant was supplied from Czechoslovakia in 1978. The installed capacity, 10,000 m<sup>3</sup> of input/year, was utilized at 60 per cent until 1980, or for a maximum of two years. Production ceased due to the lack of timber. The plant was later remodelled and is now used for making bamboo mats.

#### 6.2.4 Secondary wood industries

Manufacturers of wooden products like furniture have inefficient production lines generally equipped with old machinery. Little experience has been gained by the mission from visiting manufacturers of wood products. It would appear, however, that although the wood working machinery is of old design they are frequently operated quite successfully. The production lines as a whole are in need of appropriate rehabilitation measures, using the existing machines whenever possible.

Modern concepts of material handling and process flow would have to be introduced and considerable effort should be directed towards improved design and assembling systems to attract a wider international market. This is believed to be a branch where co-operation with overseas furniture manufacturing companies would be of mutual interest.

## Food supplies to large urban population centres

### 1. Introduction

The Ho Chi Minh City is the largest city in Viet Nam with a population slightly over 4 million. From an administrative point of view, the city is divided in 12 central and 6 peripheral districts.

Information on food supply and the agro-based industries from this area serves the purpose of illustrating, in general terms, the situation also in other larger population centres in the country. It should be stressed, however, that the order of magnitude in different fields vary considerably with regard to, e.g., standard and capacity of food processing facilities and supply of inputs with particular reference to farm produce as raw material.

### 2. Supply requirements, processing capacity

In addition to having large consumer groups in different income brackets, the city is also the centre in the south for industrial production, for its own requirements, for supply to surrounding provinces and for export.

Food production in the six peripheral districts cover about 60 per cent of the demand of vegetables, including tuber crops, and 10 per cent of the requirement of pork.

Other products such as pineapple, sugar and tobacco for processing is mainly grown and supplied from surrounding provinces. In this respect, the processing industry in Ho Chi Minh City is a very much needed outlet for these commodities. The requirement of paddy rice is at least 500,000 tonnes per annum and 50,000 tonnes of wheat flour.

The wheat is imported from abroad and approximately 600,000 tonnes of paddy rice (for 1988 580,000 tonnes) are bought from nine provinces west of Ho Chi Minh City. The paddy rice is supplied on a quota basis determined by the Central Government.

On a farm level, major difficulties are encountered with the summer/autumn paddy crops, which are difficult to dry in the traditional way during the wet season. Hence, substantial losses are frequent at this level.

In the Han Giang Province, a silo system has been built to reduce the storage losses.

The overall rice processing capacity of the city is 200,000 to 300,000 tonnes per year indicating that approximately 50 per cent of the requirement will have to be supplied as processed rice. The mechanical installations are poor, resulting in low extraction rate and high percentage of broken grains.

The demand for meat in Ho Chi Minh City is 50,000 tonnes calculated from the average per capita consumption of 12 kg per year. About 80 per cent of this, or 40,000 tonnes, is pork and the rest, beef and poultry. Assuming an average population growth including urbanization, of 3 per cent and that the

target is met of increasing the per capita consumption of meat to 25 kg per year until 1995, the total supply of meat will then have to increase to some 120,000 tonnes in total, 100,000 tonnes of which is pork, with maintained share of 80 per cent for pork products.

No detailed information is available regarding the proportion of beef and poultry. It is reasonable to assume, however, that the consumption of beef accounts for about 15 per cent, leaving 5 per cent for poultry meat. The demand for beef in 1995 would then be of the order of 15,000 tonnes and that of poultry meat 5,000 tonnes per annum.

Ho Chi Minh City has one large slaughterhouse, Vissan, which has a designed capacity of 2,400 head or roughly 180 tonnes of pork per one shift (6 hours killing). With 350 days of operation per year, the annual production is about 50,000 tonnes. If modified operational routine are adopted, including two shifts for killing, the required quantity of pork can be handled also by the mid of the 1990s. In a 10-year perspective, additional slaughtering facilities are necessary and the formulation of the project concept should be initiated fairly soon.

One important issue to determine is whether additional supplies of live pigs to the city is a realistic alternative, or whether a suitable future pig-producing area can be identified elsewhere, where the bulk of the feed can also be produced. Pending the result of such studies, the localization of additional slaughtering capacity should be determined within a period of two or three years from now.

A current problem related to animal production is the irregular supply of animal feed. Although only a comparatively small portion of the live pigs are supplied from the city area, the situation will aggravate in the future with increased demand for pork. Existing animal feed processing plants are reportedly in a poor condition but operations are maintained by high technical know-how of the operational staff.

Manufacturing of animal feed is of fundamental importance for sustained and improved animal production. The investment plans for the feed processing industry should be included as an integral part of detailed studies and recommendations pertaining to the long term strategy for supply of meat to the city.

Other food processing enterprises in the area include biscuit and confectionery manufacturing, noodles, sauces, etc.

In addition, there are Central State enterprises for tobacco, alcohol and beverage processing localized in Ho Chi Minh City. The tobacco industry produces 650 million packs of cigarettes per year, the range of products from the distillery is substantial and the brewery branch produces 170 million liters of beer annually. The raw material input for these industries is mainly supplied from other areas.

In general, the equipment in the different food industries are reportedly 10 to 15 years old, or more, using outdated technology.

Continued industrial development and expansion is vital for Ho Chi Minh City. This is also a major policy of the Peoples Committee. Of present industrial capacity, consumer goods accounts for 80 per cent of manufacturing



and the food processing sub-sector, 20 per cent. This supplies the city population, other areas in the country and so far, limited quantities for export. A future development focused also on increased export must be based on up-to-date processing technology in plants and industries equipped with acceptable process controls and monitoring systems, to ensure uniform, hygienic and generally high standard products. Assistance would have to be requested to obtain technical access regarding suitable equipment, suppliers and means of financing.

### 3. General guidelines for 1990-2005

The Peoples Committee has adopted general guidelines for investments from 1990-2005 focused on satisfying the requirements of the population; (1) food, (2) housing, (3) textiles, (4) education, (5) health services and (6) transports.

The plans for the period 1990-1995 are under study and three programmes have been presented:

- 1st. Ensure increased food production through the manufacture and supply of agricultural machinery and equipment and market investigation to prepare for increased food supply from surrounding areas.
- 2nd. Increased supply of consumer goods. This is a major programme accounting for 70 per cent of the budget. The increased output should also allow for additional exports. Alternative branches are being studied, including food industries, textiles, electrical and mechanical industries. New regulations are being prepared and amendments of the investment law may be necessary. However, the study is far from completed and the major part still remains.
- 3rd. This programme is related to import-export focused on the scope of exporting industrial products and agricultural products, supplied as a counter trade from other provinces, in exchange for industrial products from Ho Chi Minh City. Export is considered essential for buying food in the future and it is stressed that the three programmes are closely linked.

### 4. Conclusions

The economy of Ho Chi Minh City is an integral part of the national one. Hence, the strategy for development of the human resources in the city has an impact on commodity trade from other areas. This is not likely to be successful without using modern technology in industry to make it competitive in an international perspective.

Existing production facilities should be evaluated also in the light of the quality of the food products which are turned out on the market. Only superior quality should be accepted for export and the detailed studies of separate food industries must focus also on this issue.

Many agro-based industries use water in the processes and the quantities of effluent are considerable. No sewage treatment system exists either for this effluent or for the city sewerage hence, all water courses are badly polluted. This must have detrimental effects on the sea fauna downstream in the Mekong river causing serious damage to the marine fishery resources, at least in the coastal areas.

## The Tien Giang Province

### 1. General

The Tien Giang Province is located about 75 km southwest of Ho Chi Minh City. It covers an area of 240,000 hectare and has a total population of 1.4 million. An estimated 75 per cent are living in rural areas and mainly engaged in agriculture, 15 per cent are artisans, industrial workers, etc. and 10 per cent are engaged in administration and service occupations. The population density is 583 per sqkm.

### 2. Land use

Tien Giang is typical for the Mekong delta although with a much higher population density.

The landscape is flat, penetrated by a number of water courses and occupies some very wet areas, suffering from highly acid soils. Major land use is as follows:

<u>Use</u>	<u>Hectares</u>
Rice production	150,000
Household gardens	30,000
Pineapple	2,000
Sugar cane	3,500
Agro-forestry	10,000

Coconut trees cover about 9,000 hectare, 7,000 hectare of which are referred to the coastal line.

A total of 5,000 hectares of water including rivers and small lakes are used for aquaculture.

### 3. Farm culture

#### Farm system

Based on the experience from a collective system of farming, there has been a change to a system where the individual is expected to take full responsibility for the performance of the production unit and also reap the benefit if he is doing well.

In principle, a certain area of land - or farm - is allocated to the individual. This arrangement may be organized, as in the case of all rice producing areas, through farm co-operatives.

The farm co-operatives have 50 to 100 hectare of arable land where each peasant farms his share of the land. The income from the sales of the paddy goes to the farmer, not to the co-operative. Since the barter system penetrates all the way down to the producer, he must supply a certain quota to cover costs of inputs such as fertilizer, pesticides and sometimes equipment.

Above quota deliveries are paid for in cash by the provincial authorities responsible for procurement of paddy.

A pineapple farmer would typically have a contract with one of the provincial state pineapple estates for a minimum period of three years. He would then get a number of hectares which, in the case of the Dong Thap Muoi area where the soils are very arid, are reclaimed through canalization. He also gets a house and certain extension services from the Technical department of the pineapple estate which also provides fertilizer, etc. The farmers are organized in 10-member groups and one of them is appointed by the estate management as deputy supervisor for the group. He also receives training for this function.

Production quotas are determined for each farm unit. This varies depending on the productivity of the soil where the unit is located. Any quantity above the quota which covers all input costs, except labour, is paid according to the price on the market.

### Paddy

The total area used for cultivation of paddy is 105,000 hectare. Depending on the growing conditions one, two or three crops per year may be grown.

Crops/year	Hectares	Hectares harvested/year
1	25,000	25,000
2	60,000	120,000
3	20,000	60,000

In total, 205,000 hectares of paddy are thus harvested per year, giving an average cropping intensity of 1.95. The normal annual crop yield is 825,000 tonnes, or on an average about 4 tonnes per harvested hectare. Major constraints for higher production are insufficient supply of fertilizer and pesticides. Present irrigation system is also inadequate.

The post harvest losses are considerable, especially for the summer/autumn crop harvested during the rainy season. The average losses are quoted at 20 per cent in total which adds up to about 200,000 tonnes per year, equivalent to the requirements of some 900,000 people.

Storage facilities on co-operatives and provincial level are reportedly adequate but there are no facilities for cleaning, and in particular, for drying of the paddy.

### Pineapple

Total area for pineapple production in Tien Giang Province is 2,500 hectares of which the provincial state farms cover 2,100 hectares. Due to the geographical location - part of the Mekong Delta - 1,350 hectares of the state farm has acid sulphate soil with extremely low pH reportedly 2.4 in the rainy season and up to 4.5 during the sunny season. In an effort to reduce the acidity of the soil, canals have to be made to drain the water out of the fields and elevate the area for planting. The canals reduce the arable land by 50 per cent on an average. Average yield of pineapple per hectare in the

province is reportedly 12 tonnes on the state farm and up to 30 tonnes on private farms. No figures are available on total production of pineapple.

#### Pig production

The total number of pigs in the province is of the order of 200,000 heads but there is no information regarding the number of breeding stock.

Most pigs are kept on a household basis with some on a few provincial state pig farms. Exotic breeds such as Large White, Landrace, Duroc and Hampshire appear to be used here whereas the domestic type of pig is the common breed in the small scale piggeries.

Average live weight at slaughter is 80 kg indicating an average dressed weight of about 60 kg. Local consumption in the province is reportedly 12,000 tonnes per year or 200,000 pigs.

Supplies of slaughtering pigs to the Union of Livestock Enterprises in the province started in February 1988. So far about 9,000 pigs have been delivered. The Tien Giang Province also supplies pigs to Vissan slaughterhouse in Ho Chi Minh City but the numbers are not known.

#### 4. Agro-industries

Although agriculture dominates the economy of the province, the Tien Giang Provincial authorities operate a number of agro-based industries. This includes a feed mill, a pineapple processing plant, and a slaughterhouse/freezing plant. In addition, there are two district feed mills and numerous small rice mills capable of milling the local demand, about 300,000 tonnes per year.

##### Feed milling

The provincial feed mill capacity is 24,000 tonnes per year and the two on districts level are capable of milling and mixing 5,000 t/year each. The installations are reportedly outdated with poor performance.

Rice bran, maize, manioc and fish meal are mixed into a compound pig feed. Ground sea shells are included as the sole mineral supplement. There are no laboratory facilities available for analysis of ingredients or finished products.

The current market price is Dong 400/kg or half that price when subsidized.

##### Pineapple processing

The pineapple processing industry is specialized in one frozen product, cut up pineapple without syrup.

The plant was established in 1978 and has an output capacity of 5,000 t/year. Pineapple are supplied from within the province but also from other provinces. Hence, the plant can operate the year around, during 6 months running at full capacity, 3 shifts a day and during 6 months with an average

capacity utilization of about 50 per cent, which is then related to the capacity of the contact freezing cabinets.

Under these conditions, the plant is capable of producing 5,000 tonnes of finished product out of 25,000 tonnes of input.

Preparation of the fruit is entirely a manual operation involving 900 workers. After cutting the crown and stalk from the fruit, the subsequent operation are as follows: peeling, cutting, submerging in 2 ppm chlorine solution, draining/screening, packing, sealing, freezing.

The only mechanical equipment used is a tilted oscillating draining/screening table and the electrical unit used for sealing the bags.

Some of the premises are ventilated through a direct system above the working area. The plant shows signs of its age and would need some upgrading of physical structure and, e.g., adjustment of some of the freezing cabinet doors.

Previously the lack of spare parts for the refrigeration compressors created problems. This has now been overcome by keeping a reasonable stock of spares.

Power cuts occur from time to time and amounts to about 50 hours per month. This is reportedly a common feature in provincial areas like Tien Giang and is due to weakness in the power transmission network.

A standby generator is used during periods of power failure.

Present input cost was quoted at Dong 150,000/ton of pineapple, delivered at the factory and the product price Dong 1.7 million/ton.

## Ho Chi Minh Food Company

This is a provincial state enterprise engaged in a wide range of activities. It was established in 1980 and assumed the responsibility to collect, process and supply rice to the city population.

The organization of the enterprise follows the city administrative system, that is, each of the 18 districts has a Food Company Branch. To facilitate the distribution of food, there are 800 shops in 140 markets throughout the districts. In addition, 7,500 selling points are appointed where the small entrepreneur gets a percentage revenue of the sales.

The Food Company is authorized by the city authorities to operate as a commercial enterprise with no subsidies on any product.

The General Manager, Mrs. Nguyen Thi Thi, has, from the onset, applied a system of incentives and responsibility in the expansion and development of all activities.

1,700 people are on the payroll, 125 of whom employed at the head office. The total number of workers, however, in the Food Company "system" is 45,000.

Five rice mills, one plant for instant noodles, one animal feed plant and one pilot scale oil refinery are at present run by the Food Company. In addition, there are 1,700 partnership companies, private enterprises in the food processing sub-sector. Their products are paid for according to agreed prices plus part of the sales margin, usually 10 to 12 per cent.

Some 46,000 tonnes of rice is used per month out of this 12,000 tonnes are used in manufacturing together with 20,000 tonnes of wheat flour which is processed into a variety of products, mostly by a number of the 1,700 partnership enterprises. The enterprises are responsible for the quality of their products although product quality control is made on more than 100 different products such as dried fish products, rice paper, ravioli, beef extract, direct mushroom, arrow root starch etc.

Out of the total demand of paddy 51 per cent is processed in the Food Company rice mills. The second grade rice from these mills have some 30 broken kessels as compared with the processed rice supplied from the premisses where as much as 40-45 per cent may be broken. Besides, losses in the milling process are above what is acceptable but was not quantified.

The better quality of the rice processed by the Food Company is their routine procedure of drying the rice upon arrival from the provinces and prior to storage. Hence, the rice is processed at a lower moisture content.

Losses during transport are low. There is a margin given by the government of 2 per cent for paddy and 1 per cent for rice. the Food Company has less than 1 per cent for paddy which is achieved by an incentive system. For instance, for a truck load of 10 tonnes the acceptable losses are

determined at 70 kg. Should there be no losses the transporter gets market price for 70 kg as a bonus, but if the losses exceed 70 kg he has to pay every kg at the current market price

The feed manufacturing is seen as a natural part of the business activities with its close linkage to the flour and rice milling. The feed mill equipment perform poorly and marketing problems adds to the burden. There is no correlation between price of food and market price of slaughter pigs and the sales of feed have dropped.

However, a new feed plant is being considered. The capacity is intended to be 80,000 tonnes of feed per year and a further development is in its planning stage. This includes in a longer perspective establishment of smaller ..... installations using premises or concentrates from the planned and local supplies of the bulk of the private formula feed.

To integrate the activities further the Food Company is seriously thinking of starting a pig breeding scheme; ultimately for supply of ..... to the process.

Up till now, investment in food industry has relied on government funds. The ambition of the city authorities is to develop the food industry at a fast rate. This is difficult to achieve in the present situation of low investment capacity.

But the horizon for the Feed Company is much .... The difficulties to obtain foreign exchange is a serious constraint to the company development. After the reorientation implaying authorization for the Food Company to import and export directly as from June 1988 an improvement has already been ..... Foreign exchange will be unstable in the future for import of e.g. inputs also to partnership companies.

The development embarked upon ..... the company into a trading house. A small oil refinery enterprise is established with French co-operation. The capacity is 40,000 t/year, petrol, diesel ore, fuel ore and kerosin. Urged by the increasing need for fertilizer the Food Company has expressed an interest in establishing a petrochemical industry when the capacity of the oil refinery is increased to 200,000 t/year. Offers have already been obtained. The product range would thus include also lubricants and urea. All these products can be used in their size .....

For the time being a contract has been signed with a Spanish company for the supply of 300,000 tonnes of urea, about 60 per cent of current demand in the Mekong Silk. In the past fertilizer has been precided entirely by the Central Government but requested and was authorized to enter the fertilizer trade.

One of the last initiation is the discussions with Spain regarding a possible future airline.

The expanded business activities are channelled through European Trading Companies. So far permanent representation is established with a number of countries including Spain, France, Singapore, Japan and regular contracts with Taiwan, South Korea, Federal Republic of Germany and Canada.

A Swiss Company has offered a line of credits for export of products.

The Food Comapny's accelerated international contracts are expected to show results fairly soon. Still the system of barter track for domestic business appears to be difficult and certainly out of place.



### Linh Xuan Canning Factory

The Linh Xuan Canning Factory is located 25 km north of Ho Chi Minh City. In 1988 2000 tons of canned products were processed by its 500 workers. Permission has been obtained to import/export through the Pineapple Export Company (Pinexco) under the jurisdiction of Ho Chi Minh City People's Committee.

The factory uses on an average 4 tons of fruit to produce 1 tonne of finished product. Pineapple accounts for the greater part but other fruits such as bananas, rambutan, papaya, and also mushrooms are including in the product range.

The new status as an exporting company widens the market and required product volumes. Hence, an incentive payment scheme, was introduced in September 1988 with the effect that the productivity was doubled. As a consequence the company now has difficulties in obtaining sufficient inputs such as fruit, sugar and tins. In an effort to solve the problems, the management is considering to import fertilizer and pesticides to use as barter for fruits, both from their present sources, but also to increase the deliveries from producers further away from the factory mainly from the Mekong Delta area in South West, where fruits of a better quality is grown. The quality and size of the fruit from this area is superior and only 3 tonnes of pineapple is required to produce 1 tonne of finished product. The production system is very labour intensive with only the manufacturing of tin cans and the closing of the cans being done by machines.

The future plans include canning of roasted peanuts and investment in a mechanized juice line with UHT packing system for juice concentrates. The capacity is intended to be sufficient for processing 2,500 t/year of mangos, papaya, banana and pineapple juice concentrate.

## Van Diem Sugar Factory

The factory is located in Phu Xuyen in Ha Son Binh Province, about 30 km south of Hanoi, not far from the No.1 road going to the Southern parts of the country. Construction started in 1959 with technical assistance from Poland. It was completed two years later and started production in November 1961.

The designed capacity is 1000 tonnes of sugar cane per 22 hours and an expected production of 150,000 tonnes of semi-refined sugar per year.

Mechanical equipment for extraction of the sugar juice from the cane is of Chinese manufacture, whereas machinery and equipment for the remaining process are supplied from Poland.

A boiler plant with two units, fueled by dust coal, are capable of producing 16 tonnes of steam per hour at a pressure of 26 kg/m<sup>2</sup>. The steam is used mainly in the evaporation/crystallization process but to a large extent also for turbine generation of electricity. The network is connected to the national grid.

Three pumping stations serves the factory

- (i) supply of water from the river, 350 m<sup>3</sup>/h
- (ii) filtering, recirculation 1000 m<sup>3</sup>/h
- (iii) waste water disposal, 350 m<sup>3</sup>/h.

A limestone plant using lump coal (cap. 50t/day) supplies sufficient quantities of carbon hydroxide for the factory. Auxillary facilities include rail bound cars for transport of sugar cane from the supply to the feeding conveyor, loading facilities, work shop and storage shed with conveyor for powder coal.

The sugar cane is supplied by 38 cooperatives in the provinces of Ha Nam Ninh, Ha Son Binh and Hai Hung. The total hectarages under sugar cane is 2,800 hectares and the distance of transport varies from about 2 km to 80 km. 75 per cent of the transports are done by a fleet of 45 trucks which, on average, are able to load about 4 tonnes of sugar cane and haul 400-500 t/day. Some quantities are transported on the river and a maximum of 150 t/day on ox drawn carts. The harvesting period of sugar cane, hence also the period of time the sugar factory is operating, starts in November and terminates in March.

During the rest of the year 500-600 workers of the total work force of 1000 people, are kept in the factory for maintenance work and cleaning. The rest are engaged in sideline activities such as processing of different alcoholic products.

The sugar content in the cane is generally low, 11-13 per cent, and the availability of raw material limited to about 100,000 tonnes per year. This is the result of lack of interest on the part of the grower to produce additional quantities of sugar cane to suffice also for deliveries another month at the end of the season. They are more interested in other crops which are more rewarding.

In 1987 94,000 tonnes of sugar cane were processed giving 5,700 tonnes of semi-refined sugar, 4,900 tonnes of molasses and an estimated 25,000 tonnes of bagass. About one third of this is absorbed by a paper factory, about half kilometer from the sugar factory, but the two thirds have to be disposed of since the boiler is not designed to handle bagass. The capacity of the paper factory is the limiting factor for extended use of bagass for paper manufacturing.

In 1987 381 million Dong were paid in tax leaving 64 million Dong profit after tax. Half of this was taken by the state and the rest, 32 million Dong, used by the factory to replenish the three funds, the product development fund, the bonus fund and the social welfare fund.

A plan budget is prepared every year based on the plan target set by the Government. These cost estimates are made for the production year including items such as input costs, energy, labour, maintenance and depreciation. The plan budget is adjusted every third month in an effort to keep the figures up to date. Over the years this has proved to be impossible. These figures are on the paper but they far from coincide with the actual results, or costs at the end of the year. From this point of view the plan is never followed. However, it is essential that the production is in conformity with the norms of performance, in this case a cane-sugar ratio of 15:1. This has repeatedly always been the case. As from 1987 the new regulations stipulate that the amounts for depreciation are returned to the factory to be used for e.g. renovation of installations. In 1987 the depreciation was 19,4 million Dongs which were used to pay outstanding debts for repairs made earlier. In addition, the Government has allocated 250 million Dongs which will be used for repairs. Funds may be made available by the government for e.g. rehabilitation of machinery in which case credits must be obtained from foreign countries.

The above description about procedures for costing and economic management reflects the general situation for enterprises, although the seriousness at which they are performed, is likely to differ widely.

Cost of sugar cane is determined by the government, at present 200 kg of paddy for 1 tonne of sugar cane. Out of this 50 per cent must be paid in paddy in this area, and the remaining 50 per cent in cash or supplies of fertilizer, equivalent to the value of 100 kg of paddy rice.

The difficult position is that whereas the cost of paddy is affected by the inflation, at latter simmingly of the order of some per cents per day, the price of sugar has been kept stable with no increase. In essence, there is no mechanism to correlate price escalation of different commodities and inputs.

The strange situation also exist that in other areas 60 kg of paddy rice is the fixed quantity, while the value of 140 kg of paddy is paid with fertilizer or in cash.

A major constraint is the supply of sugar cane, as a result of to short harvesting period on the one hand, and the widely spread procurement area on the other. This adds to the cost of raw material through the transports which are the responsibility of the factory. The factory management has suggested that the sugar cane production is concentrated to the vicinity of the Van Dien Sugar factory.

The equipment are old and outdated, the workshop small and the engineering capacity weak. This has been the case for the past 12 years when no technical assistance has been provided.

The fact that only one third of the bagass is used for paper manufacturing, leaving about 16,000 tonnes to be disposed of, creates problems. In the 1960s there was an animal feed plant absorbing the bagass. However, in June 1972 the factory was bombed. Severe damage was done, including on the feed plant, which has not been reconstructed since.

The equipment in the factory is of pre World War II design and especially the sugar juice processing section, including corporation and crystalization, is in a bad state of repair. This applies also to the boiler/turbine department piping and major parts of the civil works. The factory and its immediate surroundings are disorganized, exhibiting an extremely dirty appearance. The heaps of scrap iron scattered over the site, and which presumably never will be used in the factory, constitute a major source of raw material for a small foundry.

The inferior and damaged insulation of pipings and processing equipment etc., and the absence of any form of heat exchangers in the system, makes the factory very uneconomical with high energy consumption per ton of sugar.

## Hanoi Fruit and Compot Canning Factory

The Hanoi Fruit and Compot Canning Factory operating under the jurisdiction of Vietnam National Vegetable and Fruit Cooperation, VEGETEXCO, was built in the early 1960s and started production in 1962. The factory has an annual capacity of 3,200 tonnes of finished products and is equipped with machinery from Hungary, GDR and the Soviet Union. In 1987 actual production was around 3,000 tonnes of canned fruit, juices, vegetables, peanuts and meat. Orange, pineapple, green beans, cucumbers, lychee and pork meat are processed in three main production lines. The pork is canned basically for the domestic market during seasons of low supply of fresh fruits. Export accounts for 2/3 of total production. There are 1,000 employees engaged in handling, preparation and canning of the products and manufacturing of the cans.

There are no problems with the fresh fruit and vegetable supply at present. Instead, the increased supply was creating problems with the 500 tonnes refrigerated stores which was considered too small for intermediate storage to even out variations in the supply.

The production unit for cans suffers from outdated machinery which are not synchronized into proper production lines, basically because there is no industrial means of handling the material, the semi-finished cans and the ultimate stock of cans. Damages occur to the cans which may be a major cause for leaking cans which reportedly is a problem.

The canning process is entirely a manual operation which appeared to have comparatively low efficiency. The pineapple supply to the factory, at the time of the visit to the plant, was of uneven quality and a large proportion were very small. This has a detrimental influence on the output per unit of time on the line for preparation of the pineapple for the subsequent canning operation.

The holding capacity of the refrigerated store room for raw material could easily be increased two or three times if a modified system is adopted. If a solution with sectioned slatted floor is used an air duct must channel the air flow under the slatted floor. Bulk manual handling can be retained and the capacity will be about twice the present.

The other alternative is to adopt a container handling system where the fruit is placed in wooden crates made with about 4 cm opening between the boards in the bottom and on all sides. For cucumber the opening would have to be narrower to prevent the cucumber from falling out. The crates should be standardized about 1 m<sup>3</sup>. With a hand operated palletizer the containers are on the floor but if a fork-lift truck is used two or three layers would be a maximum. The products will then be ventilated properly. Care must be taken so as to avoid excessive weight losses, especially of the cucumber. Proper planning is essential.

The equipment for manufacturing tin cans uses a technology from the 1930s. The cans are not of the standard needed for marketing to western countries. In general the hygiene conditions at the factory is well below what is expected for a canning factory selling for export.

The safety measures for the workers could be greatly improved. In general it is felt that the working spirit on all levels could be up-graded.

The accounting and costing is done in accordance with the Government rules and regulations. In the last three years there has been no losses or profits for the company. The costing are adjusted every three months taking the new prices level into consideration. The buildings are depreciated by 5 per cent per year, and the equipment in general by 10 percent per year. In accordance with the new policy, the management will be allowed to keep more of the profit for new investments.

It remains to be seen if this incentive is sufficient to improve the overall performance of the enterprise to generate a profile.

## Huong Cana animal feed plant

The Huong Cana Animal Feed Plant is located about 30 km north-west of Hanoi in the South-east corner of the Vinh Phu Province.

The plant was built with assistance from Yugoslavia and completed by the end of 1980. Test run as part of the commissioning was done by Government representatives and engineers from the Yugoslavian supplier. Production started early 1981.

The designed capacity is 20,000 t/year on two shifts. The complete plant include warehouses; an 8 t/hour grain drier; 6 steel silo units with a total storage capacity of 3,000 tonnes; a feed processing line, comprising cleaners, hammer mills, proportioning bins with outlets to a central scale with pre-setting arrangements for automate weight proportioning of the batches (Buhler-Miag), batch mixer, bins for finished feeds and over delleting (Buhler) with installations for fat and/or molasses injections before the pressing operation. There is also a premix line with manual weighing of the ingredients. The processing lines are complete with the necessary buffer bins, shutes, spouts, elevators and conveyors.

The grain drier and the storage silos with conveying and distribution systems are not protected by many building structures.

The plant is equiped with central control panels, one for each drier, silo and feed processing line. Some positions are remote controlled others manually operated. However, there is a position indicated system. The bins are provided with level indicators and limit switches, and the storage silos with level indicators/limit switches and a temperature control installation. An emergency power cut-off system is connected to each floor in the feed mill.

There is a small workshop but no laboratory and no fire extinguisher or hydrants in the feed plant.

The plant suffers from heavy infestation by insects, weeoels in particular, and rodents. A contributing factor to this condition is the very large quantities of grain, ingredients, feeds or rubbish in practically every place of the plant. Moreover the electrical system including light fixtures need to be mended since very few floors have any light at present. This semi-darkness is not conducive to plant cleanliness and hygiene.

More considerations should have been taken to plant hygiene requirements during design and finishing of the civil works, in particular the concrete works.

The drier has not been used during the last three years and need to be rehabilitated.

The pre-setting arrangement on the proportioning scale has not been working for quite some time.

Level indicating systems, temperature control system and fire emergency power cut-off system are all out of order. The entire electrical system needs to be overhauled including replacement of covers to connecting boxes repair of light fixtures etc.

The premix line has apparently never been used properly and did not seem to be operable.

There is a total of 100 employees including 1 mechanical engineer, 1 electrical engineer, 1 feed formulation technician, 9 other college graduates, 18 skilled workers and 70 unskilled.

The maximum production achieved in one year is 8,000 tonnes but the normal annual output is about 6,000 tonnes or 30 per cent of designed capacity.

Since there is no laboratory at the plant samples are taken and sent to Hanoi for analysis. Thus, ingredients are sampled about once a week and finished products once a month. The results from the analyses may be available after about one week. However, each bag of feed is provided with a bag starting type of feed and nutrient content which is guaranteed by the manufacturer.

The main reasons for poor capacity utilization is irregular and insufficient supply of ingredients, mechanical break-downs and power failures. More recently market constraints have turned out to be the major reason for low production. The usual customers have no funds to buy feed and there seem to be no short-term credits available. The result at present is large supplies of ingredients, fish meal, oil cakes and rice bran, in particular, which are kept in the warehouses. Here the stacks of bags have collapsed, bags have busted, some are damaged by moisture, others from urination by rats. Large quantities are deteriorating. Feed conversion rate is unacceptable low, reportedly of the order of 5:1 for pigs. This may be due to inferior management and environment for the animals, but unqualified feed is a more likely reason where poor feed hygiene may be a contributing factor.

A feed plant of this type should fit in well in a future system of feed processing units where a "nucleon" plant provides the qualified part of a compound feed, the pre-mix, to simpler satellite plants. The present performance is not acceptable and efforts should be made to put things right.

The management of the plant has suggested to the government that some equipment be replaced by modern ones, for instance motors to the hammer mills. Recently a request has been made for Yugoslavia to provide assistance to overcome the problems. In addition to technical assistance which may be provided on a periodic basis after an initial 8 to 10 months, it is essential that the technical capacity at the plant is strengthened. This is necessary in order to ensure that the appropriate maintenance and repair routines are adopted and implemented.

General plant management routines should be reviewed and changed to meet the requirements for keeping all premises clean and tidy in a broad approach to get rid of the pests, improve plant hygiene and also feed quality.

A laboratory should be arranged on the site, preferably in an existing building, with the necessary equipment for analysis of the main feed



properties, protein, crud fat, crud fat and ash content. The energy value will have to be calculated and the required literature should be included.

Quality of ingredients will remain a problem. These can only be solved by directives from the government related to supplies and costs. It is suggested that a pricing system of agricultural commodities is adopted where the price is related to quality, gradually introducing minimum requirements for acceptance.

## Tan Binh Vegetable Oil Factory

The Tan Binh Vegetable Oil Factory in Ho Chi Minh City is a provincial state enterprise built in 1973 with equipment supplied mainly from GDR.

The factory has a screw expeller extraction plant, a solvent extraction unit, a refinery and equipment for soap making and manufacturing of bread shortening and margarine.

The designed capacity is 80 tonnes/24 hours, or on an annual basis 24,000 tonnes, of raw material, sesame seed, ground nuts, castor beans or coconuts.

Tan Binh Vegetable Oil Factory also receives crude vegetable oil from other plants on a provincial level, 3,000 - 5,000 tonnes/year.

The solvent extraction plant has been inoperable since 1981. The refinery is designed for a capacity of 50 tonnes/day, or on an annual basis, 15,000 tonnes, assuming 300 working days. This quantity is used for cooking oil, shortenings and margarine manufacturing.

The consumers in Viet Nam prefer animal fat in their diet, hence 80 per cent of the crude oil is exported.

The soap manufacturing line and the section for processing of shortening and margarin are sparsely equipped and the latter apparently not used recently.

The condition of the facilities were such that an inspection more in detail was not useful.

Inadquate supply of oil seeds is considered one of the major problems. This is blamed on the pricing structure of oil seed, shortage of transports and high cost of transport using hired vehicles. To facilitate additional export the state farms are reportedly instructed to increase their production of oil crops, in particular coconut. In fact, planting of coconut palms has been done for the past three years.

The oil bearing seeds are paid in cash. However, the growers frequently also request payment in advance in order to obtain inputs like fertilizer to the future crop. This can normally not be arranged. If short term credit facilities were available to the oil seed producers, the supply of oil bearing seed to the factory is likely to improve.

Technical problems associated with mechanical break-downs and poor extraction of oil are common. These are further aggravated since spare parts are not available from the suppliers; manufacturing of this type of equipment stopped about 20 years ago. Most parts could be made locally, according to the management, if the raw material, the iron or alloy for bearings etc., had been available.

The crude oil is exported through VEGOILIMEX, mainly to socialist countries, and reportedly with no profit to the factory.

The technical design of the installations indicate that it is at least 30-40 years old. This opinion is to an extent verified by the information regarding the spare parts situation. It also indicates that the technical solution used was outdated before the plant was installed in 1983.

The overall impression of the plant is such that rehabilitation, including upgrading of e.g. the department for shortings and margarines, most likely would imply replacement of the main part of the equipment and installations.

## Vissan slaughterhouse

The slaughterhouse is located in Ho Chi Minh City and was completed in 1974.

The total capacity of the three pig slaughtering lines is 2,400 head per 6 hours shift or about 700,000 pigs per year per shift. Two shift operation is considered feasible from a practical point of view. Maximum capacity for the cattle line is quoted at 300 head in a 6 hours shift. The present capacity utilization is estimated at about 90 per cent for pig slaughter and 17 per cent for cattle.

The slaughtering lines are straight forward. The animals are stunned, debleded, hoisted to a rail and conveyed manually past the stations where the different tasks are completed to produce a clean carcass.

Apart from a scalding vat with associated dehairing unit for the pigs, there are no other mechanical facilities, Pig carcasses are not singid, but carefully scraped by hand. There are appropriate arrangements for veterinary inspection on the lines.

After weighing of the carcasses these are conveyed to the chilling department. The slaughtering premises are spatial with a modern appearance. The installations are mostly galvanized. The age of the plant is starting to show up from corrosion, wear and erosion of floor surfaces, damage by the moist environment in patches on the walls and ceiling, cable ladders etc.

Approximately 50 per cent of the daily slaughter is butchered in the meat cutting department, including special cuts according to specifications for export to the Soviet Union. The meat is marketed through the wholesale/retail shops in the major districts of the city. They are all provided with refrigeration facilities.

Seventy five carcasses, on average about 5-6 tonnes are frozen per day to maintain a constant revolving stock of 900 tonnes of frozen meat.

The blood is collected, boiled and sold for direct consumption. There is a small batch rendering unit for condemned carcasses but no treatment plant for serwerage. This is disposed of directly into the recipient.

A total of 7,000 pigs can be accommodated in the lairage designed for the pigs and an additional 3,000 if the premises for cattle are also used. Each pen is provided with troughs or watering and feeding.

The hygien programme at the slaughterhouse includes medical check-ups of all personnel twice a year including dental services.

The slaughtering area is cleaned using high pressure units after each shift and chlorine is used for the last rinsing. At the time of the visit a number of gutters and pipe connections were not properly clean and drains were blocked. Shortage of cleaning agencies makes it practically impossible to maintain the slaughterhouse in a perfectly clean condition.

The slaughterhouse is subject to periodic inspections by City Council veterinarians, and a committee representing health authorities, workers organization, fire-fighting authorities and the employees.

In addition, representatives of importing countries such as USSR, Hong Kong and Singapore also visit the plant for approval of the products for export.

### Supply of Animals

Pigs account for at least 80 per cent of total slaughtered quantities. In 1987 a total of 50,000 tonnes of live weight pigs were slaughtered or approximately 625,000 head, calculated on the basis of a registered average of 80 kg. Out of this total 100,000 slaughtering pigs were supplied from the outer districts of Ho Chi Minh City. In the past the majority of the pigs were of the local breed, the Bong Ba Xuyen breed. However, exotic breeds and crosses have increased from about 30 per cent of the total number a few years back to an estimated 40 per cent at present. Breeding programmes run by the Ministry of Agriculture and Food Industries can reportedly not satisfy the demand of improved breeding animals and some pig breeding programmes are being developed on a provincial level.

Slaughtering pigs are collected at buying points and subject to veterinary inspection prior to acceptance. This precaution results in few animals being rejected at the second inspection, upon arrival at the slaughterhouses and before killing. An estimated 0.5 per cent was quoted as an average figure for rejected number of animals. Out of the total of number of pigs received, 20 per cent are supplied from large scale production units, and 80 per cent from households. The household pigs frequently suffer from diseases and parasites.

Slaughtering pigs normally weigh 60-100 kg live weight with 80 kg as an average. Local breed pigs are smaller with generally fatter carcasses.

Cattle for slaughtering are supplied from the central parts of Viet Nam and also from the Mekong River Delta. Only about 15,000 head are slaughtered per year or 1,500 tonnes. By comparison the average carcass weight is very low. The small animals from the central parts weigh normally about 60 kg, cold dressed weight, while the Mekong Delta animals are more than twice that size, reportedly some 150 kg carcass weight.

The supply of slaughtering pigs is irregular with significant increase in number of pigs during January-February and also in March-April when the farmers are forced to sell their pigs to get money for planting a new crop. During this period it may be expected that a large number of pigs are not yet ready for slaughtering.

There appears to be a trend of reduced interest in rearing pigs for slaughtering. This is the result from poor feed, very unfavourable feed conversion rates, reportedly 5-7:1, and no correlation between cost of feed and price of slaughtering pigs.

The present cost of feed is Dong 400/kg, hence the feed cost per kg live weight is Dong 2,000-2,800. In addition, the feed to the breeding stock will have to be paid for through the slaughtering pigs. This amount may under prevailing conditions be estimated at some Dong 500/kg. The feed cost alone is Dong 2,500-3,300 per kg live weight while the current producers price is Dong 2,200/kg live weight.

In order to prevent possible future shortcoming in supply of slaughtering pigs there has been suggestions of initiating a Vissan pig breeding programme which would be based on modern concepts of pig production. This would imply the involvement of three breeds in the breeding scheme, contract supply of weaner pigs to pig producing farms, pigs which would subsequently be delivered to Vissan, based on contractual agreements. Stable and qualified supply of feed would have to be provided at a reasonable cost.

A package could be developed including veterinary services at predetermined costs, extension and credit facilities for the necessary investments in small efficient pigs units.

Demand for meat in the Ho Chi Minh City area is expected to increase during the 1990s and the Vissan Slaughterhouse may soon have to start operating on two shifts, at least periodically.

The strain on the slaughterhouse and associated facilities will increase. The physical state of the slaughterhouse is not alarming as yet, but actions should be taken very soon to repair and remedie what has been worn and degraded over the years.

## The swine rearing corporation

Slaughtering pigs to the Ho Chi Minh market are supplied to some extent from pig farming in the outer districts of the city.

The Swine Rearing Corporation under the Peoples Committee of the city is engaged in integrated pig production and feed processing.

### 1. Pig production

The Corporation operates 8 state (provincial) farms where commercial breeding stock is bred from crossing Yorkshire and Landrace and subsequently introducing a third breed, Duroc, to obtain commercial feeder pigs which are supplied to farmers for fattening on a contractual basis.

The average number of pigs born per sow per year is 15.6 out of which 13 are weaned at an average age of about 90 days when they weigh 20-25 kg. Feed conversion ratio is on an average of 5:1 for the fattening stock.

Average live weight at slaughter is 90 kg which most pigs reach when they are about 235 days old.

The future development, as envisaged by the management, is to concentrate the resources of the state farms to maintain a larger number of the three pure breeds, Yorkshire, Landrace and Duroc. A larger number of F<sub>1</sub> sows, first generation, would then be distributed to cooperatives and farms specialized in the production of F<sub>2</sub>, second generation, commercial feeder pigs. One alternative would be that the farmers sell all offsprings to pig fattening on the farms or that they have less number of sows and keep all progeny for fattening farm, integrated pig farming. Whatever system, the number of slaughtering pigs produced, under such a Swine Rearing Corporation coordinated pig production scheme, would be quite considerable.

Sale of slaughtering pigs to existing slaughterhouses is not considered profitable. It is thus the intention that the Swine Rearing Corporation invests in a slaughterhouse of its own.

Table 1:10 gives the total number of breeding sows on the different farms, type of stock produced and sales, which is either for slaughter or as feeder pigs. For the purpose of this calculation, it is assumed that the replacement rate is about 40 per cent and that there is no mortality after weaning.

The feed requirement for the fattening pigs amounts to 14,110 tonnes at present feed conversion rate. However, with a well balanced ration, the feed conversion rate should be about 3.5:1 or 4,233 tonnes less, sufficient to feed another 13,400 feeder pigs for slaughter.

Table 1:10  
Estimated Production per year

No. of Farms	Breeding Sows	Boars	TYPE	Estimated production per year		
				Weaners	Breeding	Sale
1	300	100	PURE	3,900	400	3,500
2	600	25	F <sub>1</sub>	7,800	1,000	6,800
5	2,400		F <sub>2</sub>	31,200	-	31,200
	----- 3,300					----- 41,500

The breeding programme which is used complies with what is common practice in successful operations elsewhere in the world. However, the number of weaned pigs per year is low by comparison. This is likely to be the result from using feed of inferior quality. In fact, the quality of the feed is not really known but it is confirmed by the management that feed supply is a major constraint.

Assuming that the number of pigs per sow is increased by 3 per year, there would be an additional 10,000 pigs per year for slaughtering. This is quite realistic if quality feed is supplied, given that the overall management is up to standard.

#### Feed processing

The Swine Rearing Corporation operates three feed mills with a total capacity of 100,000 tonnes per year, based on three shifts per day. At present, only 50,000 tonnes per year are processed as a result of insufficient supply of feed ingredients.

The equipment in the plants are of simple design, in a poor state of repair and the performance is not sufficient for the production of quality formula feeds of even composition.

There are no laboratory facilities which can be used to analyze ingredients as a basis for formulation of the feed and to control the final products also for the purpose of monitoring the process.

Rice bran and dried trash fish are used as the major ingredients in the feed. Ground sea shells are added to provide calcium. Apart from this, the mineral supplementation is erratic or non-existent.

There were comparatively large stocks of dried fish in bags. The appearance of the product and the odor could not be associated with acceptable quality of raw material for feed processing.



The feed supplied from the Corporation's feed mills is obviously one major reason for the low standard of performance at the pig enterprise farms and at co-operative and peasant farm levels during the fattening period.

Rehabilitation of the feed processing industry should be given priority. The upgrading of existing facilities is not a realistic approach and the rehabilitation of the industry should include investments in new installations of medium current technology as far as automation is concerned.

The rehabilitation efforts should also focus very strongly on the supply of ingredients with respect both to availability and quality.

## The Southern Pesticide Company, HCMC

The Southern Pesticide Company is the largest of the 10 formulation/mixing plants in Viet Nam. Its designed capacity is 30,000 t/year, which constitutes 75 per cent of the total national capacity which is 40,000 t/year. The Company is responsible for technical assistance to the other mixing companies. In 1988, the actual production was estimated at 8,000 tonnes or 27 per cent of designed capacity. The production is divided between three factories, all located in Ho Chi Minh City area.

<u>Factory</u>	<u>Products</u>	<u>Actual Production/year</u>
1	Granular	6,000 tonnes
2	solution & emulsifiable concentrates	1,500 tonnes
3	dust and wettable powder	500 tonnes

At factory one, the Binh Trieu Plant, the total number of employees is 200 workers and 20 professionals. The granules are produced using the sticking or coating methods.

Simple technology and equipment are used. The quality control is far from satisfactory. There seems to be no rules and regulations for the safety of the workers for the handling and disposal of waste.

The Southern Pesticide Company employs 1,000 people, 40 of which has an engineering degree. Some of them are working at the Research and Production Centre which has a total staff of 30 people. The centre gives technical management assistance to the plants concerning production technology, quality control and safety problem. The centre is also engaged in research on local raw material with the view of finding substitute for imported ingredients. At the moment, the centre is producing small quantities of a dual purpose agent for treatment of paddy seed or, spraying of the plants about ten days after planting.

In general, the equipment at the centre are outdated and basic documentation manuals and handbooks for the production formulation dates back to the 1950s to early 1970s. The centre receives no technical information or research document or scientific information from anywhere. They operate in complete isolation from the outside world.

The centre has three research farms for testing of pesticides for coffee, rice and pepper, respectively.

Overall control of the company is done by the Ho Chi Minh City branch of General Department for Standardization, Metrology and Quality Control under the State Committee for Science and Technology.

The future plans include the increase of actual production to 30,000 t/year by 1995, increase and develop the Research centre to cope with problems already mentioned above, and to increase the research aiming at producing active ingredients for the mixing of pesticides using local raw materials.

## Union of Co-operatives of Small industries and handicraft, HCMC

The small industry and handicraft sector in Ho Chi Minh City, organized by the Union of Cooperatives of Small Industries and Handicraft, represent 17 different professions. There are 700 co-operatives and 3,100 production groups. In addition, individuals are also members directly when engaged in family handicraft or cottage industry. The largest branches represented among the 17 different professions are Union of Co-operative of:

- i) bamboo, rattan and palm leaf small industries
- ii) lacquer ware and art articles
- iii) carpets, embroidery, garments and leather products
- iv) reed and coconut fibre products.

They all use materials mainly from agriculture, forestry and fishery and a large portion of the final products are exported. For the bamboo, rattan and palm leaf small industries, for instance, this is arranged by the Viet Nam National Bamboo and Rattan Export-Import Corporation (BAROTEX) which is a State Organization specializing in these types of products.

The small industry and handicrafts engage about 200,000 people in production with more than 50,000 in the bamboo, rattan and palm leaf branch.

In 1987, the total value from all branches was 17 billion Dong and the export amounted to about US\$ 35 million. Out of this, US\$ 8 million came from the bamboo, rattan, palm leaf branch, US\$ 3 million from each of lacquer ware, art articles and carpets, embroidery, garments, leather products branches and finally, US\$ 1 million from the reed and coconut fibre products.

For 1988, the total export of bamboo, rattan and palm leaf products is expected to increase to the order of US\$ 8 million with about 50 per cent from bamboo products.

The Union of Small Industries and Handicrafts coordinates and assists in marketing. It also collects and administers three funds viz, (i) fund for development of products, (ii) welfare fund, and (iii) bonus fund.

Artistic designs, which are in demand on the market, may be bought by the Union for duplication in other small industries. In such a case, the designer receives also a bonus of 0.25-0.3 per cent of the value of the product, or item, sold during one year.

In general, the profession and skill is transferred from generation to generation within a family. Apprentices are also engaged in the co-operatives or production units for on-the-job training and the Union arranges courses from time to time.

Future production of handicraft items will focus on mass production to avoid increase in prices. New designs and techniques will be introduced. At the moment, the small scale industry is using true handicraft methods and simple machines.

The introduction of better equipment and systems will have a positive effect on output hence, improve the income to the co-operative and ultimately to the individual. These changes should be made without affecting the workmanship adversely but rather contribute to better working conditions in addition to productivity. Nevertheless, efforts should be exercised to further promote fine art and workmanship, as demonstrated in, e.g., lacquer works, to ensure future unique, very high standard products which are likely to be attractive in a longer perspective.

## Machinery and equipment

Agricultural machinery, equipment and tools are manufactured by state enterprises under the Ministry of Engineering and Metallurgy but also by Provincial State enterprises in at the most, 20 out of 40 provinces in Viet Nam. The manufacturing is not monitored on a national level and detailed information on manufacturing capacity of agricultural machinery is not available.

Research and development is focused on the following:

- (i) a 50 hp four wheel tractor model
- (ii) small diesel engines
- (iii) mini hydro-electric power units
- (iv) equipment for extraction of vegetable oil from oil bearing seeds
- (v) pumps for industrial uses and irrigation
- (vi) manual tools.

The progress appears to be slow due to financial constraints and lack of documentation.

Machinery and equipment manufactured by state enterprises are as follows:

- (a) 2-wheel 12 hp tractors and the necessary implements and trailers; a total of 2,500 tractors were manufactured in 1987
- (b) Pumps, 800 m<sup>3</sup>/h; 10 units are manufactured per year.
- (c) Dredging equipment with pumps.
- (d) Knapsack sprayers, capacity about 150,000 units/year.
- (e) Small capacity threshing machines.
- (f) Carts for draft animals.
- (g) Cleaning machines for paddy rice; they are designed with oscillating screens and air and made in two models. A large one with an input capacity of 2 tonnes per hour, motor-powered and intended for co-operatives and small hand-operated cleaner for use on the farms. Both types are made in different factories in Viet Nam at a rate of a few dozen large ones per year. Some 10,000 small cleaners are believed to be manufactured per year, mostly in the south.
- (h) Rice driers with capacities from 0.5 to 5.0 tonnes per hour. The air is heated by rice husks, coal or fuel oil. The total manufactured drying capacity per year is of the order of 30-40 tonnes per hour and these units are reportedly only used for drying of paddy rice for export to ensure a high quality product.

- (i) Rice mills are made by enterprises under the Ministry of Engineering and Metallurgy at a rate of 5-10 units per year with a capacity of 15 tonnes per 8 hours. Mills with 5 tonnes capacity are also produced. At present, about ten 15-ton units and twelve 5-ton units are in operation. The national capacity for manufacturing rice mills is reportedly 1,000 to 2,000 units per year. This information probably indicates the order of magnitude rather than absolute figures. It is reasonable to assume, however, that a certain number of these mills have a lower capacity, probably less than 1 ton per day.
- (j) Oil crushers for oil-bearing seeds. These are hand operated and capable for extracting vegetable oil from 50-60 kg of seed per hour. So far about 10 units have been manufactured.
- (k) Sugar cane processing plants for extraction of the sugar and evaporation of the syrup. The plants are designed for 50 or 100 tonnes of sugar cane per 24 hours. A few hundred of the smaller units are reportedly in operation but only five 100-ton plants. For a larger plant, imported components amount to about US\$ 100,000, or 10 per cent of total investment.
- (l) Coffee processing machinery for shelling, drying and roasting are manufactured domestically but classifiers are imported from the Federal Republic of Germany. The Ministry of Engineering and Metallurgy is responsible for collection of the required equipment from different manufacturing enterprises, whereas the assembly of the plants is supervised by the Union of Enterprises for Coffee under the Ministry of Agriculture and Food Industries. Up till now, the manufacturing capacity of processing equipment has been sufficient and the engineering aspects managed through a joint venture agreement with the German Democratic Republic. In the future, when coffee production is increased, the manufacturing capability for this type of machinery will have to be strengthened.
- (m) Only some components in the tea processing plants are made in Viet Nam while major equipment are imported from the USSR and more recently some from India. Spare parts, however, are manufactured locally in sufficient quantities.

In addition to the joint venture agreement with the Democratic Republic of Germany for coffee processing equipment, Viet Nam has cooperation with Eastern European countries also with respect to tea and sugar cane processing facilities. In order to benefit from the experience gained in countries engaged in coffee, tea and sugar cane processing, technical assistance may be requested from UNIDO.

### Phu Lam Export Furniture Manufacturer

Phu Lam Export Furniture Manufacturer is under the jurisdiction of the Union of Wood processing industries area No.1 covering Ho Chi Minh City. The production is divided between three factories, all located in Ho Chi Minh City. A total of 1,200 workers are employed in the 20 workshops. In 1987 the total export of furniture to six countries amounted to US\$ 4 million accounting for half the manufactured volume. These three factories require 2,800 m<sup>3</sup> of logs per year for its production. However, wood is not available in sufficient quantities, reportedly due to transport problems from the forest areas and apparently also difficulties at the saw mills. If these problems were solved the possibilities for export is quite bright.

The company is rated as one of the better ones in Vietnam, and still the machinery and the production concept is in need of rehabilitation. The safety for the workers using the machines is also far from satisfactory. The accuracy of the equipment is not up to normal standard, which is evident from the finished product. Existing machines are not used optimal. The reason for this may be that large quantities of semi-finished component are stacked almost every where making any transfer of elements from one place to another rather difficult. It would also disturb the general flow of material. Nevertheless, modifications should be considered in a future rehabilitation process.

The quality control on all levels of production should be improved in a programme to promote overall finish of the products. The workers appear to be well trained and highly motivated, and can easily adjust themselves to new technology and a higher standard of quality control. If these minimum changes in combination with qualified product development and design is done, the preconditions for increased export of furniture will be improved.

## Central Union's of Co-operative of Small Industry and Handicraft

The Union was formed in 1961 and is today developed to an organization with more than 2 million members. The Union is the apex organization for 5,944 co-operatives with an estimated 600,000 members, 40,000 production groups with 300,000 members, 600,000 private workers and the rest 500,000 in agricultural cooperatives. Two thirds work in collectives. The name of the Union has recently been changed to "Central Council of Cooperatives and Non-Governmental Organizations" (CCNGO) to better reflect the mandate of the organization and its importance in the development efforts of Viet Nam.

The Central Council is located in Hanoi. Its main functions is to maintain contacts with the Government, arrange training of members both in Viet Nam and abroad and provide assistance in general to provincial unions. In each province there is a provincial union responsible for matters of technical and practical nature such as assistance to purchase raw material, marketing and export in addition to technical assistance.

The new policy gives the individual co-operative the possibility to deal directly with central import-export organizations to reduce the bureaucratic procedures.

At present the total output is about 60 billion Dong accounting for 43 per cent of the total industrial output and 60 per cent of all consumer goods produced in Viet Nam. Thus, the members of the former Union contributes a significant share of products and items both for local consumption and for export. Total export value for 1988 is expected to be 140 million rubles/US\$ which accounts for around 18 per cent of total export from Viet Nam. Handicraft export include primarily bamboo and rattan products, lacquer wares, carpets, garments, leather wares and coconut fibre articles.

The new directives for CCNGO, lately formulated by the Government, includes the task of creating 400,000 new jobs every year up to year 2000. In the past five years the Union has managed to create around 200,000 new jobs per year.

With the new policy CCNGO predicts to increase its total production to 74 billion Dong by 1990, 140 billion Dong by 1995, 240 billion Dong by year 2000, and 320 billion Dong by 2005, all in fixed prices. In the long term plan it is envisaged that the export will be as follows: 160 million rubles/US\$ by 1990, 320 million rubles/US\$ by 1995 and 800 million rubles/US\$ by year 2000.

For national economic and employment points of view the cooperatives are of great importance as the figures above clearly indicate. Of equal importance are the new opportunities to exploit so far dormant entrepreneurship, often out in rural and remote areas, where there are few other job alternatives. Most of the co-operatives are running economically well, despite small problems with supply of raw material etc. By comparison the co-operative members have an income generally well above what other workers in the same area are getting. In most co-operatives there is a good spirit and the members are hard working.



There is no doubt that the co-operatives and the rest of the non-governmental section will be a very important partner for the Government in its efforts to develop the country. This is especially important in the rural areas where the co-operatives are doing most for the production of consumer goods, processing of food, creating job opportunities, and at the same time generating about 20 per cent of Viet Nam's total export.

## APPENDIX 2

Total production of main crops(except paddy)  
(1000 tonnes)

Type of crop	Actual production		Projection	
	1985	1995	2005	
Maize	587	1,450	2,400	
Potatoes	189	960	1,400	
Sweet potatoes	1,778	2,800	5,000	
Manioc	2,940	3,500	4,000	
Vegetables	2,605	6,000	8,000	
Bean of various types	82	215	340	
Soya beans	79	225	350	
Peanuts	202	430	640	
Sugar cane	5,560	13,800	23,000	
Tobacco	38	44	80	
Jute	47	113	200	
Tea	127	280	600	
Coffee	12	10	12	
Rubber	48	144	410	
Coconut	612	600	600	
Bananas	1,250	2,000	2,000	
Pineapple	363	720	1,080	
Orange and Lemon	111	176	300	
<u>Livestock</u>				
Cattle (1000 heads)	5,188	7,750	10,250	
Pigs (1000 heads)	11,807	16,100	20,300	
Poultry (million)	92	175	245	
Meat production (unslaughtered 1000 tonnes)	748.6	1,308	1,845	
eggs (million)	1,472	4,200	7,000	

Source: Ministry of Agriculture and Food Industries