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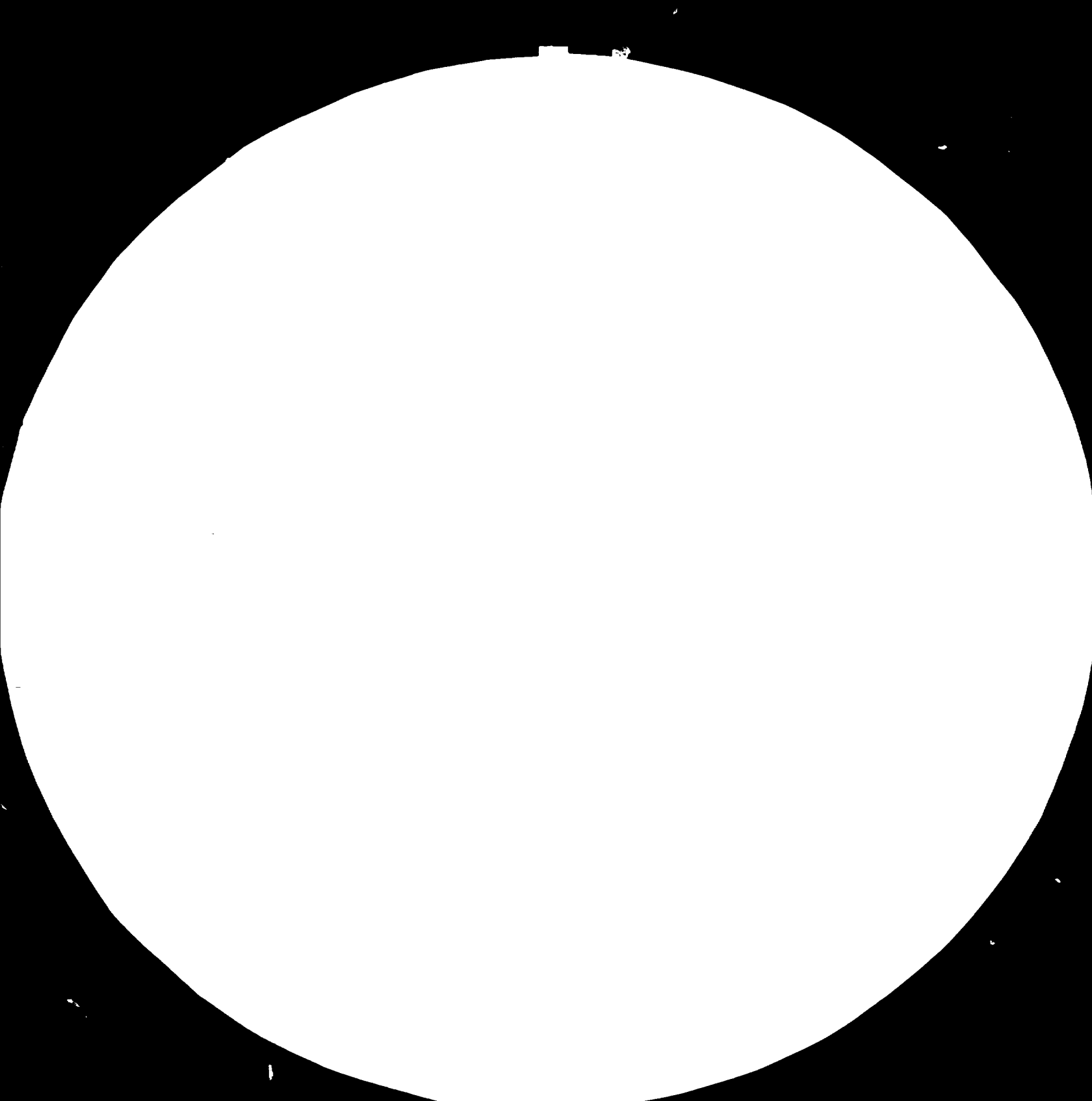

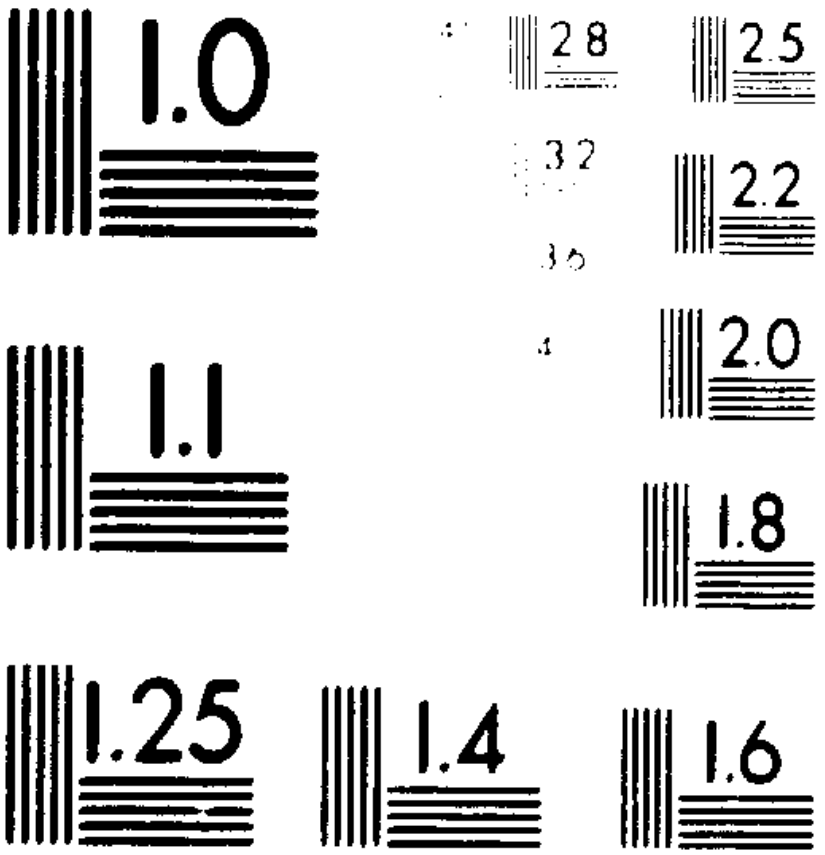

Comprehensive Investment Profiles in Selected Regions

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West Sumatra

COMPREHENSIVE INVESTMENT PROFILES

A Report Prepared for
Badan Koordinasi Penanaman Modal
and United Nations Industrial Development Organization

Institute for Regional Economic Research
DEPARTMENT OF ECONOMICS ANDALAS UNIVERSITY
Padang 1984

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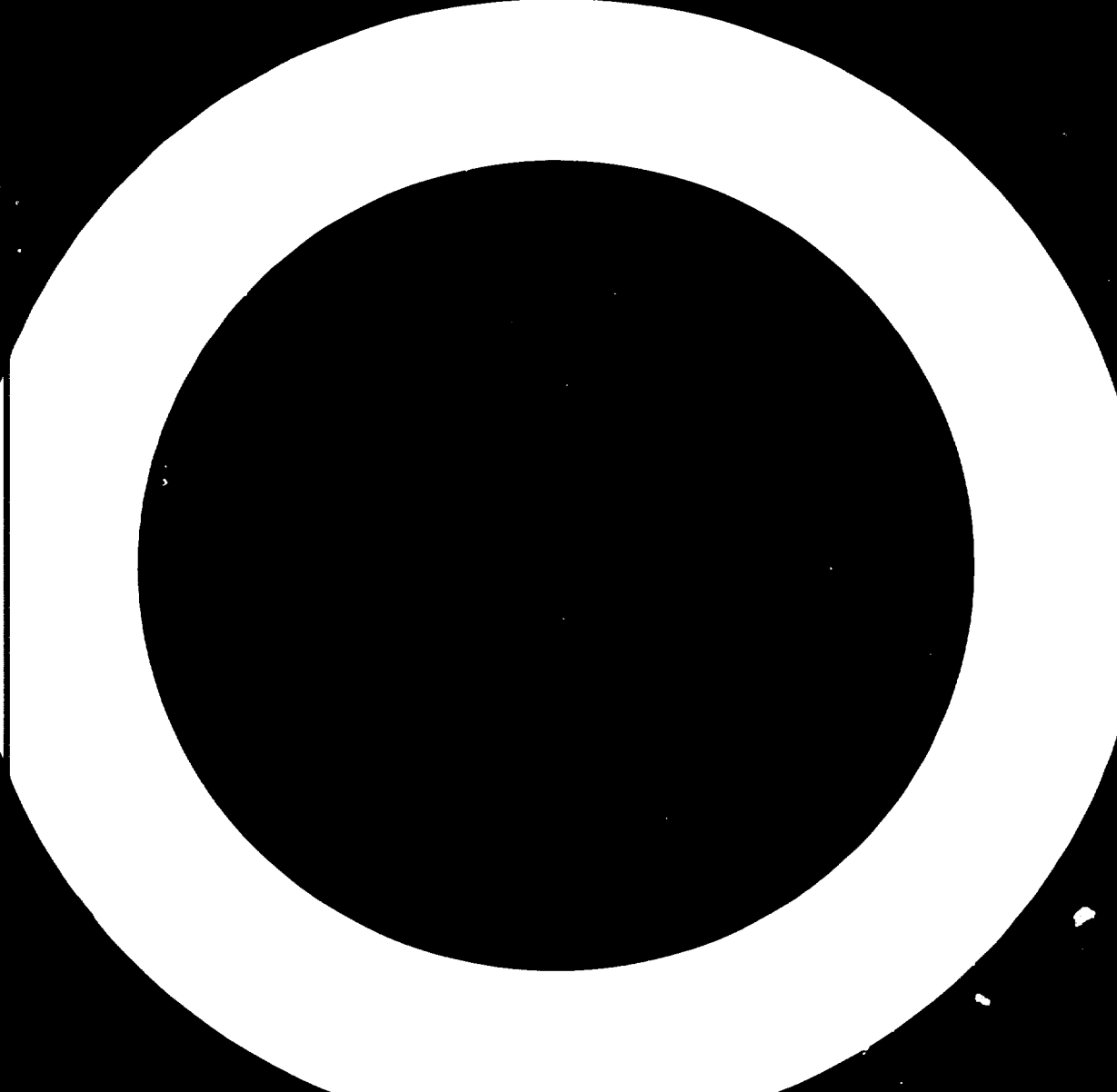
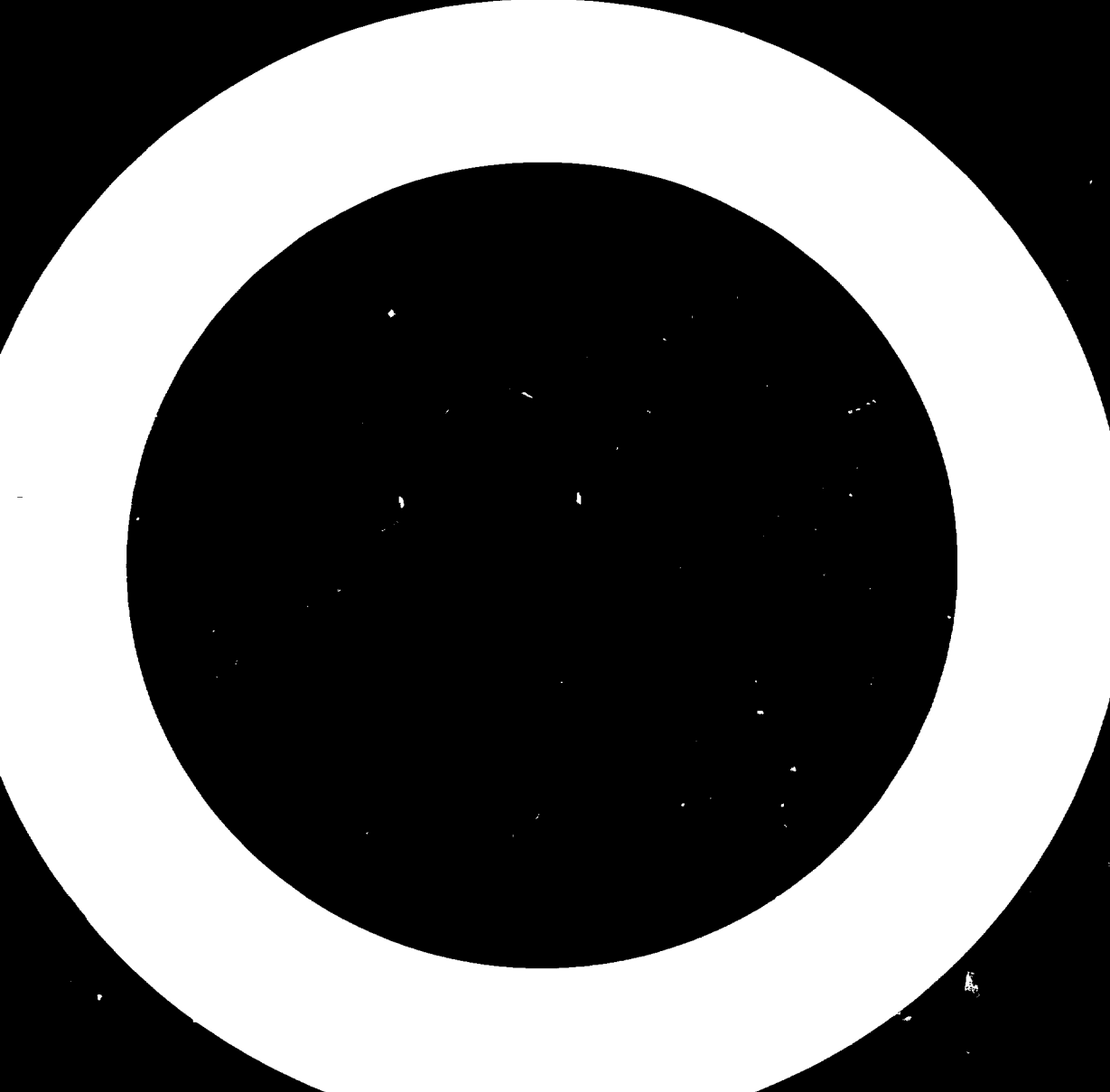
West Sumatra

COMPREHENSIVE INVESTMENT PROFILES



Part I

CONCLUSIONS AND RECOMMENDATION



Chapter 1

PROMOTING PRIVATE INVESTMENT : CONCLUSIONS AND RECOMMENDATIONS

UNLIKE the previous plans,the Fourth Five-Year Development Plan of Indonesia, 1984/85-1988/89 -- or Repelita IV -- gives a bigger role to the private investment. The planned private investment was estimated to be around 54 per cent of the total investment in Repelita IV, compared with 46 per cent in Repelita III. Although the role of private investment increased rapidly, but compared to other ASEAN countries was considered to be low. The Fourth Malaysia Plan (1981-1985) expected the private investment to participate around 69 per cent, while the Fifth Thailand's Plan (1982-1986) and the Philippines' plan (1978-1982) estimated about 74 per cent and 78 per cent respectively.

The low level of private investment became more acute due to the unequal regional distribution of the investment. Over the period of 1968-1983, about 59 per cent of private domestic investment were located in Java. In the meantime, the private foreign investment preferred also to invest in Java than the other islands.

West Sumatra is one of the provinces which has been lagged behind in attracting the private investment. The growth of the private investment seems to be too low. In the last seventeen years, the total private domestic investment was about 1.6 per cent, while the total private foreign investment achieved only 0.8 per cent, of the total respective investment in Indonesia.

This Chapter will discussed the major findings, conclusions, and recommendations of promoting private investment in West Sumatra. The discussions began with the macro-econmic development of the province followed by the identifications of the agro-industrial and manufacturing projects to be developed in West Sumatra.

The Economic Development of West Sumatra

With a weak private sector, West Sumatra developed rapidly due to the massive government investment in the last eighteen years -- 1966-1983. The existing previous neglected production sectors have bing activated due to the improved infrastructureal networks, and optimazing the use of water resources for electicity. Total investment was estimated to be 16.4 per cent of the Gross Regional Domestic Product of West Sumatra in 1983.

The economic growth of West Sumatra depended upon four main sectors, i.e., agriculture, manufacturing, trade and transportation & communication. These four sectors became the primary sources of growth for the West Sumatra's economy -- contributed more than 85 per cent of the growth in the last ten years. It is expected that these sectors will remain as the leading sectors to the projected growth rate of 6.3 per cent over the period of 1983-1990. The economic growth of West Sumatra in the last eighteen years (1966-1983) was 6.7 per cent per annum.

In the efforts to achieve the projected growth of West Sumatra, two actions will be taken. First, the enlargement of the small scale agricultural resource base either on the existing or introducing new commodities. Second, improving the road and transportation networks to the neighbouring areas .

By attacking these two fronts, export will be expected to increase at the rate of 15 per cent per annum over the period of 1983-1990. The exports of West Sumatra will depend upon four main commodities -- rubber, plywood, cassia vera , and coffee. These four commudities will be expected to contribute to more than 80 per cent of the total export value in 1990.

With the increasing rate of development efforts, import has already exceeded export after 1980 -- and expected to continue to year 1989. The balance of international trade will turn to surplus again in 1990.

The projected total investment requirements over the period of 1984/85 to 1990/91 are Rp 3,162.1 billions or approximately US $ 3,162.1 million (US$ 1 = Rp 1,000). The private sectors are expected to invest about 55 per cent of the total investment in the next seven years.

The expected population growth to the year 1990 will not much differed compared with the seventies -- 2.21 per cent per annum -- which seems to the higher than the projected national growth of 2.0 per cent in 1988. One of the main reason is the reducing outmigration rate to the year 1990. With this assumption, the total population of West Sumatra in 1990 will be 4.2 million -- which has an increase of 0.6 million compared to 1983.

With the projected population growth of 2.21 per cent per annum, the real per capita income of West Sumatra is expected to grow at the rate of 4.1 per cent per annum. If calculated on the basis of current prices, the per capita income will be double in the next seven years -- from Rp 261,019 to Rp 570,611 over the period of 1983-1990.

Development in the 1980s: Some Problems

With the slow economic recovery of the industrial countries, the main problem of the Indonesian economy will be on a limited financial recources to finance the projected investment in Repelita IV. This reflected in a lower projected growth rate of 5 per cent per annum over the period of 1984-1988 . This development has a direct impact on the regions, including West Sumatra.

With a narrowing national financial resources, West Sumatra will face a serious problems in financing her development. Out of the total estimated investment in Repelita III, almost 80 per cent of financial sources came out of West Sumatra -- particularly from the national budget in the form of the sectoral projects. The role of the internal financial resources seems to be insignificants including the internal private fi-

nancial resources. It is not surprising, however, that attracting the private investors to invest in West Sumatra become the crucial element in realizing the projected growth rate of 6.3 per cent to the year 1990.

The provincial government budget depended heavily upon the central government subsidies and aid. The provincial government saving -- total revenue minus routine expenditures -- seems to be nonexistence. Almost 95 per cent of the routine budget was financed by the central government subsidies.

The massive government investment in the last three Repelitas have achieved a minimum requirement for launching a more rapid increase in the private sectors. The government investment were oriented toward providing basic infrastructural services while the private entrepreneurs on increasing the production sectors. The exploitation of the existing productive capacity should be supplemented with a new expansions of the available resources.

Due to the lacks of running capitals, a large part of the existing agro-industrial projects in West Sumatra were operated below the maximum operating capacities. The resource base of West Sumatra economy seems to be limited to few large-scale operations while most of the industries operated on the medium and small-scale units.

The operations of the large-scale units, to a certain extent, will face the problems of manpower requirements. The West Sumatra labour force grew at the rate of 2.17 per cent per annum over the period of 1971-1980 while the employment growth rate was 2.31 per cent per annum. It was not surprising the open unemployment rate was decreasing from 2.28 per cent to 1.09 per cent. The West Sumatra unemployment rate was lower compared to the other provinces. The "achievements" could be explained in terms of two interrelated factors: the increasing employment absortive capacity and the high outmigration rate.

The Minangkabau laour force tended to avoide the manual works. The unskilled labour tended to work in the self-employed activities while the skilled labour preferred the white collar job. The implications were quite clear. About one-fifth of the employment activities were in the modern formal sector while the rests in the traditional informal small-scale activities . The implementation of the large-scale development activities have to import the labour force from Java. The unbalanced employment situation will be expected to continue in the future.

Selected Projects Identification: Preliminary Results

The study identified at least 29 projects to be developed by the private sectors to the year 1990, and 10 of the existing projects have to be operated optimally. The main focus of the projects identification were limited to three main industries -- agro-industries, manufacturing, and basic needs.

(A) AGRO-INDUSTRIES

The agro-industrial projects identified were consisted of seven group of industries including the agricultural related industries and support facilities.

(1) Food-Crops Based Industries.
(2) Plantation Based Industries.
(3) Forest Based Industries.
(4) Livestock Based Industries.
(5) Fishery Based Industries.
(6) Agricultural Related Industries.
(7) Agricultural Support Facilities.

The identifications were based on the existing and projected gap between the maximum operating capacities and the supply of raw materials or demand.

(1) Food-Crops Based Industries

The food-crops mostly consumed hardly with any processing activities. If the process has to be made, the technology seems to be simple. Rice, as the main food-crops production, were characterized by the seasonal variations with the consequences that seasonal underutilization of the paddy-rice processing plants could not be avoided.

The non-rice based industries have to be developed as the integrated part of the food-crops plantation such as cassava, chili (red pepper), maize and peanuts.

Rice Processing Plants

On the basis of the production flows, the existing rice processing plants seems to be sufficient in handling the projected increasing paddy production to the year 1990. However, re-allocation of the existing rice processing plants is necessary in order to optimize the utilization of the plants.

A large part of the rice processing plants plants consisted of the small scale units scattered throughout the province. The rice-machinery-mills (RMM) gradually replaced the local technology ricewater-mills. The seasonal utilization rate of the existing RMM has come to more than 80 per cent, howver, the average utilization rate was less than 50 per cent.

New investments in the rice processing plants are not to recommended.

Non-Rice Processing Plants

The non-rice processing plants usually operated on the small-scale household activities which tended to be oriented toward labour intensive rather than capital intensive technology. Nevertheles, efforts have being made to process the cassava on an intergrated industrial plant and plantation. New investments in the cassava-based industries are promising due to the suitable land for the cassama plantation.

The other food-crops-based industries such as chili plants and cake & bake industries (using maize & peanuts as the raw-materials) seems to be promising on the small scala units.

(2) Plantation-Crops Based Industries

The utilizations rate of the five surveyed plantation-crops based industries -- crumb-rubber, coconut oil, soap, coffee powder, and tea -- were still below the maximum operating capacities. Except one out of the five industries (soap) could be expanded by new investments. However, the period of operating the new investments will be differed from one industry to the others.

Crumb Rubber Industries

The present utilization rate was 69 per cent. The maximum operating capacities of the seven crumb-rubber industries (58,000 ton) will be achieved in 1987 while the projected export of crumb rubber still increasing. The new investment could be made after 1987, at least, with the new additional total capacity of 10,000 ton crumb rubber per year in 1990.

Coconut Oil Industries

The small-scale coconut oil industries seems to be less efficient and the utilization rates were lower compared to the medium-scale plants. The total maximum production capacities were 20,012 ton. Almost half of the 50 per cent utilization rates of the coconut oil industries were produced by 41 small-scale coconut oil plants in kabupaten Padang Pariaman compared to the 4 medium-scale plants in Padang.

The maximum operating capacities will be achieved in 1987. The new medium-scale coconut industries in addition to the expansion or enlarging the small-scale plants could be made after 1987. The production of copra support the investment opportunities in the coconut oil industries.

Soap Industries

Soap industries were integrated in the coconut oil industrial activities. However, only two soap industries emerged

from the four medium-scale coconut oil industries. The production were limited to the low-grade washing soaps with the total maximum operating capacities of 10,400 ton per year. The underutilization capacities were very high -- almost 76 per cent. With the projected demand for washing soap in 1990 about 6,048 ton, the soap industries will still operate below the existing capacities.

No new investment could be made on producing the low-grade washing soap.

Roasted Coffee Industries

The prospects for investment in the roasted coffee industries seems to be promising. A large part of the production of coffee in West Sumatra -- in addition from Kerinci -- were exported without any processing activities. The local demand for roasted coffee was met about 51 per cent from the local production. Although the present small-scale roasted coffee industries were operated under maximum operating capacities, but with a higher quality of coffee produced, the utilization rate could be increased.

Tea Industry

Tea industry should be integrated with the tea plantation. The only tea plantation operating actively in West Sumatra has the maximum capacity of producing about 300 ton of tea per year. But due to the lack of operating capital, and maintenance of the tea plantation, the industry produced only 64 ton of tea in 1983 or about 22 per cent of the maximum capacity. In the meantime, demand for tea was estimated to be around 2,610 ton per year. The gap was covered by importing tea from other provinces.

With an intensive investment in the tea plantation and tea industries, the prospects for tea is promising.

(3) Forest-Based Industries

The forest-based industries in West Sumatra were consisted of the sawn-wood and plywood industries. With the prohibition of exporting logs the prospects for investment in the plywood industries are promising in West Sumatra. The logs produced are quite sufficient either for producing sawn-wood or plywood for export.

Sawn-Wood Industries

The total maximum operating capacities of the ten large-scale sawn-wood industries were 286,500 m^3 per year. However, the present utilization rates of these industries were estimated to be around 29 per cent. Since the production of sawn-wood were destined for export, the demand for sawn-wood seems to be less than logs. It has been estimated that the demand in 1990 is still less than the maximum operating capacities. Than the strategy for sawn-wood industries should be changed to the domestic markets. Howver, the changing strategy could hamper the small-scale sawn-wood industries which have been operating for the local markets. New investments in the sawn industries seems not to be brightened.

Plywood Industries

The only plywood industry in West Sumatra has been operated near maximum operating capacity of 47,000 m3 per year. Estimated demand for plywood is still increasing and reached about 129,036 m3 in 1990. By considering the present maximum capacity of the plywood industry, two new industries with the average capacity of the present industry could be established in the near future.

(4) Livestocks-Based Industries

The annual per capita consumption of meat in West Sumatra was still below the minimum requirement of 8.2 kg per year. The prospects for investment in the livestocks-based industries

have a wide range of opportunities -- from the livetocks and poultry farming to the shoe industries. It has been identified that some investment possibilities could be made also in the egg-powder industries, leather tarning industries and improved chicken breeding plants.

(5) Fishery-Based Industries

Fishery-based industries could not be made without any increase at the present rate of fish production except such activities as cold storage and transportation fasilities. The first effort in increasing the fish production will be motorizing the fishermen's boat in the near future.

(6) Agricultural Related Industries

In addition to the direct agroindustrial investment possibilities, some efforts were also made on exploring the investment possibilities in the agricultural related industries. Out of the five surveyed agricultural related industries -- tractors, thresher, hoes, chicken feed, and fertilizer packaging -- only two have the potential for new invesment, i.e., tractor industry and chicken feed plants.

Tractor Industries

The sawah preparation hand tractor industries seems to be promising to be produced, or at least assembled, in West Sumatra. The needs for hand tractors in 1983 were estimated to be 1,929 units while the available tractors were 106 units, or 5.5 per cent of the tractor needs. In the meantime, the projected needs for hand tractors will be 2,050 units by considering the projected paddy harvesting areas of 329,741 ha in 1990.

Thresher Industries

The total demand for threshers in 1983 was estimated to be 369 units while the total maximum production capacity of the

thresher industries was 827 units. The projected demand in 1990 will still below the maximum production capacity. Judging on the excess capacity of thresher industries, the investment opportunities seems to be unfavourable.

Hoe Industries

The maximum production capacities of the existing hoe industries up to the year 1990 will still have an excess production compared to the projected demand for hoes. By utilizing the present maximum capacities of 186,554 units, the demand in 1990 is estimated to be around 168,656 units. The conclusion seems to be quite clear: no new investment could be made in the hoe industries.

Chicken Feed Industries

With the 18 per cent annual growth rate of chicken population to the year 1990, the prospects for the chicken feed industries are promising. By assumsing the increased proportion of the consumption of industrial chicken feed -- compared to the traditional chicken feed -- the consumption is still below the feed requirements. The present maximum capacity of 20,828 ton of the 28 chicken feed industries could be met by the projected demand around 1986. On the basis of this calculation, the new investment in the chicken feed industries could be made after 1986.

Fertilizer Packaging Industries

The present available fertilizer packaging industry is West Sumatra has the maximum packaging capacity of 150,000 ton per year. However, the demand for fertilizer is estimated to be around 106,058 ton in 1990. In the next seven years, the present capacity could handle the increasing demand for fertilizer up to the year 1990. No new investment is expected in the future.

(7) Agricultural Support Facilities

The agricultural support facilities consisted of:

(a) Agricultural Research Institutes.
(b) Agricultural Schools.
(c) Slaughter Houses.
(d) Fish Marketing Facilities.

The agricultural support facilities in terms of research and education seems to be sufficient. Optimalizing the uses of these facilities should be made in the future. The four research institutes oriented toward agricultural activities are (1) Animal-Disease Research Institute, (2) Food-Crops Research Institute, (3) Agro-industrial Research Institute, and (4) Soil Science Research Institute.

In addition to the agricultural research institutes, agricultural education from the middle to the higher level have been established in West Sumatra such as the Agricultural High Schools, Animal Science High Schools, Agricultural-Industrial Technology High School, Faculty of Agriculture, Faculty of Animal Husbandry, Faculty of Fishery, and the Institute of Agricultural Training.

The other aspect of the agricultural support facilities are connected with the agricultural service activities, such as the slaughter houses and fish marketing facilities. The facilities of the six slaughter houses seems not to be suffcient in handling the slaughtering activities. Expansion of the existing slaughter houses are necessary. The same situation applied to the fish marketing facilities, particularly, the fishing landing ports.

(B) MANUFACTURING

The manufacturing projects identification cover a general trends and prospects of industrial development and focussed later on the metal working industries.

(1) Industrial Development

Out of the seven industrial groups surveyed in the study, three industries projected to grow at the rate of more than 10 per cent per annum up to the year 1990, i.e., food, drinks, & tobacco; chemical industries; non-metal mineral industries and metal products & machinery. Except the chemical industries, these industries have the larger employment absortive capacity as well, in addition to the textile & leather and wood-based industries.

On the macro-economic framework, these industries have the potential to be develop in the future.

(2) Metal Working Industries

The investment needs in the metal repair industries seems to be felt more than the metal processing industries, based on the calculation of the excess demand up to the year 1990 . Almost 43 per cent of the total 106 new projected metal repair industries in 1990 consisted of the car repair industries. The other promising metal repair industries are motor cycle repair, welding shop, car body repair and ship repair.

The highest excess demand projected in the metal working industries is in the metal roof industry -- almost equal to the present full capacity of the metal roof industry in 1983. The new investment in the metal roof industry could be made either in doubling the present capacity or adding a new industry with the same capacity. The other promosing industries are metal construction, black-smithery, metal furniture, kitchen tools and empy can industries.

(C) BASIC NEEDS

The basic needs of West Sumatra -- nutritional requirements, housing, clothing, potable water & health, and education & training -- were in a better position compared to most

of other provinces. The number of population below the poverty line in 1983 were estimated to be 22 per cent and projected to decline to 14 per cent in 1988[1/].

The average per capita calories and protein intake per day were already surpassed the minimum requirements of 1,900 calories and 40 gram protein. However, the distributional aspect presented almost 45.3 per cent of the population below the minimum requirements of the per capita calories and protein intake per day in 1976. The projected intakes shows an increasing trends and the results are shown in the decreasing number of population below the minimum requirements.

The housing needs were still below the housing availabilities in 1980 and projected an increasing gap to the year 1990. The needs for housing in 1990 are estimated to be around 39,105 units while the projected availability are 22,468 units. The projected housing availabilities are limited by the growth and income level of the population.

The per capita consumption of textile in West Sumatra was estimated to be 8.43 m per year and projected to increase to 10.93 m in 1990. The needs for textile in 1990 will be 46.5 million metres.

The total number of population using the pipe-water in 1971 was estimated to be 9.6 per cent and increased to 11.1 per cent in 1980. The projected number of population using the pipe water will increase to 12.4 per cent in 1990. The investment needs for the construction of the pipe water lines are considerable.

The provision of health facilities in West Sumatra increased considerably. On the average, the health facilities seems to be sufficient in handling the population needs.

1/ Fourth Five-Year Development Plan of West Sumatra , 1984/85-1988/89, Vol I, p.4.5

The level of education in West Sumatra is higher compared to other provinces. The graduates from the elementary education mostly continue their education to the higher level. However, the needs for the educational facilities increased much more faster than the availabilities of the facilities. The private sector investment in providing the educational facilities increased in the last few years and expected to do so in the future.

Recommendations

The improvement in the infrastructural networks of West Sumatra have made the available potential resources could be used more efficiently. The lack of information to the private sector on the potential of West Sumatra and the unbalanced economic activities in Indonesia reflected in the slow increased of the private invesment in the past. Efforts have to be made in the future to overcome these deficiencies.

The various agro-industrial projects could be developed in West Sumatra in addition to the manufacturing and basic needs projects. However, the scale of the operations seems to be oriented toward the midle-scale activities. Although it does not preclude such large scale activities, as in the case of cement factory and its related products.

However, the problems of regional reallocation of investment depended not on the provincial government only, but to a large extent on the central government plicy. Differential tax rates, for instances, should be made to move the investment outside Java.

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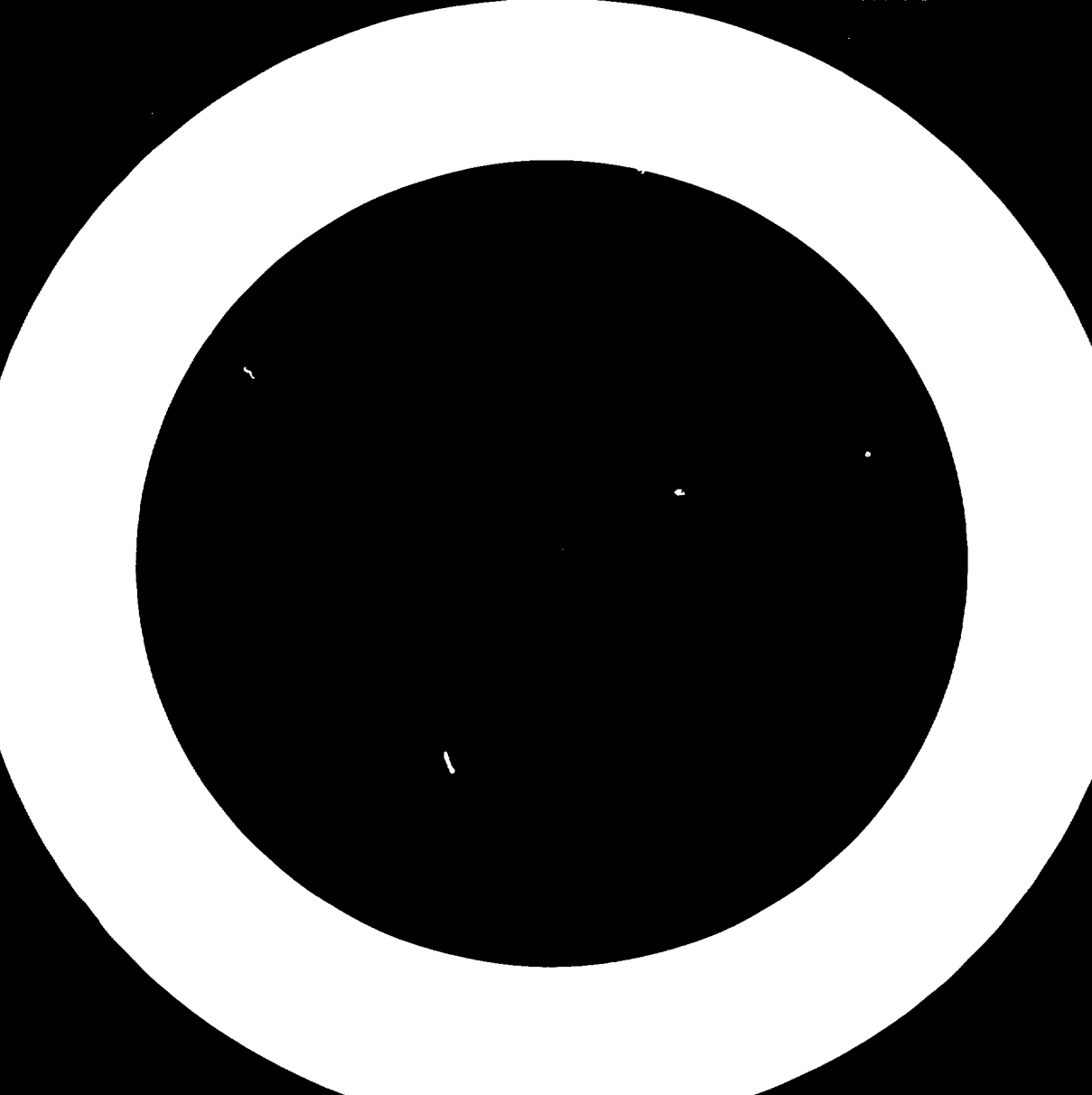
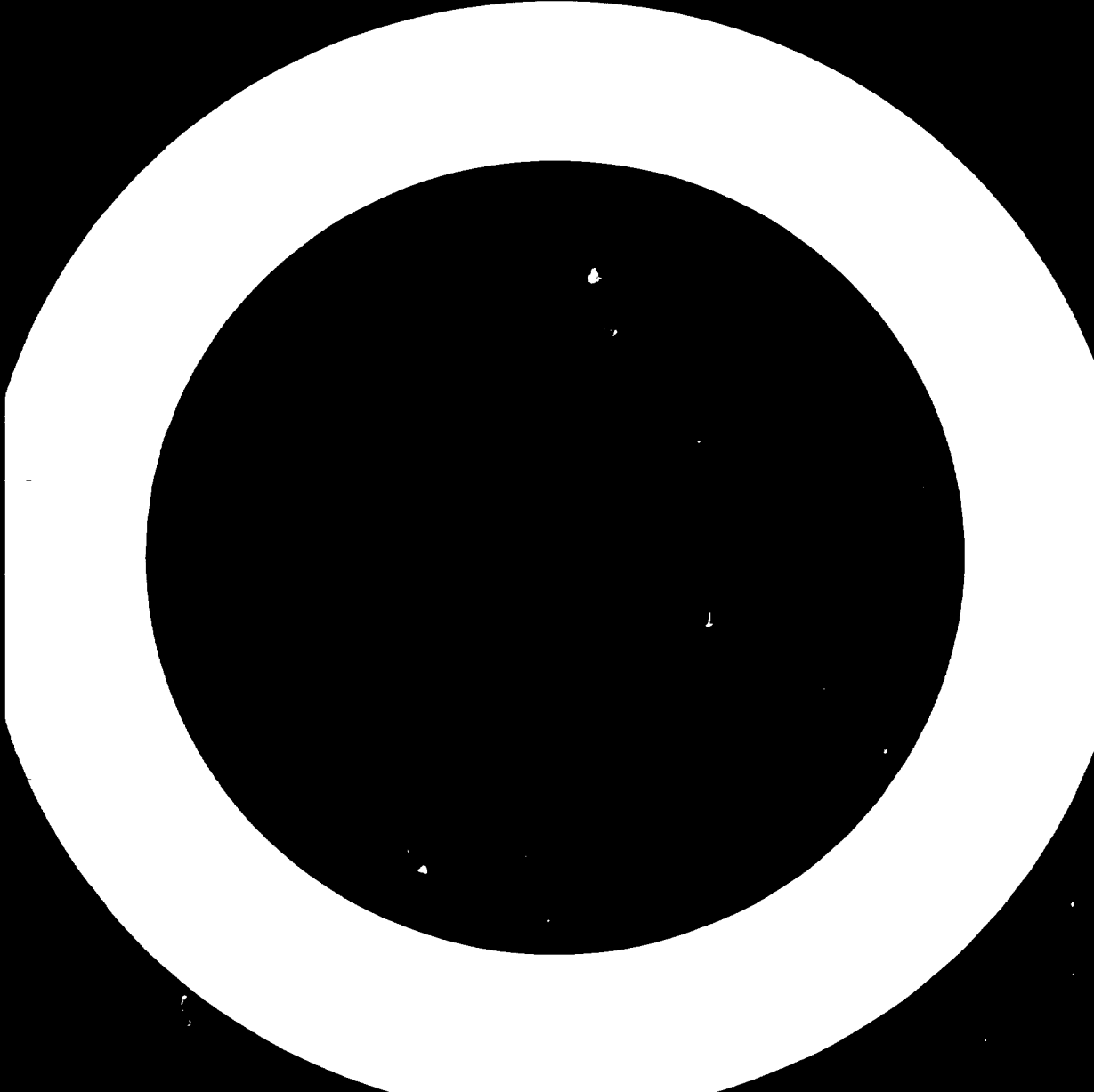


Part II

PLANNING, GROWTH AND POPULATION



Chapter 2

WEST SUMATRA'S FIVE-YEAR DEVELOPMENT PLANS : A REVIEW

LIKE the national development plan , West Sumatra will enter the period of the Fourth Five-Year Plan beginning in 1984. The plan, however, tries to implement the national plan in the geographical area of West Sumatra. The provincial plan was defined as : "....(a) the national development activities and projects located in the regions, (b) the regions' own development activities and projects outside the ones worked out by the central governments..." [1/]

Although the objective of the regional -- or provincial -- plan is to support the national plan through a spatial effort, nevertheles, a top-down planning was stronger than the bottom-up planning due to the centralized administrative system of the Indonesian unitary state. It was not surprising, therefore, that a larger financial resources in financing the regional development plan came from the central government.[2/] This situation reflected clearly in the West Sumatra Five-Year Development Plans.

This chapter will review the West Sumatra Five-Year Development Plans, from the First Plan (1969/70-1973/74) to the Third Plan (1979/80-1983/84). In the meantime some ideas on the forthcoming Fourth Plan (1984/85-1988/89) will be presented. These plans will give a macro overview of the direction of West Sumatra development policy in the last fifteen years.

HISTORICAL DEVELOPMENT OF WEST SUMATRA'S PLANS

West Sumatra Five-Year Development Plans, as the national plans, began in 1969 as an effort in coordinating the development activities of the province. The first plan, Rentjana Pembangunan 5 Tahun Daerah Propinsi Sumatera Barat, 1969-1973 (Five-Year Development

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1/ Hendra Esmara, Regional Development and Planning in Indonesia : A Review of Methodology (Padang : Institute for Regional Economic Research, Department of Economics, Andalas University, 1976) -- A Report to the United Nations Centre for Regional Development, Nagoya, Japan.

2/ Hendra Esmara, "Development Tasks of Local Administration : The Indonesian Experience", paper prepared for the seminar on Local Administration and Regional Development at the United Nations Asian and Pacific Development Centre, Kuala Lumpur (18-30 July 1983).

Plan of the Province of West Sumatra,1969-1973) was prepared in such a simple way by only identifying the various sectoral development projects to be implemented in the province. The main emphasis was on the rehabilitation program rather than the development activities.

The second plan, Rencana Pembangunan Lima Tahun Pemerintah Daerah Propinsi Sumatera Barat, 1974/75-1978/79 (Five-Year Development Plan of the Province of West Sumatra, 1974/75-1978/79) was developed on the basis of a study by the Andalas University, Sumatera Barat : Rencana Pembangunan Lima Tahun 1974/75-1978/79 (West Sumatra : Five-Year Development Plan 1974/75-1978/79). This study was prepared on the request of the National Development Planning Agency (Bappenas). Although a larger portion of the plan was still devoted to the rehabilitation program, the development elements were begun to be introduced in the second plan.

Unlike the previous plans, the third plan began with the formulation of the provincial development policy through the Pola Dasar Rencana Pembangunan Lima Tahun Ketiga Daerah Propinsi Daerah Tingkat I Sumatera Barat, 1979-1984 (The Basic Pattern of the Third Five-Year Development Plan of the Province of West Sumatra, 1979-1984). The Pola Dasar gave the broad outlines of the provincial development policy to be implemented in the third plan. The third plan itself, Rencana Pembangunan Lima Tahun Ketiga, 1979/80-1983/84 (Third Five-Year Development Plan, 1979/80-1983/84) covered a broad area of development activities with particular emphasis on the Sapta Karya Pembangunan Daerah (Seven Principles of West Sumatra development policy).

The seven principles of West Sumatra development policy were as follows :

(1) Equal distribution of development and its results to achieve a social justice for all people.
(2) To achieve a high economic growth.
(3) To maintain and increase the national stability in the province.
(4) To increase the faith and devotion to the God Almighty in the framework of maintaining the good moral and character.
(5) To develop the national intelligence.
(6) To develop a harmonious way of life on the principle of alur and patut.
(7) To increase the participation of ninik mamak (clan chief), alim ulama (religious leaders), cerdik pandai (the intelligentsia), women, the youth and all level of society in the process of development.

The three plans had changing the emphasis of activities from the rehabilitation programmes to the development efforts over the period of the last fifteen years. The rehabilitation programmes put the priority on the rehabilitation of the existing road networks which had been damaged by the previous "civil war" and the abortive communist coup. The objective of the programme was trying to make the road usable. Only after the second and during the third plan, the development activities began to roll particularly due to the increasing oil revenue of central government.

REPELITA I AND II : REHABILITATION PERIODS

West Sumatra encountered several political as well as economic crisis after the Indonesian independence in 1945. After fighting against the Ducth until 1949, West Sumatra faced another political crisis by fighting another "war" against the central government during the period of 1958-1961. Then again, near the end of 1966, West Sumatra as well as Indonesia involved in another "fighting" against the abortive communist party rebellion. All through these crisis, regional development had been neglected. Physical as well as social infrastructures were severely damaged.

With the new order government, a new era began in Indonesia. In the first three years, the new order government busily taking stock of the economic situation of the country. In the meantime, a rescue programme had been implemented with the main objective of rehabilitating the most severely damaged physical infrastructures of the country. After this period, the first five-year development plan was introduced as an effort to develop the country particularly in connection with attracting the foreign investment and planning the foreign debt.

Along the line taken by the central government, all provinces in Indonesia began preparing their own provincial plans. West Sumatra was without exception and has taken planning seriously. However, the first five-year plan of West Sumatra was very simple. Since the main goal of the plan was on rehabilitation programme, the plan was more straight forward by identifying the projects to be rehabilitated.

The first and second five-year development plans -- or usually called as Repelita I and II respectively 3/ -- had the objectives of :

(1) To increase the level of income and consumption of the people in such a way that will erfected other economic activities (home industries and trade).
(2) To increase the employment opportunities in all economic activities through the opening of new agricultural land and developing the agricultural tool and agro-industries.
(3) To provide skilled manpower in the agricultural and small industrial fields with due consideration to the natural condition, climatology, and geography.
(4) To improve the welfare of the people which cover the development of religion, culture, health and social activities.

In order to achieve these objectives, the development priority was given to the agricultural sector. First, approximately around 70 per cent of the population, directly or indirectly, got their living from the agricultural sector. Second, the main income of the population originated from the agricultural sector. Third, with the existing rice field technology, and other agricultural sub-sectors, increasing the income of the people could be expected from the agricultural sector.

West Sumatra's rice production has served not only the needs of the province but also the surrounding neighbouring provinces, such as Riau and Jambi. However, rice production alone, though necessary would not sufficient to increase the income of the people. In this strategy, rice production will be accompanied by the commercial crops such as rubber, palm oil, coffee, etc.

Smallholder commercial crops could survive in any condition compared to the estate plantation. This is mainly due to the flexibility of maintaining the crops with a low, or costless operation. It was not surprising that 28 former estate plantations in West Sumatra had been neglected therough the periods of revolution and rebellion.

3/ REPELITA is an abbreviation of Rencana Pembangunan Lima Tahun or Five-Year Development Plan. REPELITA I means The First Five-Year Development Plan.

REPELITA III : The Third Plan, 1979/80-1983/84

The Third Five-Year Development Plan of West Sumatra was a continuation of the efforts conducted in the First and Second Plans. However, the emphasis of the plan had been shifted from the rehabilitation programmes to the development planning.

Performance, Problems and Objectives

The results of the Second Five-Year Development Plan were as follows :

(1) The real Gross Regional Domestic Product increased at the rate of 7.08 per cent per annum. With the population growth rate of 1.92 per cent per annum, the level of per capita income increased at 5.16 per cent per annum. Due to these development, the real per capita income in 1977 came to Rp 55,668 while in 1974 was Rp 47,996.

(2) Improvement in the household income distribution.

(3) The condition of physical infrastructures, such as roads and bridges, improved in a much better way.

(4) Rice production increased at the rate of 2.47 per cent per annum.

(5) Export value in 1977 had achieved US$ 92 million while in 1974 was US$ 41 million. At the beginning of REPELITA I (1969), the value of export only US$ 12 million.

(6) Regional stability had been maintained.

(7) Education, health, and other activities in the social welfare fields, had been improved tremendously.

The end of a planning period did not automatically solved all problems of West Sumatra. The problems to be faced by West Sumatra in the REPELITA III were as follows :

(1) The level of per capita income was still lower than the per capita income of Indonesia. The real per capita income of West Sumatra in 1975 was Rp 50,970 while Indonesia had achieved Rp 58,429. In the meantime, the per capita income of the provinces of North Sumatra was Rp 80,233, Riau was Rp 80,233 and Jambi was Rp 74,575.

(2) The sectoral and regional inequalities in economic and social structures still existed in West Sumatra, e.g., population distribution, financial resources, development activities, social services, etc.

(3) The employment opportunities still limited in the agricultural sector.

(4) The financial resources originated within the province were seriously limited. The provincial financial resources in REPELITA II could financed only 14 per cent of the total investment requirements of West Sumatra. Due to this situation, West Sumatra was heavily relied on the external financial resources.

(5)The natural resources mostly consisted of small scale sizes. The exploitation of these resources were conducted by the people in the small scale activities.

With references to the results of REPELITA II and the problems to be faced in REPELITA III, the objectives of West Sumatra's REPELITA III were :

(1) To equalize the distribution of basic needs and social services, such as food, clothing, housing, education, health, and some environmental factors to all level of society and development regions.

(2) To achieve the economic growth rate of, at least, 7 per cent per annum with a more equal development activities among development regions within the province. In this connection, the development priority will be given to the agricultural sector while the other sectors will be developed in such a way that it will supported the agricultural sector.

(3) To create employment opportunities as much as possible among all level of the society.

(4) To create the regional stability in the framework of national stability.

(5) To increase the religious facilities in order to maintain the good moral and character and devotion to the God Almighty.

(6) To spread more information on law and creating more law schools in order to establish a way of life on the principles of alur and patut.

(7) To create a two-way communication in getting the participation of ninik mamak (clan chief), alim ulama (religious leaders), cerdik pandai (the intelligentsia), women, the youth and all levels of society in all development activities.

The objectives of the third plan reflected the development policy formulated in the Sapta Karya Pembangunan Daerah. Two important elements in the plan were the development equity and economic growth. The first element will be implemented through the creation of development regions and the provision of the basic needs, while the second ones by setting the target of the Gross Regional Domestic Product of the province.

Development Regions

The approach to development in REPELITA III was made through five development regions. Each development region has its own growth centre. The delineation of development regions was conducted through several principles. First, the development regions must not to be too large or too small since it will become too difficult to handle. Second, the development regions should be delineated in such a way that it should not crossing the administrative second governmental level of political boundaries. Third, the principle of homogenity should be used in delineating the development regions.

With this approach, the development regions consisted of combination of several second governmental level of the province. The present administrative governmental system of West Sumatra consisted of 14 second governmental levels with eight kabupatens and six municipalities. If the second governmental levels were used as the basis for constructing the development regions, then there will be 14 development regions. This seems to be too large to handle.

The delineation of West Sumatra into development regions was made in the efforts to spread the development activities and the provision of basic needs throughout the province. By using this approach, all estimates and development targets setting should be made by development regions.

The development regions of West Sumatra were delineated as follows :

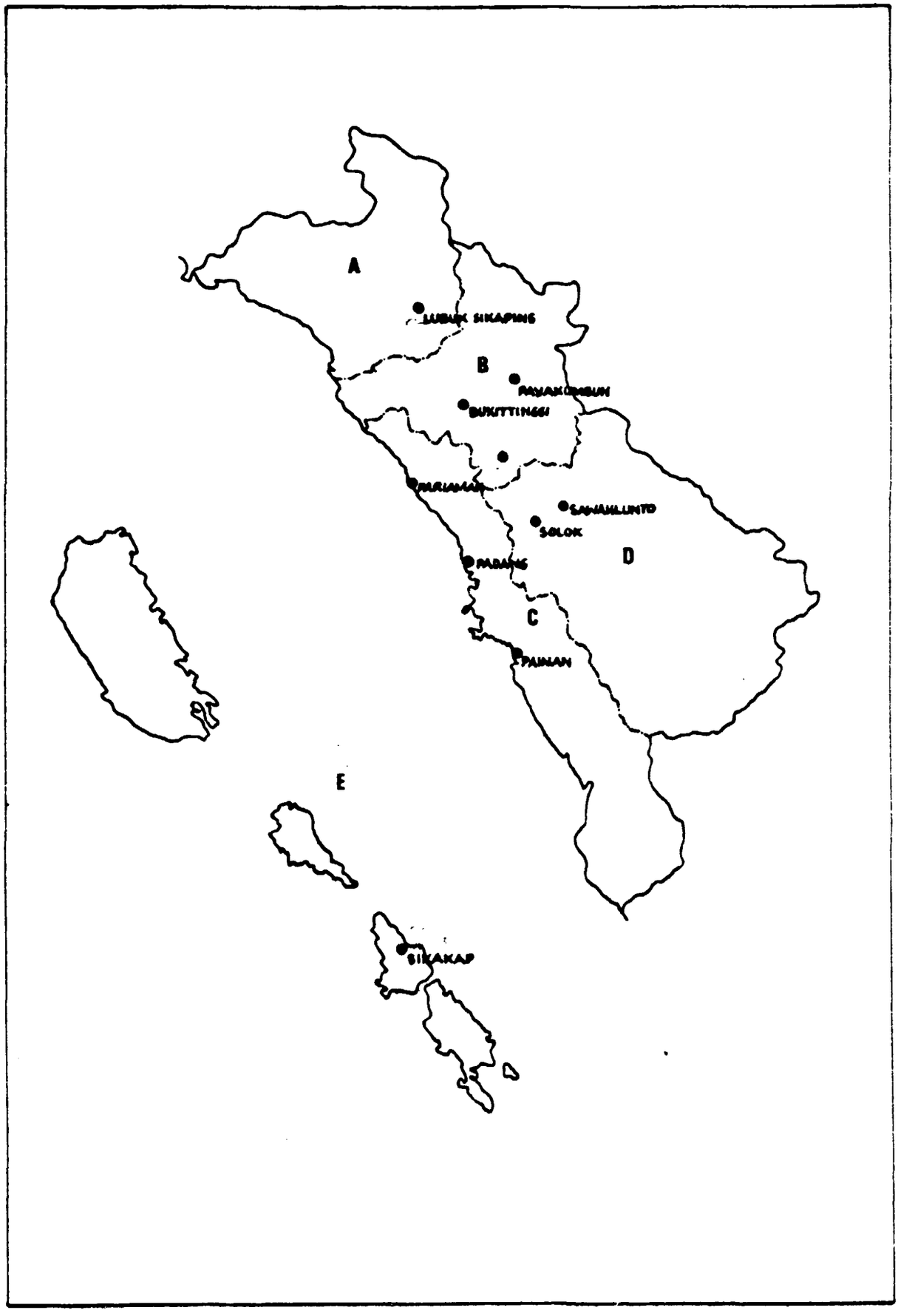
Development Region A. The development region A consisted of Kabupaten Pasaman with its growth centre in Lubuk Sikaping.

Development Region B. The development region B consisted of Kabupaten Agam, Kabupaten Tanah Datar, Kabupaten Limapuluh Kota, Kotamadya Bukittinggi, Kotamadya Padang Panjang and Kotamadya Payakumbuh. The growth centre of development region B is in Bukittinggi.

Development Region C. The development region C consisted of Kabupaten Padang/Pariaman, Kabupaten Pesisir Selatan and Kotamadya Padang, The growth centre of development region C is in Padang.

Development Region D. The development region D consisted of Kabupaten Solok, Kabupaten Sawahlunto/Sijunjung, Kotamadya Solok, and Kotamadya Sawahlunto. The growth centre is in Solok.

Development Region E. The development region E consisted of the islands of Siberut, Sipora, and Pagai in the island of Mentawai. The growth centre of the island is in Sikakap.



Map 2.1 WEST SUMATRA'S DEVELOPMENT PLANNING REGIONS

Although the delineation of development regions was made in such a way that it should not crossing the administrative political boundaries of the second level of government, nevertheless, one exception was made for the Mentawai islands. The level of living in these islands is far behind the mainland of West Sumatra. Although the Mentawai islands, administratively, belongs to the kabupaten Padang Pariaman but due to the special case of development has been delineated as a development region by itself.

The concentration of economic and social activities has been found also in every development region. These concentration of activities have been identified and been assigned as the economic or production units. These units were delineated as the sub-development regions. The sub-development regions will be used as the operational units for the implementation of target setting at the level of development regions.

The sub-development regions consisted of the combination of several kecamatans with the homogenious characteristics. These sub-development regions, in principle, could cross the second governmental level of administrative boundaries. However, some difficulties will be encountered if the sub-development regions crossed the administrative boundaries.

Planning at the second governmental level will be made by giving due consideration to the role of the areas in the development regions.The role of the second governmental level is heavily oriented toward deciding the location of development programmes in supporting the planning of the development regions. By this approach the development activities could be spread to all parts of West Sumatra.

In every development regions and sub-development regions there will be a growth centre. The growth centres at the development regions were called the first level growth centres while at the sub-development regions were the second level growth centres. All growth centres will be provided with a set of facilities for the development of the province.

In the five development regions were established twenty-two sub-development regions. However, the development targets setting will not be made at the level of the sub-development regions.

Target Areas : Poor Kecamatans

The Third Plan identified 33 poor kecamatans as the special target areas. The poor kecamatans were identified by using the basic nine essential commodities [4] as the poverty line. On the basis of the 1973 prices, the poverty line was estimated to be Rp 24,366 per month. All kecamatans were classified on the following basis :

Poorest kecamatans are the kecamatans with the per capita income under 75 per cent of the basic nine essential minimum needs.
Poor kecamatans are the kecamatans with the per capita income under and above 25 per cent of the basic nine essential minimum needs.
Nearly poor kecamatans are the kecamatans with the per capita income above 25 per cent of the basic nine essential minimum needs until achieving the secondary needs.
Non-poor kecamatans are the kecamatans with the per capita income exceeding the secondary needs.

By using this approach, none of the kecamatans in West Sumatra could be classified as the poorest kecamatans or the non-poor kecamatans (except in Padang). The kecamatans in West Sumatra were either poor or nearly poor. This finding confirmed the impression that the income inequality in West Sumatra is low compared to other provinces. The Gini ratio in West Sumatra in 1969/70 was .2506 which was lower compared to North Sumatra (.2777), Riau (.2830) or Jakarta (.6120).

The Basic Minimum Needs

The target on economic growth on the one hand should be supplemented on the evaluation of the level of living, on the other hand. In this respect, REPELITA III used the concept of the basic minimum needs as the target to be fulfilled in the near future. The Declaration of Principles and Programme of Action as the results of the International Labour Organizations conference in 1976 defined the basic minimum needs as follows :

4/ The nine essentials commodities are rice, salted fish, cooking oil, sugar, salt, soap, kerosene, textile, and batik.

> "Basic needs, as understood in this Programme of Action, include two elements. First, they include certain minimum requirements of a family for private consumption : adequate food, shelter and clothing, as well as certain household equipment and furniture. Second, they include essential services provided by and for the community at large, such as safe drinking water, sanitation, public transport and health, educational and cultural facilities".

The basic needs concept used two approaches. First, the family or individual approaches. The basic calculation of the first approach was made by calculating the minimum income needed by the family or individual in attaining the basic minimum needs. The minimum income was used as the poverty line. Second, the regional approach. The concept of the regional approach will be based upon the provision of the basic needs for the community.

The components used in the measurement of the poverty line were not much differed with the provision of the basic needs for the community. However, the indicators used in the components were different from one component to the other. The components of the basic minimum needs used in West Sumatra's plan are as follows :

(a) Food
(b) Clothing
(c) Housing
(d) Education
(e) Health

In calculating the poverty line, these components will be used as the basis for estimating the minimum income of the family or individual in West Sumatra. The minimum income will changes over time. The target groups will be the number of people living below the poverty line.

Provision of basic needs for the community will be based on the regional approach. The components and indicators used in West Sumatra are as follows :

Food
(a) Calories intake per day, per head.
(b) Percentage of total calories derived from cereals.
(c) Total protein intake, grams per day per head.
(d) Percentage of total protein intake derived from animal.

Clothing
(a) Per capita textile consumption per year.
(b) Per capita batik consumption per year.

Housing
(a) Number of persons to a room.
(b) Percentage number of housing with own lavatories.

Health
(a) Ratio of medical facilities to the number of population.
(b) Ratio of medical personnels to the number of population.

Education
(a) Literacy rate.
(b) School enrolment ratio at the elementary and junior high schools.
(c) Number of pupil per classroom.
(d) Pupil-teacher ratio.

In addition to these components, the environmental problems were included as one of the components of the basic needs in a development region.

Environment
(a) Ratio of the length of road to the number of the population.
(b) Ratio of asphalt roads to the total length of roads.
(c) Per capita electric consumption per year in the urban areas.
(d) Percentage number of villages with rural electrification.
(e) Percentage number of urban population using pipe water.
(f) Ratio of the number of wells and hand pumps to the number of rural population.
(g) Ratio of the number of post offices to the number of villages.
(h) Ratio of the number of radios to the number of population.

The development policy of REPELITA III was directed toward the provision of these basic needs.

REPELITA IV : The Fourth Plan, 1984/85-1988/89

The planning framework of Repelita IV is practically the same as Repelita III. However, the national economic condition in facing the Repelita IV is not to be brighter. With the world economic recession, and the decreasing trends of the price of oil, the national plan envisages a lower economic growth target than Repelita III -- which is 5.0 per cent compared to the 6.5 per cent of Repelita III.

The serious economic condition facing the national government has its immediate impact on the provincial development. Nevertheless, the impact of the world recession which had dropped the national economic growth to 2.2 per cent in 1982 could be avoided by the West Sumatra's economy. Since the basic economic structure of West Sumatra's economic was not on her international relations, then the economic growth of 1982 was still high, 6.0 per cent.

Changing Problems of the West Sumatra's Economy

Provincial development planning of West Sumatra should respond to the changing problems of the economy. The problems facing Repelita IV are as follows :

(1) The structural disparity on the economic structure of West Sumatra which are still existed at the eve of Repelita IV, such as inter-sectoral or inter-regional disparities, the unbalanced distribution of population, the gap in the social services, etc.

(2) With the increasing trends of income, the increasing demand for higher quality of consumption goods, housing, and other services, such as schools, health facilities, etc. could not be avoided.

(3) The increasing economic and social demands will put a higher pressure on the available resources. This situation become more accute with the increasing population growth rates in the seventies compared to the sixties.

(4) The population composition of West Sumatra has moved from a homogenous to a more heteregenous society. The changing society has begun a few years ago with the opening the new transmigration settlements at Sitiung and the voluntary migrants from Tapanuli to Pasaman in the northern part of West Sumatra. A new social problem will enter Repelita IV as the implications of the changing society.

(5) With the approval of the international agreement on the sea law, Republic of Indonesia belongs to the archipelago state. The jurisdiction on the sea territorial expands tremendously. As the consequence of this agreement, the sea territorial of West Sumatra increase suddenly.

(6) Although the impact of the world recession was not so severe on the West Sumatra's economy, however, the indirect impact will be felt through the national economy.

(7) With the reducing availability of the central government financial sources, the development subsidies to West Sumatra will be restricted also. In the meantime, the provincial ability in matching the decreasing central government funds are not automatically increase.

(8) The growth of the labour force will be expected to be higher than the employment absorbtive capacity.

(9) Since the bussiness activities mostly conducted by the small scale, weaker groups of the society, the ability of this sector to development will be limited.

(10) The production of the non-rice commodity group and export commodities were not so developed in the past.

The changing problems of West Sumatra's economy in facing Repelita IV have given new dimensions in preparing the plan. The rising demand due to the progress in the seventies should be adjusted with the new national economic environments.

The objectives of the Repelita IV, however, do not differ substantially from Repelita III.

(1) To equalize the distributic, of basic needs and social services, such as food, clothing, housing, education, health, and some environmental factors to all level of society and development regions.

(2) To create employment opportunities to all level of society.

(3) To increase the provincial financial sources such as saving and social participation.

(4) To achieve the economic growth rate of 6.0 per cent per annum with a more equal distribution of income.

(5) To increase the production of the non-rice and export commodities.

(6) To increase the ability of the small scale and weaker bussiness institutions and strengthening the cooperative movements.

(7) To increase the religous facilities in order to maintain the good moral and character and devotion to the God Almighty.

(8) To spread the information on law in order to establish

a way of life on the principles of alur and patut.

(9) Creating a two-way communication system in order to enlarge the participation of ninik mamak (clan chief), alim ulama (religous leaders), cerdik pandai (the intelligentsia), women, the youth and all level of society in all development activities.

(10) Creating the regional stability in the framework of national stability.

(11) Developing the region without damaging the local natural environment.

Repelita IV will give more emphasis on the expansion of the private bussiness sector.

The Role of the Private Sector

Although the government sector moved rapidly, the private bussiness activities seems to be lagging behind. The private sector engaged mostly in the small scale home industries with a few operated on the modern high tecnological machines and equipments. Almost all, in one way or another, consisted of the agroindustrial activities.

The economic and socio -cultural factors influenced the development of the private enterprises. However, the Minangkabau [5/] entrepreneurs which were known for their energetic activities outside West Sumatra seems to have a loosing ground at the home town.[6/]

One of the main characteristics of the Minangkabau private bussiness activities were the family bussiness. The family bussiness, however, did not respond easyly to the expansion of the activities. Management usually handled by the family head. The relationship with the employees was mostly based on the family lines than on bussiness relations. In this case bussiness and family affairs became mix one another.

The transformation from the family bussiness to a modern management system seems to be too slow. It was not surprising, that some difficulties had been encountered in finding the local partners in establishing a joint venture either foreign or domestic joint ventures.

5/ Minangkabau is the ethnic group of the indigenous population of West Sumatra.

6/ See Chapter 5.

Planning the private bussiness sector in West Sumatra will oriented toward modernizing the family bussiness enterprises. This could be made by opening West Sumatra, in terms of bussiness climate, to the influences of the outside bussiness enterprises.

CONCLUSIONS

Through the periods of turbulence and violance, West Sumatra survived and progressed rapidly from Repelita I to Repelita III. The main achievements of Repelita I were rehabilitating the mental breakdown of the people and constructing the various physical infrastructures in a simple manner. The roads, for instance, were rehabilitated to be passable by the light-weight road vehicles and not on a permanent high-costs road networks.

Repelita II, although mostly consisted of rehabilitation programmes, had moved to a selected development activities. The emphasis was still on improving the infrastructural networks. Some attentions have been given also to the small-holders agricultural production activities. Rice production increased rapidly.

The development programmes became the core of Repelita III. Efforts have being made on reducing the regional disparity within West Sumatra and providing the basic needs of the people. The number of the population below the poverty line decreased rapidly.

Repelita IV is the continuation of the basic activities programmed in Repelita III. Although the problems have being changing over the last decade, some adjustments have to be made to incorporate the recent world and national economic situation.

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Chapter 3

ECONOMIC GROWTH AND TRADE : PERFORMANCE AND PROSPECTS

THE ECONOMIC growth of West Sumatra followed closely the trends of the economic growth of Indonesia. The influence of the national development policy seems to be very high and the consequence is that the long-range economic development of West Sumatra will be determined not oly by the natural resources of the province -- and the regional development policy -- but also by the national economic development efforts. However, the national development efforts will be influenced also by the global economic situation particularly during the last few years. Due to this phenomenon, a study on the long-range economic growth of West Sumatra cannot be separated from the national patterns of economic growth. 1/

This chapter will assess the potential economic growth of West Sumatra for the future development of the province. Extensive use of the fourth-five year plan's projections will be made in addition to the other materials provided for this study.

ECONOMIC GROWTH

Economic Performance of West Sumatra, 1966-1983

The long-range economic growth of West Sumatra, in the last eighteen years had achieved the rate of 6.7 per cent per annum (1966-1983). The economic growth rate was quite high indeed, particularly due to the continuity of development efforts after the implementation of the three successive five-year development plans' programmes and projects.

The growth rate increased rapidly during the seventies with 7.6 per cent per annum which followed the same trends as the Indonesia's growth rate with 8.0 per cent per annum. The high growth rate could not be separated from the increasing price of oil during that period. With the abundance oil-money, the finan-

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1/ This chapter was based on the framework of ideas presented in Hendra Esmara, "The Long-range Economic Perspective of West Sumatra", The Indonesian Quarterly (April 1978), Vol.VI, No.2.

Table 3.1 West Sumatra and Indonesia : Trends and Projections of Gross Domestic Product at Current Market Prices 1966-1990

Year	Gross Domestic Product (Total)			Gross Domestic Product (per Capita)		
	West Sumatra	Indonesia	GDP Ratio	West Sumatra	Indonesia	GDP Ratio
	(Rp billion)		(%)	(Rp)		(%)
(1)	(2)	(3)	(4)=(2:3)	(5)	(6)	(7)=(5:6)
1966	12.5			4,918		
1967	20.1			7,745		
1968	45.4			17,171		
1969	62.7	2,718.0	2.3	23,248	23,659	98.3
1970	72.4	3,238.0	2.2	26,363	27,565	95.6
1971	80.4	3,672.0	2.2	28,721	30,909	92.9
1972	98.0	4,564.0	2.1	34,320	37,533	91.4
1973	135.0	6,753.4	2.0	46,263	54,201	85.4
1974	160.3	10,708.0	1.5	53,764	83,918	64.1
1975	188.7	12,642.5	1.5	61,918	96,803	64.0
1976	232.9	15,466.7	1.5	74,752	115,683	64.6
1977	278.0	19,033.0	1.5	87,305	138,967	62.8
1978	345.3	22,746.0	1.5	106,108	162,471	65.3
1979	457.4	32,025.4	1.4	137,527	233,887	58.8
1980	614.0	45,446.7	1.3	180,269	310,502	58.1
1981	673.9	54,027.0	1.2	193,793	360,957	53.7
1982	810.6	59,632.6	1.4	228,335	389,786	58.6
1983 a/	948.7	72,512.9	1.3	261,019	458,652	56.9
1984	1,096.6	83,114.3	1.3	295,431	514,321	57.4
1985	1,261.0	95,033.7	1.3	332,740	575,265	57.8
1986	1,443.6	107,870.9	1.3	373,083	639,424	58.3
1987	1,643.9	121,539.2	1.3	416,100	705,803	59.0
1988	1,864.5	135,917.3	1.4	462,203	774,017	59.7
1989 b/	2,114.7	152,708.9	1.4	513,553	852,646	60.2
1990	2,398.5	171,590.8	1.4	570,611	939,194	60.8

a/ Projections of Indonesia's Gross Domestic Product at current market prices are made on the basis of the fiscal years (April to March) as used in the Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (Draft, Fourth Five-Year Development Plan, 1984/85-1988/89) instead of the calendar year -- for the period of 1984-1988. However, the projections of the West Sumatra's Gross Regional Domestic Product are calculated on the basis of the calendar year, as in Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra : Draft, Fourth Five-Year Development Plan, 1984/85-1988/89).

b/ Extrapolation of the fourth five-year development plans' projections.

Sources : Central Bureau of Statistics, National Income of Indonesia (Jakarta : several issues), Lembaga Penelitian Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Pendapatan Regional Sumatera Barat 1966-1979 dan 1975-1980 (Regional Income of West Sumatra). See also the explanations on (a) and (b).

cial resources for development of West Sumatra practically came from the national development budget -- as well as in the other provinces.

Nevertheles, the Gross Regional Domestic Product of West Sumatra was less than two per cent of the Gross Domestic Product of Indonesia (see Table 3.1) while the disparity between the per-capita income of West Sumatra and Indonesia became widen during the seventies (see Figure 3.1). The increasing disparity between the per capita income of West Sumatra and Indonesia suggested two different kinds of explanations :

First, the growth of the other regions of Indonesia -- excluding West Sumatra -- was more higher than West Sumatra, particularly in the non-agricultural sectors. The share of manufacturing sector of West Sumatra from Indonesia dropped from 2.5 per cent to 1.3 per cent during the seventies. In the meantime the share of the agricultural sector remained the same.

Second, the rate of inflation of West Sumatra was lower than Indonesia.Measured by the GDP deflator, the rate of inflation in West Sumatra was 15.14 per cent while in Indonesia was 20.61 per cent per annum during the seventies.

The agricultural sector plays a dominant role in the economic development of West Sumatra. The growth rate of the agricultural sector during Pelita III (1978-1983) was 4.49 per cent which was higher than the previous years. Although there was a shift in the economic structure of West Sumatra from the agricultural sector to the non-agricultural sectors, however, the contribution of the agricultural sector to the Gross Regional Domestic Product remains the larger -- from 51.53 per cent to 34.26 per cent over the period of 1968-1983.

The existing agricultural land has not being exploited at the full maximum capacity. Although the agricultural sector plays a significant role in the economic structure of West Sumatra, its productivity level is much lower than the other sectors.

The low productivity level of the agricultural sector is a reflection of the achievement of the small scale operations by the smallholders in the rural areas. These efforts are being carried out through the informal activities in comparison to the for-

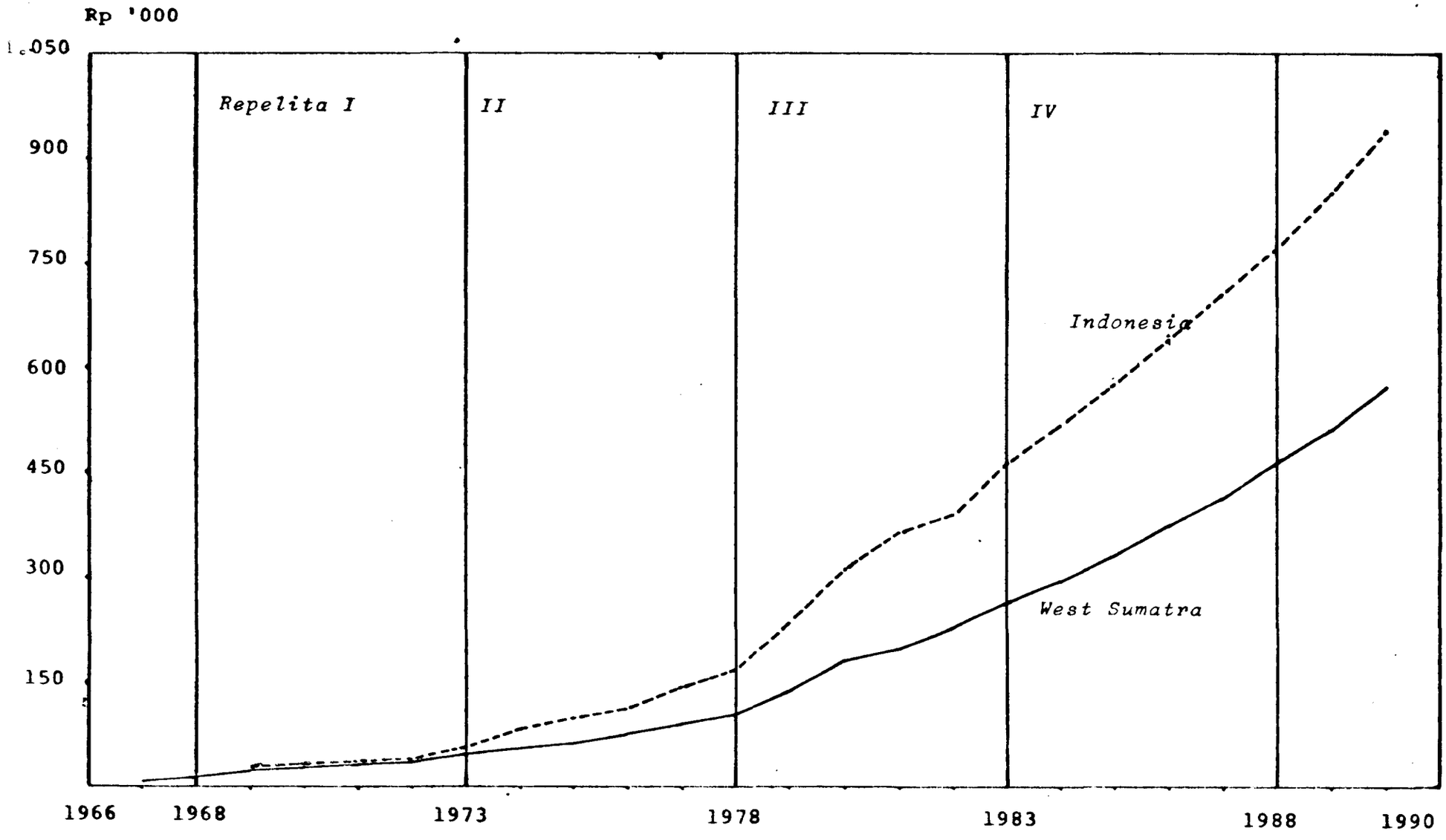

Figure 3.1. WEST SUMATRA AND INDONESIA: TRENDS AND PROJECTIONS OF PER CAPITA INCOME, 1966-1990

mal sector of the modern estate plantation.

The informal activities have being carried out in a traditional way by using a less complex modern technology. The level of these traditional activities can be measured by using the Informal Employment Index (IEI). This index reveals the ratio between the number of employment in the informal sector (the self-employed, the family worker and the self-employed assisted by the temporary members of the family) and the formal sector (the employee). The higher the index, the greater will be the role of the informal sector in the development of those sectors.

The IEI of the agricultural sector in 1980 was 842, which was higher than the manufacturing sector (440) or construction (72) and transportation & communication sectors (62). For every 100 persons working in the formal agricultural sector (plantation, fishery or forestry) there are at least 842 persons working in the informal agricultural sector. The manufacturing, construction, transportation & communication sector were operated in a more modern way.

Optimalization of the agricultural sector should be conducted in intensifying the existing operation while the efforts to extensify the agricultural land will be hampered by the natural geographical condition of the province. Although the total land area of West Sumatra is 41,431.1 squares km, the land suitable for agricultural cultivation -- and habitable -- is approximately only 14.3 per cent. The rests consisted of the mountainous and swampy areas and reserved forests.

The population density on the basis of the geographical areas which was 82 persons per squares km seems to be misleading. Due to the limitation of the habitable land, the agricultural population density seems more approriate -- which came to 576 persons per squares km.

Almost 62 per cent of the employment was concentrated in the agricultural sector particularly in the food crop activities. The contribution of the food crops subsector to the agricultural sector -- in terms of value added -- was 56 per cent in 1983. It was not surprising that the main sources of growth in the agricultural sector came from the food crops activities.

The shift in the sources of growth of the Gross Regional Domestic Product had been made over the period of the three successive five-year development plans -- from the agricultural sector to the trade and manufacturing sectors. Almost one third of the growth of the Gross Regional Domestic Product during Pelita I originated from the agricultural sector. However, in Pelita II, the main sources of growth had been shift to the trade sector. In the meantime, the manufacturing sector progressed rapidly during Pelita III -- with 12.53 per cent per annum -- and taken over the role as the main sources of growth from the trade sector. It is expected, that the manufacturing sector will remain the main sources of growth during the next Pelita IV. See Table 3.2.

The structure of the manufacturing sector were heavily oriented toward the small scale agroindustrial activities, such as the rice mills, chilli processing plants, sugar, etc. The total value added of these small scale agroindustrial activities came about 60 per cent of the total value added of the manufacturing sector. On the other hand, one big modern cement factory alone contributed nearly 20 per cent, while 5 crumb rubber plants to 12 per cent, of the total value added of the manufacturing sector in West Sumatra.

The leading activity in the manufacturing sector seems to be in the cement factory. The production of cement increased from 151,396 ton to 510,967 ton during the period of 1970-1980. It is expected that the production of cement will rapidly increase to 2.7 million ton in 1988. Since 1981 cement had been exported to Bangladesh and two years later, to India also. The total volume of export increased from 5,000 ton to 20,000 ton over the period of 1981-1983. The prospect of export of cement is quite satisfactory.

The expansion of the resource base manufacturing industries, except cement, will be limited by either by the small scale operations of the agricultural sector or by the scarcity of the industial raw materials. The crumb rubber factories processed only 30 per cent of the total raw materials required for export in 1983 from the production of rubber in West Sumatra. More than two-third

Table 3.2 West Sumatra : Annual Growth Rates of Gross Regional Domestic Product at 1975 Prices, and Sources of Growth, 1968-1988 (%)

Industrial Origin	Annual Growth Rates				Sources of Growth			
	Pelita I 1968-73	Pelita II 1973-78	PelitaIII 1978-83	Pelita IV 1983-88	Pelita I 1968-73	Pelita II 1973-78	PelitaIII 1978-83	Pelita IV 1983-88
Agriculture	3.83	3.14	4.49	4.06	31.22	18.62	24.10	22.28
Mining	2.92	1.29	32.65	23.79	0.17	0.05	1.95	4.08
Manufacturing	8.93	13.33	12.53	9.65	11.71	17.89	23.36	25.40
Construction	32.68	2.21	1.63	1.33	12.46	1.16	0.71	0.52
Electricity and Drinking Water	5.04	15.81	14.77	11.86	0.15	0.46	0.66	0.83
Transportation and Communication	10.55	12.57	11.32	9.18	9.93	12.42	14.90	16.40
Trade	4.45	13.36	6.84	5.22	13.87	37.80	24.03	20.47
Banking	6.56	11.46	16.07	12.92	0.72	1.17	2.33	3.08
Ownership of Dwelling	1.98	2.20	1.60	1.30	1.27	0.96	0.58	0.42
Public Administration and Defence	11.87	5.96	4.75	4.06	15.76	7.56	5.91	5.20
Services	7.00	5.93	4.57	4.01	2.74	1.95	1.47	1.32
Gross Regional Domestic Product	6.05	7.21	6.80	6.00	100	100	100	100

Sources : Lembaga Penelitian Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Pendapatan Regional Sumatera Barat, 1966-1979 and Pendapatan Regional Sumatera Barat, 1975-1980 (Regional Income of West Sumatra) and Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra : Draft, Fourth Five-Year Development Plan, 1984/85-1988/89).

of the total raw materials required for export of crumb rubber originated from the production of rubber outside West Sumatra. The same situation occurred in the cassia vera processing plants. The improvements of the road connection from West Sumatra to the surrounding neighbouring provinces had made the transportation costs cheaper. Due to this condition, the flows of the raw materials for the agroindustrial projects in West Sumatra became possible.

The sources of growth in the trade sector had been shifted from the marketing of agricultural to the manufacturing products following the trends in overall sources of growth of the Gross Regional Domestic Product. The annual growth rate of the trade sector over the period of Pelita III was estimated to be 6.84 per cent.

The operation of the trade sector has being conducted in a more informal labour intensive way compared to the other sector, including agriculture. Out of 100 persons working in the formal trade sector, about 1,214 persons were concentraded in the informal small scale operations. Export and import activities and some private and state trading companies could be regarded as the formal modern trade sector. The contribution of the trade sector to the Gross Regional Domestic Product was quite significant.

Economic Growth : Prospects, 1984-1990

The prospects of economic growth in West Sumatra depends upon four main activities: agriculture, manufacturing, trade and transportation & communication. The projection of the economic growth of West Sumatra during the period of the next Repelita IV (1984-1988) is estimated to be 6.00 per cent per annum which is higher than the Indonesia's Repelita IV, 5.00 per cent per annum. The initial growth rate is estimated to be 4.1 per cent and the terminal growth rate is 7.0 per cent. By using the extrapolation of the Repelita IV projection, the average growth rate of Gross Regional Domestic Product of West Sumatra over the period of 1983-1990 is 6.38 per cent per annum.

Almost 85 per cent of the sources of growth to the year 1990 will be expected from those four main activities with the leading sector on the manufacturing development. The core of the manufacturing activities is on the cement with the supporting activities on the agroindustrial projects.

The annual growth rate of the manufacturing sector over the next Repelita IV will be 9.65 per cent. The prerequisites for the rapid development of the manufacturing sector has been planned in Pelita II and Pelita III with the construction of the hydroelectric power plants at Batang Agam River and Lake Maninjau. The installed capacity of the respective power plants are 10 MW and 68 MW. The Batang Agam hydroelectric power plant has been operated since 1976 and the Maninjau hydroelectric power plant just finished at the end of 1983. In the meantime a 42.7 MW of the Bandar Buat Steam Electric Power Plant was installed in 1983.

The plan to increase the installed capacity of the electric power plants in Repelita IV will be concentrated on the uses of the hydro power and coal. Preparations have been made to construct Singkarak hydro electric power plant with the installed capacity of 200 MW. The possibility of using the coal for the construction of the a 75 MW steam power plant has begun a few years a go. It is expected that the total installed capacity of the electric power plant in West Sumatra will be 300 MW at the end of Repelita IV. The demand for electricity increased in the last few years at the rate of 20 per cent per year.

The development of the large scale resource base industries will be concentrated on the abundant industrial raw materials available in West Sumatra, such as cement, coal, marbles, However, the agroindustrial resource base activities will be hamper by the lack of the existing raw materials. The prerequisites for the development of the large scale agroindustrial projects in West Sumatra will be on the expansion of the agricultural sector itself. The potential for these activities are promising.

However, the lack of the resource base raw materials seems not to hinder the development of the agroindustries in West Sumatra. Since the last few years, the "hinterland" of West Sumatra has gone beyond the existing administrative boundaries. The increase of export of West Sumatra was mainly due to the inflows of the raw materials from outside the province. In this sense the foot-loose agroindustries either for export or domestic consumption could be developed in West Sumatra. The determination for the sites of the agroindustries should be based on the accessibility of the raw materials and not on the local potentials only.

To a certain extent, development without the resource base should be directed toward the expansion of the "service" sectors in the broadest sense. The main leading sector in the service sectors will be trade. The sources of growth from the trade sector will be expected to contribute about one fifth of the projected growth rate in the next Repelita IV.

Trade and transportation & communication should go along together. The expansion of the transportation & communication facilities will be crucial in attracking either the flows of the raw materials or reducing the costs of production and marketing. Since Teluk Bayur is the largest harbour in the western part of Indonesia, it should be used optimally for the development of these regions.

Trade connection with the foreign countries located in the western part of Indonesia such as Europe, America, Africa, and South Asia will be less expensive if exported through Teluk Bayur harbour. It is not surprising that almost 80 per cent of the destination of export commodities of West Sumatra went into these directions. On the contrary, trade connections with the countries

located in the eastern part of Sumatra are negligible. It is less expensive to send the export commodities to these directions by road transportation either to Pekanbaru or Dumai (Riau Province) and then shipped and exported to these countries.

In addition to the efforts in expanding the transportation & communication networks, the expansion of the resource base agro-industrial products itself are being underway. The efforts to increase the rubber production with the nucleus estate system began at Abai Siat on the southern part of Kabupaten Sawahlunto/Sijunjung in 1977/78. The total area of 10,000 ha had been planted with the high yielding variety of rubber seed over the period of four years. The Abai Siat project -- which receives aid from the West Germany's government -- became a "pilot project" in promoting the quality of the smallholders' rubber in West Sumatra. The project seems to be very successful.

The efforts in Abai Siat has attracted the State Plantation Enterprise to invest in a 1,000 ha rubber plantation on the north of Kabupaten 50 Kota. Planting already began since 1983. In the meantime, the Provincial Government Smallholders Extension Service assisted the smallholders plantation crops to improve the condition of their rubber trees.

The West Germany's government assisted also the Provincial Government of West Sumatra in developing the lagging area of West Pasaman in the northern part of West Sumatra. The area plan of West Pasaman was prepared in 1974/75. The implementation began a few years later. The core of the programmes consisted of planting a 12,000 ha oil palm in the fertile land of the former Ophir plantation. It is expected that the first production of oil palm will come out in 1985. The oil palm investment was financed and operated by the State Plantation Enterprise (PTP VI). On the basis of the successful efforts in planting the oil palm at Pasaman, a private investment explored the possibilities of planting the oil palm in an area of 8,000 ha at Tiku. The investment in oil palm plantation is very promising. The World Bank projected the increase of the price of palm oil more than double in the next decade.[2/]

2/ The World Bank, Price Prospects for Major Primary Commodities (July 1982), Vol. I, p. 31.

Oil palm is a new commodity in West Sumatra. Efforts to introduce the new commodity included also planting a 3,000 ha cocoa since 1981. It is expected that the first production of cocoa will come out in 1984.

Although West Sumatra used to export tea, however, the tea was produced at Kerinci, in the neighbouring province of Jambi. The climate of West Sumatra seems to be favourable also for planting tea. A former tea plantation at Halaban, Kabupaten 50 Kota was rehabilitated by a cooperative unit in an area about 200 ha. The production of tea from this plantation usually oriented toward the local and regional markets. By improving the processing of tea in this area, the products could be exported in the future. The expansion of tea plantation on a more commercial basis was conducted by one of the State Plantation Enterprise (PTP VIII) in an area of 800 ha near Solok.

Rehabilitation of the smallholders coffee plantation was already begun since 1981 in the Kabupaten Pasaman. Since West Sumatra already has an excess supply of coffee, efforts in this direction will not to be continued. The difficulties in exporting coffee, by quota system, has discouraged the coffee growers.

Although the efforts to rehabilitate the former plantations with the total area of 54,247 ha in West Sumatra have begun with the planting of oil palm in West Pasaman and tea in Solok, nevertheles, the potential of these former plantations are still not fully exploited. With the recovery of the world economy in the near future, the prospects of the plantation crops seems to be promising.

A large scale efforts in modernizing the marine fishery of West Sumatra has begun in 1981/82 with the Asian Development Bank's funding Sumatra Fisheries Development Project. The five-year project will be expected to increase the production of marine fishery either for the local consumption or for export.

The ADB fishery project will provide the fishermen with the inboard marine diesel engine trollers, long liners, purse seiners, motorization of small fishing boats, workshops, cold storages, ice plants, training for skippers and enginers, extension services and other related activities. The marine fishery development were concentrated at seven fishing centres. Six out of the seven fishing

centres were located in West Sumatra, i.e., Bungus (Padang), Pariaman, Painan, Tiku, Air Bangis and Sikakap (Mentawai).

The marine fishery development at Sikakap (Mentawai) has been suggested to be related to the planned transmigration settlement at the islands.[3/] However, the fishery development will be operated either on a cooperative or commercial private enterprises. After the ADB's funding project terminated, it is expected that the fishermen could be self-propelling in the marine fisheries development.

A new cattle breeding station was open since 1982 in an area of 2,000 ha in West Pasaman. It was expected that over the period of five years, about 500 improved cattles -- cows and buffaloes -- will be turned over to the farmers in improving the local breeds. The efforts to increase the pasture grass for cattle's feed on a commercial basis have been explored in the last few years. The market of the cattle's feed will not to be limited to West Sumatra only, but on a national scale.

Cattles have being breeding in West Sumatra on a small scale basis, particularly in the southern coast of the province. The total number of cattles in 1982 were 437,758 heads, with the annual growth rate in the seventies about 2.6 per cent. The central cattle breeding station at Padang Mangatas has become the main livestock breeding centre in West Sumatra.

The rapid increase in the livestock population was on the poultry husbandry although mostly as the household activities. The growth rate of the poultry population was about 10 per cent annually over the period of 1970- 1982 . With the rapid increasing trends of the poultry population, the investment in the chickens' feed on a commercial basis has begun since the last few years.

With the changing government policy in the forestry, efforts have been made in producing and exporting plywood instead of log. The main sources of timber production in West Sumatra is on the

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3/ Lembaga Penelitian Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Survey dan Perencanaan Dalam Rangka Menyusun Program Pengembangan Sosial Ekonomi Wilayah Pemukiman Transmigrasi D Daerah Perbatasan Pantai Barat Sumatera (Planning for Transmigration Settlement in the Offshore Islands of Sumatra)(Padang:1983).

islands of Mentawai. The available timber production seems to be sufficient in producing plywood in West Sumatra. In the last few years, production and export of plywood increased rapidly : from 1.5 thousand ton to 68.1 thousand ton (1979-1982).

In the non-agricultural sector, intensive surveys have being conducted in the last fifteen years to explore the various possibilities in the mining and quarrying sectors. Except for selected few main commodities, such as limestones, coal, marble and the possibility of oil, almost all mining potentials of West Sumatra could be considered as small scale mining deposits.

The limestone and other related cement raw materials has the potential deposit of at least 120 million tons. With an annual production capacity of 4 million ton, the available raw materials could be used for 30 years. Besides the cement raw materials, the 82 year old Ombilin coal mining has a potential deposit of 185 million ton. With an annual production of 500,000 to 600,000 ton, the deposits could last at least for 370 years. In the meantime, a new coal deposits was found at Sinamar, Kabupaten 50 Kota. The potential deposits was estimated to be around 150 million tons.

In the last three years, explorations were made by CALTEX to find oil on the high plateau of West Sumatra. Drilling began in 1983. After arriving at 2,825 feet from the earth surface, some indications were found on the possibilities of the availability of oil in West Sumatra. The planned drilling of 10,800 feet will be finished in next few months.

An estimated 32 million of marble boulder deposits were found a few years ago at Kabupaten 50 Kota. Different varieties of grey, black and brown marble boulder can produce at least 400 metre squares of marble per month. A trial production has been made recently to test the quality of the marble.

About 100 km from the marble boulder areas, a silica sand deposit with 95 per cent intensity of $Si\ O_2$ is available in large quantity. The Chemical Research Institute at Baogor strongly recommended the use of the sand for the manufacture of glass.

Several indications have been found on the possibilities of the availability of lead, gold, silver, zinc, iron sand, and other mining deposits.

With the changing patterns of growth in the next Repelita IV, the share of the agricultural sector will be declined to 31.21 per cent of the Gross Regional Domestic Product in 1988, compared to 34.26 per cent at the beginning of the planning period. The contribution of the agricultural sector will continue to be declined in 1990 -- less than 30 per cent. It is not surprising, however, that the share of manufacturing, trade, transportation & communication sectors will be increased rapidly. See Table 3.3.

Table 3.3 West Sumatra : Distribution and Changes in Percentage Distribution of Gross Regional Domestic Product, 1968-1988

Industrial Origin	Percentage Distribution of Gross Regional Domestic Product					Changes in Percentage Distribution of Gross Regional Domestic Product			
	1968	1973	1978	1983	1988	Pelita I 1968-73	Pelita II 1973-78	PelitaIII 1978-83	Pelita IV 1983-88
Agriculture	51.53	46.36	38.20	34.26	31.21	- 5.17	- 8.16	- 3.94	- 3.05
Mining	0.38	0.32	0.24	0.72	1.57	- 0.06	- 0.08	+ 0.48	+ 0.85
Manufacturing	7.50	8.57	11.31	14.69	17.40	+ 1.07	+ 2.74	+ 3.38	+ 2.71
Construction	1.37	4.19	3.30	2.57	2.06	+ 2.82	- 0.89	- 0.73	- 0.50
Electricity and Drinking Water	0.19	0.18	0.26	0.37	0.49	- 0.01	+ 0.08	+ 0.11	+ 0.12
Transportation and Communication	5.21	6.41	8.18	10.06	11.66	+ 1.20	+ 1.77	+ 1.82	+ 1.66
Trade	19.49	18.06	23.87	23.91	23.04	- 1.43	+ 5.81	+ 0.04	- 0.87
Banking	0.66	0.68	0.82	1.24	1.71	+ 0.02	+ 0.14	+ 0.42	+ 0.47
Ownership of Dwelling	4.20	3.46	2.72	2.12	1.69	- 0.74	- 0.74	- 0.60	- 0.43
Public Administration and Defence	7.15	9.34	8.81	8.00	7.29	+ 2.19	- 0.53	- 0.81	- 0.71
Services	2.32	2.43	2.29	2.06	1.87	+ 0.11	- 0.14	- 0.23	- 0.19
Gross Regional Domestic Product	100	100	100	100	100	0	0	0	0

Sources : See Table 3.2.

TRADE : PROBLEMS AND PROSPECTS

Trade played a dominant role in the process of development of West Sumatra. Although some problems were encountered in the efforts to construct the balance of trade of the West Sumatra's economy -- particularly to the interislands and interlands trade relations -- a rough qualitative analysis will be highlights in this section.

The overall balance of trade of West Sumatra was expected to be deficit and continue to the year 1990. West Sumatra imported a large part of her consumption goods by interislands and interlands trade. On the other hand, imported of raw materials & auxiliary goods and capital goods were conducted through the international trade channels.

Trade outflows of West Sumatra almost consisted of the agricultural commodities except a few items such as cement, coal and plywood. Export by the interislands and interlands channels consisted of cement, rice, vegetables and selected smallholding plantation crops. International export commodities, however, almost consisted of the agroindustrial production and in the last few years by cement and coal.

The balance of interislands and interlands trade seems to be in a continous structural deficit. Although the scene on the international trade was different, however, with the rising development activities after 1980, import began to surpass export and will be expected to be deficit to the year 1990.

The fourth five-year development plan of Indonesia projected a rising increase of foreign exchange gap. With the gloomy prospect of oil and the slowing recovery of the industrial countries, the current account of the Indonesia's balance of payments will be continously deficit increasingly over the next five years.

Due to this situation the analysis of the performance and prospects of trade of West Sumatra will be focussed on the international trade than the domestic interislands and interlands trade. Although investment possibilities could be directed toward the national market, the analysis will be made in the sectoral agroindustrial and manufacturing activities.

BALANCE OF INTERNATIONAL TRADE

The performance of export of West Sumatra was influenced by the national trade and monetary policy, on the one hand, and the global economic situation,on the other hand. The 1980 recession in the industrial countries had its severe impact on the Indonesian economy in 1982. The growth rate of the economy dropped to 2.2 per cent, while the value of export declined to 13 per cent.

Since the composition of the export commodities of West Sumatra almost the same with Indonesia (excluding petroleum & gas), the trends of the value of exports followed closely one another. The impact of the recession had dropped the value of export over the period of 1981-1982 about 30 per cent compared to the value of export in 1980. See Table 3.4.

The growth of export of West Sumatra during the seventies was 27 per cent per annum, which was higher than the national growth of 25 per cent per annum. With the recovery of the industrial countries, the response of West Sumatra seems much quicker than the national response. The value of export of West Sumatra increased 32 per cent while the renspons of Indonesia was 21 per cent only.

The growth of import, however, was much slower in the seventies and rapidly increasing after 1980. This reflected the rapid development efforts of the province in the last few years. The import composition was mostly consisted of capital goods, such as iron and steel,electric power machineries, road motor vehicles,heavy duty equipments, etc. With the rapid increased of import after 1980, the balance of international trade turned from a surplus to a deficit condition. Although the balance of international trade at the provincial level has no practical policy implication, the trends, at least, will give some insights on the position of West Sumatra with her international economic relations.

EXPORT

Trends and Composition of Exports,1966-1983

The export commodities of West Sumatra could be classified into three groups :

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Trends and Composition of Exports,1966-1983

The export commodities of West Sumatra could be classified into three groups :

Table 3.4 West Sumatra and Indonesia : Trends and Projections of Value of Exports and Imports, 1966-1990

Year	Export			Import				
	West Sumatra	Indonesia Excluding Petroleum Products	Export Ratio	West Sumatra			Indonesia Excluding Petroleum Products	Import Ratio Excluding Petroleum Products
				Total	Petroleum Products	Excluding Petroleum Products		
	(US$ Million)		(%)	(US$ Million)				(%)
(1)	(2)	(3)	(4)=(2:3)	(5)	(6)	(7)	(8)	(9)=(7:8)
1966	14.4	475.3	3.0	1.3			519.2	
1967	12.1	425.8	2.8	2.9			636.6	
1968	12.0	433.2	2.8	3.1			709.7	
1969	11.6	470.8	2.5	3.9			769.8	
1970	13.0	661.8	2.0	3.6			986.8	
1971	14.4	755.7	1.9				1,082.4	
1972	14.4	864.6	1.7	17.6	2.2	15.4	1,531.4	1.0
1973	28.4	1,602.1	1.8	16.1	2.1	14.0	2,685.3	0.5
1974	41.2	2,214.9	1.9	19.5	3.8	25.7	3,658.9	0.7
1975	30.5	1,791.7	1.7	60.4	7.7	52.7	4,516.3	1.2
1976	62.1	2,542.4	2.4	34.0	4.0	30.0	5,235.4	0.6
1977	92.4	3,474.5	2.7	47.8	6.1	41.7	5,497.3	0.8
1978	84.5	3,657.8	2.3	92.3	5.9	86.4	6,110.4	1.4
1979	113.9	5,426.3	2.1	47.5	6.0	41.5	6,408.8	0.6
1980	130.3	6,168.9	2.1	125.8	67.2	58.6	9,085.9	0.6
1981	89.6	4,501.3	2.0	162.7	80.1	82.6	11,550.4	1.2
1982	90.5	3,929.2	2.3	230.3	66.7	163.6	13,314.1	1.2
1983 a/	119.1	4,750.0	2.5	186.8	63.7	123.1	12,869.0	1.0
1984	128.1	5,700.0	2.2	192.4	66.8	125.6	13,107.0	1.0
1985	149.9	6,669.0	2.2	211.0	70.2	140.8	14,579.0	1.0
1986	172.4	7,669.0	2.2	229.7	74.1	155.6	16,011.0	1.0
1987	199.9	8,896.0	2.2	249.8	77.4	172.4	17,639.0	1.0
1988	233.9	10,408.0	2.2	270.2	81.2	189.0	19,253.0	1.0
1989 b/	273.6	12,177.0	2.2	292.5	85.3	207.2	21,014.7	1.0
1990	320.1	14,246.6	2.2	316.6	89.6	227.0	22,937.6	1.0

a/ Projections of Indonesia's exports and imports (excluding petroleum and gas) are calculated on the basis of the fiscal years (April to March) as used in the Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (Draft, Fourth Five-Year Development Plan, 1984/85-1988/89) instead of the calendar year -- for the period of 1984-1988. However, the projections of West Sumatra's exports and imports are calculated on the basis of the calendar years, as in Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra : Draft, Fourth Five-Year Development Plan, 1984/85-1988/89).

b/ Extrapolations of the fourth five-year development plans' projections.

Sources: Central Bureau of Statistics, Exports by Commodity, Country of Destination and Port of Export, and Central Bureau of Statistics, Imports by Commodity and Country of Origin (Jakarta : several issues). Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 : Republik Indonesia, and Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89.

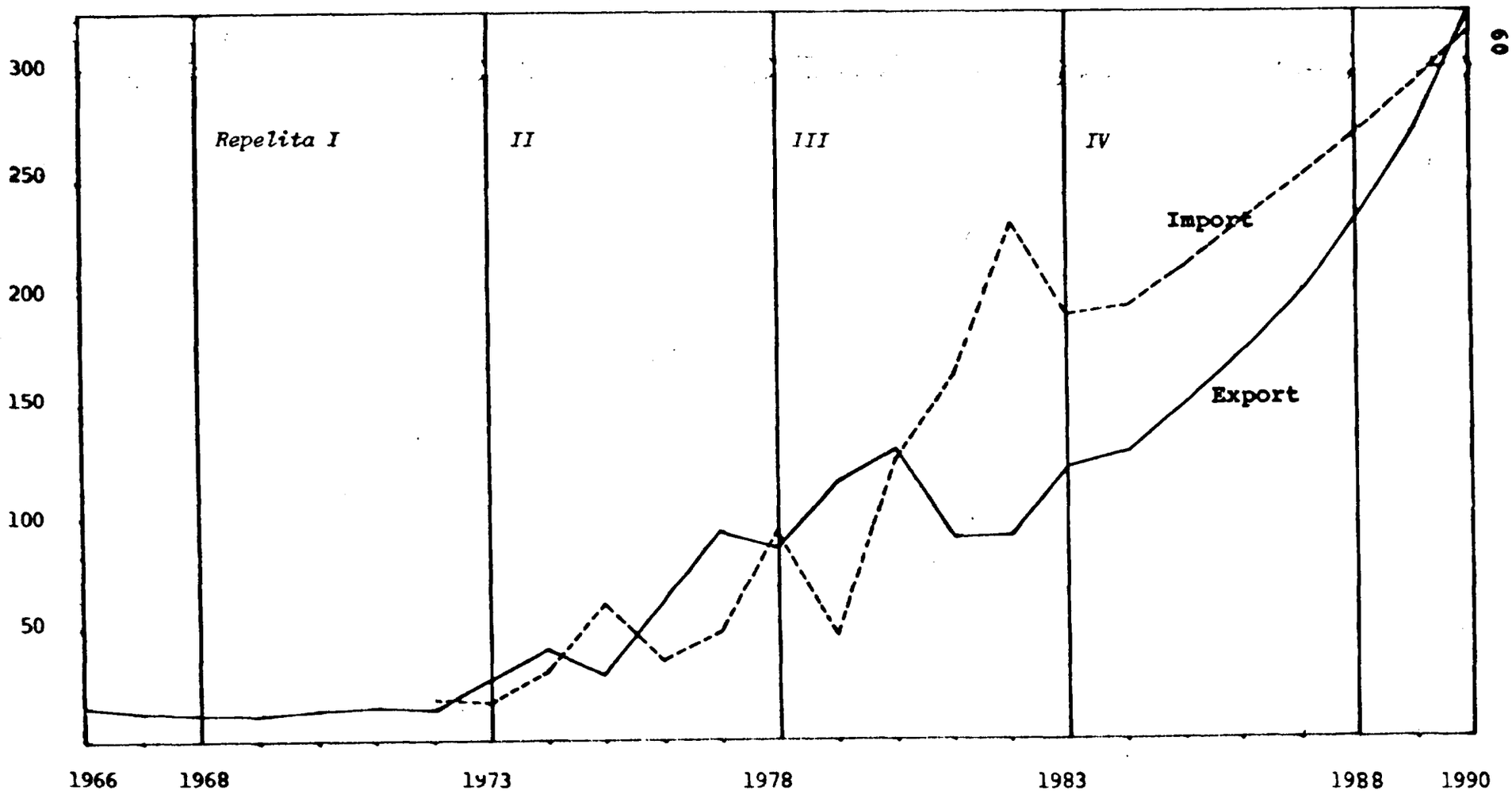

Figure 3.2. WEST SUMATRA : TRENDS AND PROJECTIONS OF EXPORT AND IMPORT, 1966-1990

First, export from internal production. The raw materials processed were entirely came from the production inside West Sumatra, such as, coffee, rattan, copra cakes, saw log,gambir, jelutung, cement, coal, plywood, and other minor commodities.

Second, export from external production. The raw materials and production of these group of commodities entirely came from outside West Sumatra, such as tea and urea (fertilizer).

Third, export from the combination of internal and external production. The raw materials produced inside West Sumatra were combined with imported raw materials from the neighbouring provinces. These group of commodities consisted of rubber and cassia vera.

The increasing trends of exports of West Sumatra in the seventies were mainly dues to the increasing inflows of the export raw materials from outside the province. The Internal Sources Ratio (ISR) 4/ of West Sumatra declined rapidly from 90 to 50 over the period of 1970-1980.

Judging from these trends, the basic foundation of export of West Sumatra were very shaky. The resource base seems not to support the export of the province. In the meantime, some arguments have been put forward, that the export of West Sumatra will loose its ground if the neighbouring provinces tries to detour the trade flows through their own habours.

Exports without resource base, which was supposed to be the main obstacle for development seems to loose ground with the experience of Singapore, Hongkong, South Korea, and Japan. West Sumatra, however, should not be treated as an "isolated" country within a country but as an integrated part of Indonesia as a whole. With this concept, the resource base should be treated not in a narrow meaning but on a more broader aspect.

The resource base, however, could not be limited to the concept of the administrative units, such as province, kabupaten or municipalities but more on the economic units. Although cassia ve-

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4/ The ratio between the export earnings received from the internal production and the total value of export.

Table 3.5 West Sumatra : Trends of Value of Exports by Commodity, 1977-1983
(US$ '000)

Commodities	1977	1978	1979	1980	1981	1982	1983
Crumb Rubber	29,655.9	33,689.5	40,731.1	55,732.8	38,193.5	33,193.3	45,806.4
Plywood	-	-	368.7	1,046.7	7,034.3	17,005.4	22,469.8
Cassia Vera	4,356.0	5,740.8	7,015.4	11,643.8	12,410.2	16,273.9	18,464.4
Coffee	27,331.9	15,585.7	17,189.6	10,823.6	6,611.2	4,011.3	11,495.1
Tea	8,690.0	6,764.8	4,897.9	3,691.0	3,254.1	3,811.3	5,128.5
Coal	-	69.3	148.9	256.0	437.8	1,567.2	4,805.9
Rattan	4,354.2	4,487.2	10,115.4	7,179.4	5,706.0	6,054.0	6,065.4
Copra Cakes	1,008.9	1,008.0	1,012.0	1,007.0	1,090.8	810.0	1,103.6
Urea	-	650.0					-
Sawlog	14,153.7	13,773.1	25,713.7	27,826.6	7,376.1	579.8	-
Gambir	260.1	428.9	424.6	736.7	347.5	562.5	781.2
Jelutung	-	4.0	59.4	542.0	499.0	671.8	759.9
Cement	-	-	-	-	240.0	240.0	743.7
Others	2,585.7	2,348.4	6,215.3	9,834.1	6,435.1	5,712.8	1,476.1
Total	92,396.4	84,549.7	113,892.0	130,319.7	89,635.9	90,493.3	119,100.0

Sources : Central Bureau of Statistics, Exports by Commodity, Country of Destination and Port of Export (Jakarta : several issues) except the 1983 figures from the Bank Indonesia, Padang.

Table 3.6 West Sumatra : Trends of Volume of Exports by Commodity, 1977-1983
(ton)

Commodities	1977	1978	1979	1980	1981	1982	1983
Crumb Rubber	42,586.8	43,617.2	40,467.6	52,995.1	40,408.5	45,229.8	46,164.8
Plywood	-	-	1,483.1	4,784.7	33,785.3	68,122.3	a/
Cassia Vera	5,133.6	8,571.7	10,797.5	14,179.1	11,699.2	14,174.5	16,578.3
Coffee	8,453.7	7,861.0	7,190.0	4,365.0	4,235.0	2,423.0	5,995.4
Tea	4,040.5	4,207.8	3,480.6	2,688.2	2,750.6	3,053.2	2,914.4
Coal	-	3,300.0	5,516.1	8,000.0	12,086.7	29,100.0	131,834.4
Rattan	6,176.9	5,273.7	8,911.4	4,764.1	3,197.5	3,622.9	b/
Copra Cakes	8,679.5	9,000.0	7,600.0	8,900.0	9,485.1	7,300.0	8,193.0
Urea	-	5,000.0					-
Sawlog	250,147.1	227,351.7	220,598.0	171,082.1	44,850.3	3,337.0	-
Gambir	391.4	474.7	492.2	766.0	358.9	529.4	783.9
Jelutung	-	20.0	63.0	250.0	230.0	385.0	c/
Cement	-	-	-	-	5,000.0	5,000.0	20,000.0
Others	2,175.8	1,490.4	26,954.2	51,110.1	68,014.4	81,192.6	...
Total	327,785.3	316,768.2	333,553.7	323,884.4	236,501.5	263,469.7	...

a/ 121,013.8 m^3. b/ rattan (1,252.1 ton) and manau (1.6 million pieces).
c/ consists of 620 ton and 14,823 pieces.

Sources : Central Bureau of Statistics, Exports by Commodity, Country of Destination and Port of Export (Jakarta : several issues) except the 1983 figures from the Bank Indoresia, Padang.

ra or tea came from Kerinci area in the neighbouring province of Jambi but economically, it belongs to West Sumatra.

The export patterns of the country of destination of West Sumatra influenced also the export oriented agroindustries to be established in the province. Almost 85 per cent of West Sumatra's export were and are destined to the countries located in the western part of Indonesia, particularly Europe and America. When the trade relations were going into these directions, it was not surprising, West Sumatra will be economically preferable as the exit port and the processing of the export raw materials. Teluk Bayur, as the main ocean port in the western part of Indonesia, could be used as the main outlet for export.

The export composition of West Sumatra and the country of destination have being changing over the last two decades. In the sixties, the export commodities of West Sumatra consisted only of the agricultural or agroindustrial products. However, at the second half of the seventies , industrial and mining products began to be exported from West Sumatra, i.e., cement, plywood, and coal. Cement were exported to Bangladesh and India. Plywood to Europe, South Korea and Hongkong and coal to Bangladesh, Malaysia and other Asian countries.

Log or saw-log which influenced the composition of the export commodities in the early seventies, had been changed by plywood. However, crumb rubber, plywood, cassia vera and coffee dominated the export of West Sumatra -- almost 83 per cent of the total export value in 1983.

Although Europe and United States of America remain the important trade relations of West Sumatra, nevertheles, efforts have being made in the last few years to broaden the trade relations with other countries. At the present time, West Sumatra has the trade relation with more than 56 countries [5/], out of which about

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5/ ASIA : Singapore,Japan,Pakistan,South Korea,Thailand,Hongkong,Malaysia,India,Bangladesh,Sri Lanka,Taiwan,Philippines,and other Southeast Asia countries. ARAB : Saudi Arabia,Kuwait,Jordan, Syria, ,Yaman,Oman,Iraq,Turkey,and other West Asia countries. EUROPE : United Kingdom,Netherland,France,Belgium,Denmark,Italy, Sweden,Greece,Finland,Czekoslovakia,Spain,Portugal,Norway,Poland, Switzerland,Bulgaria,Hongaria,Romania, Yusgoslavia and USSR. AMERICA : United States of America, Canada,Venezuela,Mexico,Brazil, Argentina,Nicaragua, and other Latin American countries. AFRICA...

Table 3.7 West Sumatra : Trends of Value of Exports by Country of Destination, 1977-1983 (US$ '000)

Country	1977	1978	1979	1980	1981	1982	1983
ASIA	17,623.1	18,903.1	36,683.0	39,336.0	18,740.7	21,033.9	18,388.1
Singapore	4,817.1	9,937.4	15,705.4	12,707.2	6.954.2	6,662.6	5,381.0
Japan	5,492.0	3,643.7	6,874.8	11,528.9	4,047.2	636.3	1,630.4
Pakistan	2,269.4	1,928.8	582.0	2,647.3	664.8	708.5	2,187.3
South Korea	4,749.3	2,305.2	5,373.8	5,125.0	-	1,845.7	1,603.1
Malaysia	-	-	1,351.3	-	2,156.1	4,641.3	3,639.8
Bangladesh	-	-	3,101.0	2,177.8	867.9	1,357.2	292.0
Others	295.3	1,088.0	3,694.7	5,149.8	4,050.5	5,182.3	3,654.5
ARABIAN COUNTRIES	387.3	938.5	1,051.5	706.8	2,126.2	2,501.2	2,325.7
EUROPE	47,091.3	31,159.0	33,501.3	37,371.0	26,513.0	22,234.1	37,887.2
United Kingdom	2,552.0	2,193.9	1,232.1	945.6	107.1	1,962.4	
Netherlands	11,024.7	6,993.6	7,550.4	6,094.5	7,394.5	6,347.1	
France	4,767.7	1,757.2	1,108.3	1,171.7	1,001.9	2,204.9	
R.F. Germany	7,249.6	3,335.2	4,490.2	8,794.2	5,535.9	4,130.1	
Belgium	1,955.8	606.7	679.5	636.2	2,360.5	2,284.9	
Spain	6,812.9	5,084.9	9,465.4	7,593.9	5,418.1	1,494.0	
Others	12,718.6	11,187.5	8,975.4	12,134.9	4,695.5	8,810.7	
AMERICA	26,910.0	32,382.9	41,037.3	52,205.4	41,736.4	44,084.8	58,769.0
United States of America	26,520.2	32,306.6	40,954.4	51,820.0	41,300.0	41,484.7	48,599.8
Others	389.8	76.3	82.9	385.4	436.4	2,600.1	10,169.2
AFRICA	96.2	1,001.2	1,584.3	685.0	235.5	402.2	1,374.1
AUSTRALIA AND NEW ZEALAND	288.5	165.0	34.6	15.5	283.6	237.1	326.6
TOTAL	92,396.4	84,549.7	113,892.0	130,319.7	89,635.9	90,493.3	119,100.0 a/

a/ Including US$ 29.3 thousand to elsewhere.

Sources : Central Bureau of Statistics, Exports by Commodity, Country of Destination and Port of Export (Jakarta : several issues) except the 1983 figures from the Bank Indonesia, Padang.

13 countries have become the regular trading partners of West Sumatra. See Table 3.8.

Prospects of Exports, 1984-1990

Since the trends of the value of West Sumatra's export were highly correlated with the Indonesia's export, a regression analysis has been made between these export figures.[6/] The projections of the value of Indonesia's export for the period of the next Relita IV are quoted from the draft of the Fourth Five-Year Development Plan, 1984/85-1988/89. The estimated projections of the value of West Sumatra's export by using this method has been used in the preparation for the draft of West Sumatra's Fourth Five-Year Development Plan, 1984/85-1988/89.

The estimated projections of the value of West Sumatra's export through this approach, has the advantage of integrating West Sumatra into the Indonesian economy. The share of the value of West Sumatra's export will be around 2.2 per cent of the national projections -- which is nearly remain constant compared to the trends in the sixties and seventies.

The projections, however, are being re-check with the potentials of the export commodities of West Sumatra.

The value of West Sumatra's export to the year 1990 will grows approximately about 15 per cent per annum at current market prices -- achieving US$ 320.1 million. The ISR, however, declines to 53 from 60 in 1983. This figure indicates, that the internal supply of export raw materials will be declined in the next seven years. Although the internal production increase rapidly, but the growth of export will surpass the growth of production.

With the projected increasing prices of the four West Sumatra's main export commodities -- rubber, plywood, cassia vera and

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AFRICA : Egypt, Sudan, Marocco, Tanzania, Zambia, Kenya, and Algiers.
AUSTRALIA AND NEW ZEALAND : Australia, and New Zealand.

6/ The regression equation between the value of West Sumatra's export (y) and Indonesia (x) is $y = 0.056 + 0.0225\ x$. $n = 16$, $r = 0.9722$.

Table 3.8 West Sumatra : Trends and Projections of Value of Exports by Sources, 1966-1990 (US$ Million)

Year	Total Export	Internal Sources	External Sources	Internal Sources Ratio (%)
1966	14.4	12.4	2.0	86
1967	12.1	11.2	0.9	93
1968	12.0	11.2	0.8	93
1969	11.6	11.0	0.6	95
1970	13.0	11.7	1.3	90
1971	14.4	12.4	2.0	86
1972	14.4	12.4	2.0	86
1973	28.4	19.6	8.8	69
1974	41.2	26.2	15.0	74
1975	30.5	20.7	9.8	68
1976	62.1	36.9	25.2	59
1977	92.4	57.0	35.4	62
1978	84.5	46.1	38.4	55
1979	113.9	68.0	45.9	60
1980	130.3	64.8	65.5	50
1981	89.6	49.1	40.5	55
1982	90.5	48.6	41.9	54
1983	119.1	71.8	47.3	60
1984	128.1	70.9	57.2	55
1985	149.9	82.1	67.8	55
1986	172.4	93.7	78.7	54
1987	199.9	107.8	92.1	54
1988	233.9	125.3	108.6	54
1989	273.6	145.7	127.9	54
1990	320.1	169.6	150.5	53

Note : Projections begin from 1984.

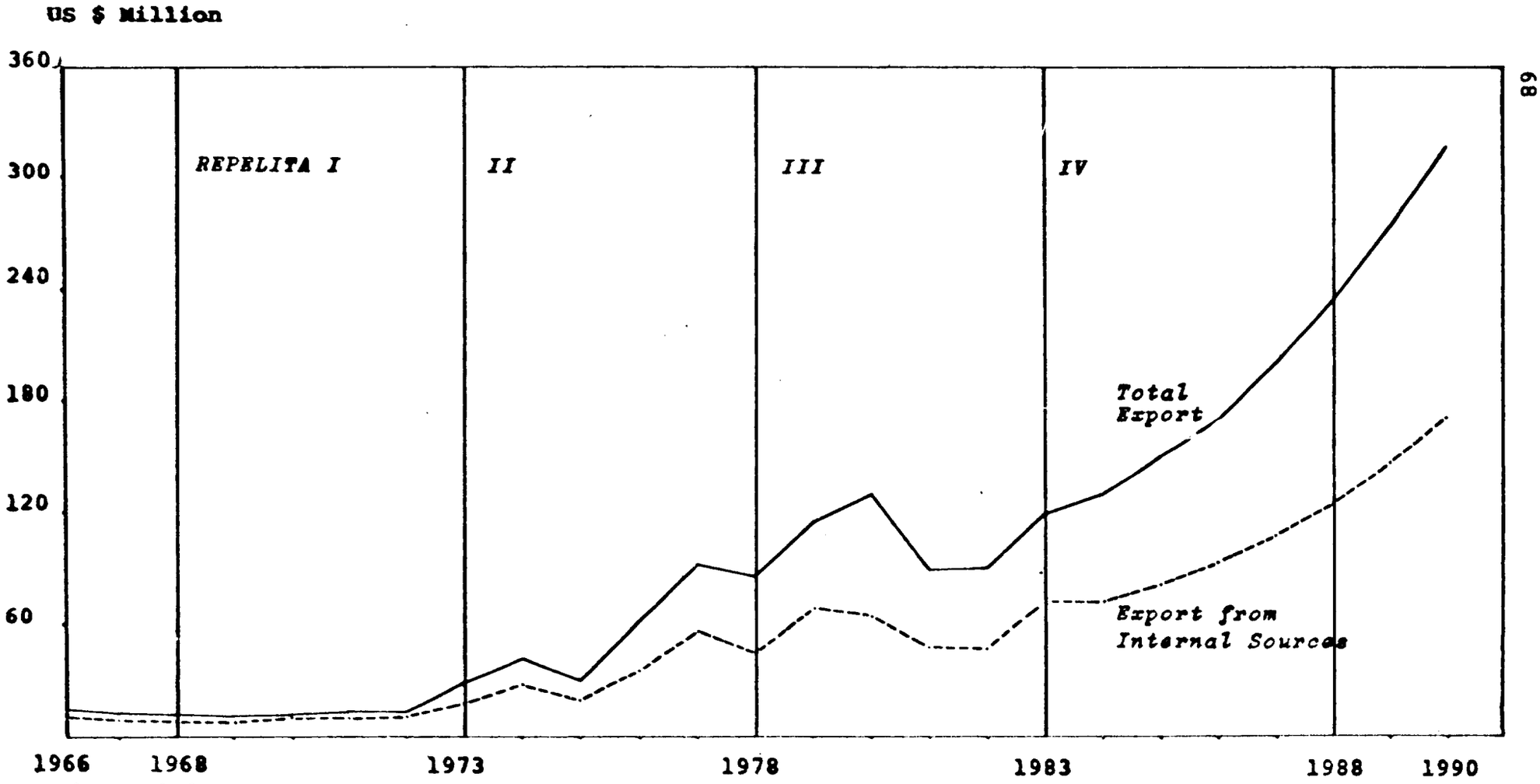

Figure 3.3. WEST SUMATRA: TRENDS AND PROJECTIONS OF VALUE OF EXPORTS BY SOURCES, 1966-1990

coffee [7] -- the supply will respons to the price although not at the same degree. The crumb rubber and coffee response to the increasing export price were higher than the cassia vera. The sleeping smallholders rubber plantation areas will be tapped by the attraction of the increasing price. While the excess supply of coffee could be exported easily -- although usually this could not be done due to the limitation of the export of coffee. Cassia vera, however, mostly influenced by the supply side rather than by the export price.

The traditional market of cassia vera -- through Singapore or directly to Europe -- has being enlarged in the last few years by exploring new markets in various parts of the world. The results were very successful. West Sumatra exported 14,174.5 ton of cassia vera, with the total value of US$ 16.3 million, to 33 countries [8] in 1982. It is projected that the total export value of cassia vera in 1990 will be double than the present earnings.

The export of crumb rubber will still follow the traditional trade relations -- Europe and USA -- with the projected value of US$ 121.5 million in 1990. In the meantime coffee will be expected to increase to US$ 19.9 million.

The export of cement and coal are expected to increase rapidly in the next Repelita IV. Tea which formerly came only from the negihbouring province will be expected to be added by the local production of tea at Halaban and Solok. While palm oil will enters the international market, as the new commodity of West Sumatra, in the next few years.

7/ World Bank, op cit.

8/ ASIA : Singapore, Japan, Pakistan, Scuth Korea, Thailand, Hongkong and Malaysia. ARAB : Kuwait, Jordan, and Syria. EUROPE : United Kingdom, Netherland, France, R.F.Germany, Belgium, Denmark, Italy, Sweden, Greece, Finland, Czekoslovakia, Spain, Portugal, Bulgaria, Hongaria, Romania, and USSR. AMERICA : United States of America, Canada, Venezuela, Mexico, Brazil, and other Latin American countries. AUSTRALIA .

Table 3.9 West Sumatra : Trends and Projections of Export and Production of Crumb Rubber and Cassia Vera, 1969-1990

Year	Crumb Rubber					Cassia Vera				
	Value of Export	Volume of Export	Required Raw Materials for Export	Production	Production Export Ratio	Value of Export	Volume of Export	Required Raw Materials for Export	Production	Production Export Ratio
	(US$'000)	('000 Ton)	('000 Ton)	('000 Ton)	(%)	(US$'000)	(Ton)	(Ton)	(Ton)	(%)
(1)	(2)	(3)	(4)	(5)	(6)=(5:4)	(7)	(8)	(9)	(10)	(11):(10:9)
1969	6,872.0	28.5	57.1	21.8	38	3,020.7	2,308.0	3,000.4	5,675	189
1970	6,957.0	22.5	45.0	25.4	56	2,995.3	2,464.1	3,203.3	2,134	67
1971	6,950.9	26.3	52.6	17.9	34	2,647.6	2,753.7	3,579.8	2,345	66
1972	5,833.7	29.6	59.2	20.6	35	2,204.5	3,545.2	4,608.8	2,246	49
1973	14,612.4	38.4	76.8	29.0	38	3,735.4	4,038,9	5,250.6	3,000	57
1974	19,579.1	34.3	68.6	18.8	27	5,189.5	2,936.5	3,817.5	2,463	65
1975	11,671.0	27.5	55.0	15.2	28	2,752.9	2,988.8	3,885.4	1,917	49
1976	27,415.7	43.6	87.2	18.1	21	3,457.0	4,400.7	5,720.9	1,323	23
1977	29,655.9	42.6	85.2	17.9	21	4,356.0	5,133.6	6,673.7	1,628	24
1978	33,689.5	43.6	87.2	18.2	21	5,740.8	8,571.7	11,143.2	2,551	23
1979	40,731.1	40.5	80.9	19.3	24	7,015.4	10,797.5	14,036.8	2,739	19
1980	55,732.8	53.0	106.0	20.9	20	11,643.8	14,179.1	18,432.8	3,090	17
1981	38,193.5	40.4	80.8	21.7	27	12,410.2	11,699.2	15,209.0	7,414	49
1982	33,193.3	45.2	90.5	25.4	28	16,273.9	14,174.5	18,426.9	7,219	39
1983	45,806.4	46.2	92.3	27.3	30	18,464.4	16,578.3	21,551.8	9,774	45
1984	50,674.3	48.3	96.5	29.4	30	13,780.7	12,304.2	15,995.5	10,106	63
1985	60,752.4	51.5	103,3	31.6	31	14,359.7	12,596.2	16,375.1	10,450	64
1986	69,934.6	54.2	108.4	33.9	31	16,791.9	13,763.9	17,893.1	10,805	60
1987	79,717.1	56.9	113.9	36.5	32	19,411.1	14,931.6	19,411.1	11,172	58
1988	91,073.4	59.9	119.8	39.3	33	22,581.0	16,245.3	21,118.9	11,552	55
1989	106,273.0	63.6	127.3	42.1	33	25,987.3	17,559.0	22,826.7	11,945	52
1990	121,466.0	67.1	134.2	45.3	34	30,049.5	19,018.7	24,724.3	12,351	40

Note : Projections begin from 1984

IMPORT

Trends and Composition of Import, 1977-1982

With the rapid increased of import after 1980, the share of West Sumatra's import to Indonesia (excluding petroleum & gas) became double -- from 0.6 per cent to 1.2 per cent over the period of 1980-1982. The patterns of import of petroleum (including a small quantity of gas in 1982) changed dramatically since 1980. The supply of petroleum to West Sumatra formerly channeled through the domestic oil refinery. However, with the increasing consumption of petroleum, the supply of petroleum to West Sumatra has been imported directly through foreign-based oil refinery such as Singapore or the Philippines. With the changing sources of supply, the import of petroleum increased rapidly from 30 thousand tons in 1979 to 209 thousand tons in 1980. After 1980 the import of petroleum slowly decreased until achieving 166 thousand tons in 1982.

Due to the changing sources of petroleum supply, the import value of West Sumatra increased almost three times during the period of 1979-1980. However, about 53 per cent of the import value in 1980 consisted of petroleum.

By excluding petroleum & gas, the composition of import of West Sumatra almost entirely consisted of capital goods particularly in 1982. The sources of supply of the imported consumption goods were channeled through the other eastern ports of entry, such as Pekanbaru, Medan, or in most cases through Jakarta. Since a large part of the imported consumption goods originated from Singapore, Hongkong or Japan, then it was much easier to import it through the eastern ports or Jakarta.

Although West Sumatra has already surplus in the rice production , rice was still being imported either for the civil servants or to be transfered to the rice defisit neighbouring Riau province. However, the import of rice has been declined from 40,763 ton in 1977 to 800 ton in 1982. It is expected that import of rice will be completely stop in the next few years.

With the establishment of the import substitution textile industry in West Sumatra, the import of textile machineries began in 1981 and 1982. The needs for cotton, however, has to be supplied

Table 3.10 West Sumatra : Trends of Value
1977-1982
(US$ '000)

Group of Commodities	1977	1978	1979
Live Animals for Food	-	-	-
Rice	16,197.4	13,185.4	17,689.3
Cotton	-	-	-
Stone, Sand and Gravel	325.5	-	-
Petroleum Products a/	6,128.9	5,877.8	6.014.1
Fertilizer b/	46.6	1,838.3	289.5
Paper and Paperboard etc.	1,038.4	864.9	2,880.3
Lime, Cement and Clay	61.3	309.1	675.0
Iron and Steel, etc.	9,611.5	9,705.5	5,865.5
Non-Electric Parts	373.1	168.6	480.5
Agricultural Machineries	81.4	1.0	2.4
Electric Power Machineries	3,294.4	5,325.3	1,056.7
Machines for Specialized Industries	5,043.7	32,084.7	8,013.0
Machine and Appliances	3,323.9	14,587.6	1,915.6
Road Motor Vehicles	1,555.2	3,884.8	1,488.1
Railways Vehicles	-	1,424.2	0.4
Heating and Cooling Equipment	-	-	-
Pumps and Compressors	-	-	-
Civil Engineering and Contractor Plant & Equipments	-	-	-

of Imports by Groups of Commodities,

1980	1981	1982
-	1,072.1	1,830.8
14,679.7	5,345.5	331.7
-	-	1,203.5
-	2,150.2	1,508.3
67,157.3	80,120.5	66,669.9
1,408.9	13,816.1	13,768.8
1,849.9	3,850.1	2,504.1
7.3	2,629.5	1,444.4
9,094.6	15,155.4	14,753.3
817.9	897.3	6,523.8
1,019.8	11.9	7.5
4,770.9	6,486.9	69,365.7
8,679.1	4,660.1	16,025.0
7,885.7	17.6	59.9
3,888.6	4,438.9	2,920.5
1,638.0	239.6	8,411.4
-	1,550.9	4,663.3
-	308.4	1,145.3
-	4,846.8	4,479.8

Continued ....

Table3.10(continued)

Group of Commodities	1977	1978	1979	1980	1981	1982
Textile and Leather						
Machinery	15.1	6.0	7.9	22.0	8,475.1	1,626.2
Mechanical Handling Equipments	-	-	-	-	2,595.6	6,204.5
Measuring Instruments	-	-	-	-	318.9	1,849.6
Others	1,745.8	3,053.2	1,151.1	2,855.6	3,685.2	3,002.7
Total	47,842.2	92,316.4	47,529.4	125,775.3	162,672.8	230,300.0

a/ Import of petroleum in 1980 included crude petroleum and in 1982 included residual petroleum products and related materials.

b/ Import of fertilizers in 1980 and 1982 included the crude fertilizers in addition to the manufactured fertilizers.

Sources : Central Bureau of Statistics, Imports by Commodity and Country of Origin (Jakarta : several issues).

from abroad. With the increasing costs after the devaluation, the textile plant has been trapped into some difficulties.

Import for the construction of Maninjau Hydroelectric Power plant, machineries for cement plant, road motor vehicles, railways vehicles, and other capital equipments absorbed most of the import of West Sumatra in the last few years.

Capital Requirements, 1984-1990 : Projections of Import

Although efforts have being made to increase the production of capital goods domestically, however, the high technological machineries and equipments have to imported. The fourth five-year plan of Indonesia projected the growth of import in the next five years to 8.4 per cent per annum. On the other hand, the import of capital goods projected at a higher growth, 11.8 per cent per annum.

Since the trends of import of West Sumatra were closely followed the trends of import of Indonesia (excluding petroleum & gas) -- as was in the case of export -- a regression analysis was made in projecting the import requirements of West Sumatra.[9/] The import projections for Indonesia are taken from the draft of the Fourth Five-Year Development Plan, 1984/85-1988/89. The projected import of West Sumatra by this method has been used in the draft of the West Sumatra : Fourth Five-Year Development Plan, 1984/85-1988/89. The results of the regression analysis can be seen in Table

The import projections of petroleum & gas were made separately. By assuming the growth of petroleum consumption to the year 1990 about 5 per cent per annum, the import of petroleum will be estimated to be 245 thousand tons in 1990. The total import value of petroleum will be estimated to US$ 90 million. With this estimate, the total projected value of import in 1990 will be around US$ 316.6 million.

9/ The regression equation between the value of West Sumatra's import (y) and Indonesia (x) is $y = -9.6125 + 0.0103\ x$. $n = 11$, $r = 0.8690$.

The projected import will surpassing export over the period of 1984-1989. The balance of international trade will become deficit. However, the turning point will come out in 1990.

The projected import of West Sumatra to the year 1990 will be one per cent only of the total value of import of Indonesia (excluding petroleum & gas). In other words, the share of West Sumatra's import will be less than one half of West Sumatra's export in Indonesia's projected import and export.

CONCLUSIONS

The long-range economic growth of West Sumatra over the period of the last eighteen years, 1966-1983, was 6.7 per cent per annum. The projected growth to the year 1990 will be expected to achieve about 6.3 per cent per annum. The economic structure of West Sumatra changed rapidly over the period of twenty-five years, 1966-1990. The share of the agricultural sector will be declined from 56.23 per cent in 1966 to less than 30 per cent in 1990.

The economic growth of West Sumatra depends upon four sectors -- agriculture, manufacturing, trade, and transportation & communication. These four sectors became the primary sources of growth for the West Sumatra's economy -- approximately more than 85 per cent of the growth in the last ten years. It is expected that these sectors will remain as the leading sectors to the year 1990.

In the efforts to achieve the projected growth of West Sumatra, two actions will be taken. First, the enlargement of the small scale agricultural resource base either on the existing or introducing new commodities. Second, improving the road and transportation networks to the neighbouring areas.

By attacking these two fronts, export will be expected to increase at the rate of 15 per cent per annum over the period of 1983-1990. The exports of West Sumatra will depend upon four main commodities -- rubber, plywood, cassia vera, and coffee. These four commodities will be expected to contribute to more than 80 per cent of the total export value in 1990.

With the increasing rate of development efforts, import has already exceeded export after 1980 -- and expected to continue to the year 1989. The balance of international trade will turn to surplus again in 1990.

With all these efforts, per capita income of West Sumatra will nearly double in the next seven years : Rp 261,019 in 1983 to Rp 570,611 in 1990 -- at current prices. The disparity with the per capita income of Indonesia will be decreasing. However, the total Gross Regional Domestic Product of West Sumatra is expected to be around 1.4 per cent of the Gross Domestic Product of Indonesia in 1990 -- which was not much different with the share in 1983.

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Chapter 4

POPULATION TRENDS: PROFILE AND PROJECTION

INFORMATION, recognition and understanding of the aspects of demography or population of a province is very important in the development process of the respective region, including for the investment planning especially that of the private investment. In this respect, it concerns the profile and trend of the population, the structure and composition of population, population distribution, and so on.

Concerning the above instances, if we pay attention to the performance and growth of the population of West Sumatra from the three last censuses, it is obviously as follows. In the West Sumatra province, which an area of covers 42,901.2 sq. km or 2.59 per cent of Indonesia's territory, the population amounted to 2,319,057 (1961), and then increased to 2,793,196 (1971) and 3,406,816 (1980). Percentage share of this province population to that of Indonesia is more or less about the same as that of the area percentage,although some what lower, namely, from 2.39 per cent in 1961 to 2.34 per cent in 1971 and 2.31 per cent in 1980. Nevertheless, because this province population was increasing every year, so its population density has increased from 47 persons per sq. km in 1961 up to 56 persons per sq, km in 1971 and 79 persons per sq. km in 1980.

Furthermore, in connection with the development planning, and especially with the future investment planning and requirement, the information and recognition of the current population condition only is not enough; it is also needed the future projection on the number, composition and distribution of the population. Thus, it is necessary to project the future population up to 1990, by basing it on certain assumptions and postulates.

The population estimate and projection according to this study, the population of West Sumatra now is 3,626,091 in 1983 and then will increase up to 3,781,126 in 1985, and 4,202,312 in 1990, with the average growth rate of 2.12 annually. The population density will increase from 79 persons per sq. km in 1980 up to 88 persons per sq. km in 1985 and 98 persons per sq. km in 1990.

Certainly the population projection figures will not be exactly the same as the real figures in the future. Nevertheless, then will be expected to be fairly "accurate". And these can be used as the general figures and directives for the other calculations and projections. These figures will also be able to be used for making policies and taking measures concerning development programs, especially in connection with population problems such as man-power resources, market potentials for products, socio-cultural matters, etc.

The objectives of this population study are as follows:

(1) To analyze the recent growth of demographic condition of West Sumatra, from 1971 up to 1980.

(2) To estimate or project the future growth and condition of West Sumatra population up to 1990.

(3) To analyze and estimate the past and future trend of population growth in relation to sex, age group, and dependency ratio,

(4) To analyze the migration problems and the transmigration efforts in connection with the population growth and cultural matters, especially concerning the traditional aspects in the community.

(5) To draw some conclusions and to make recommendations concerning the process of regional development.

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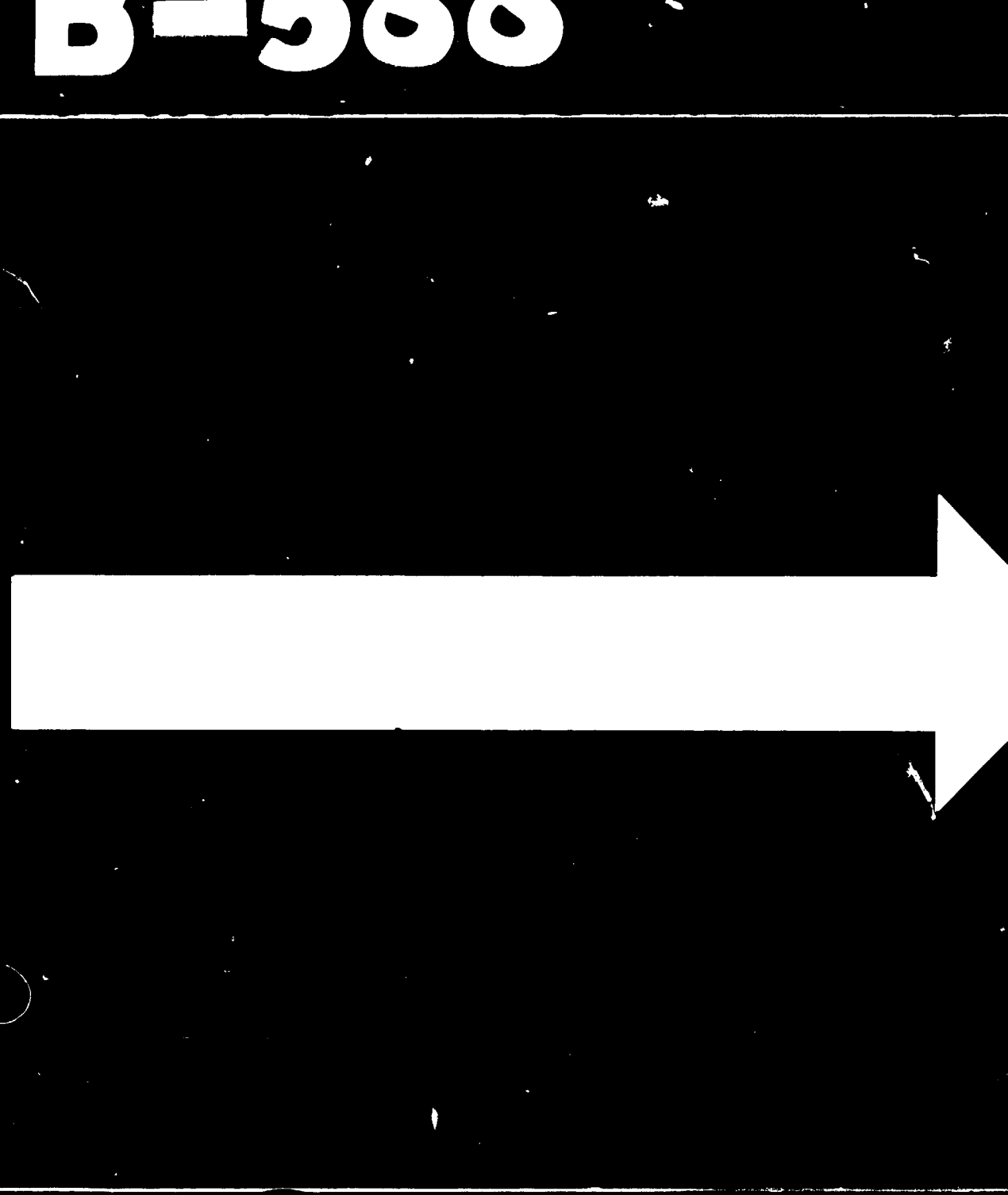

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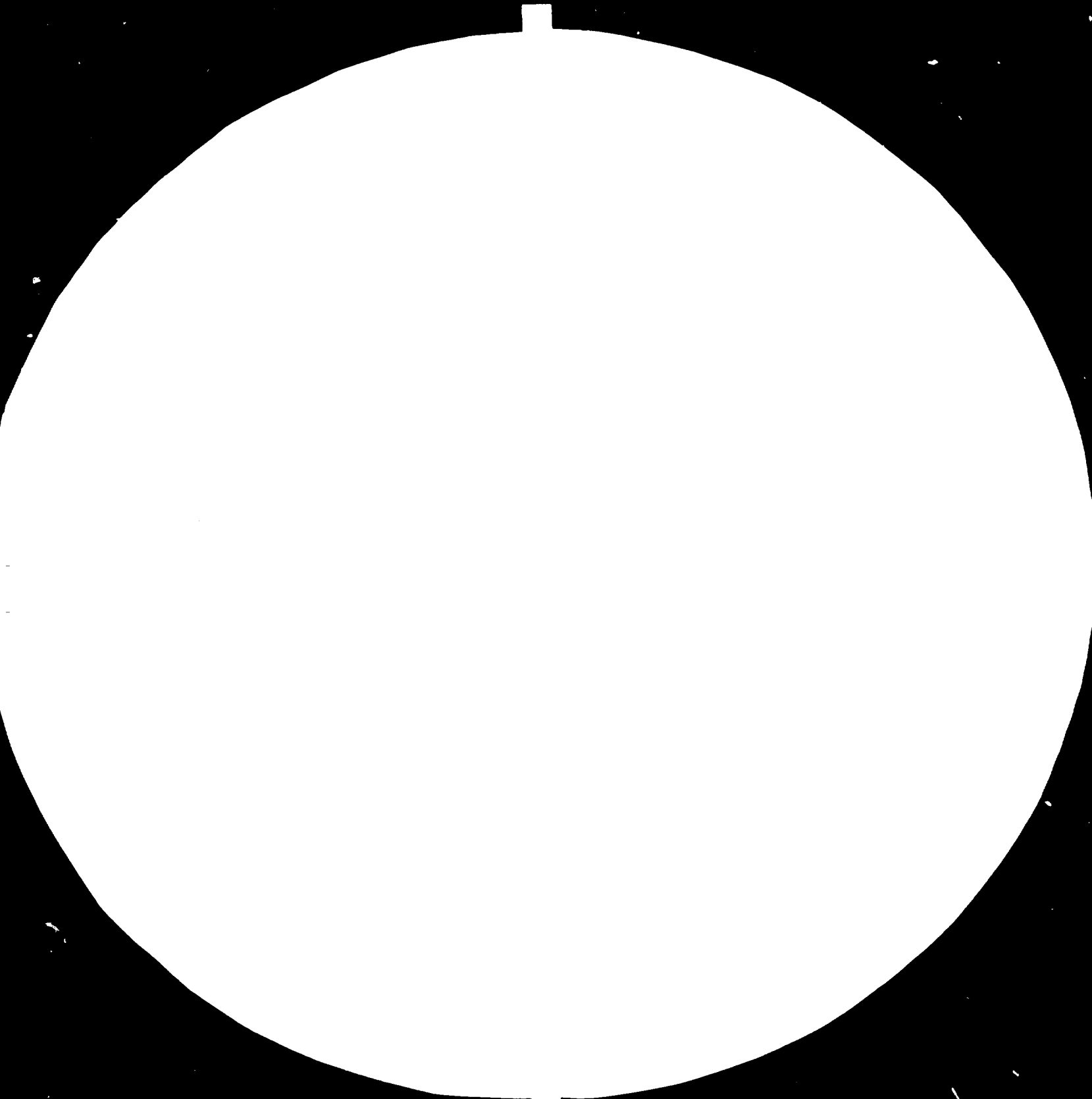

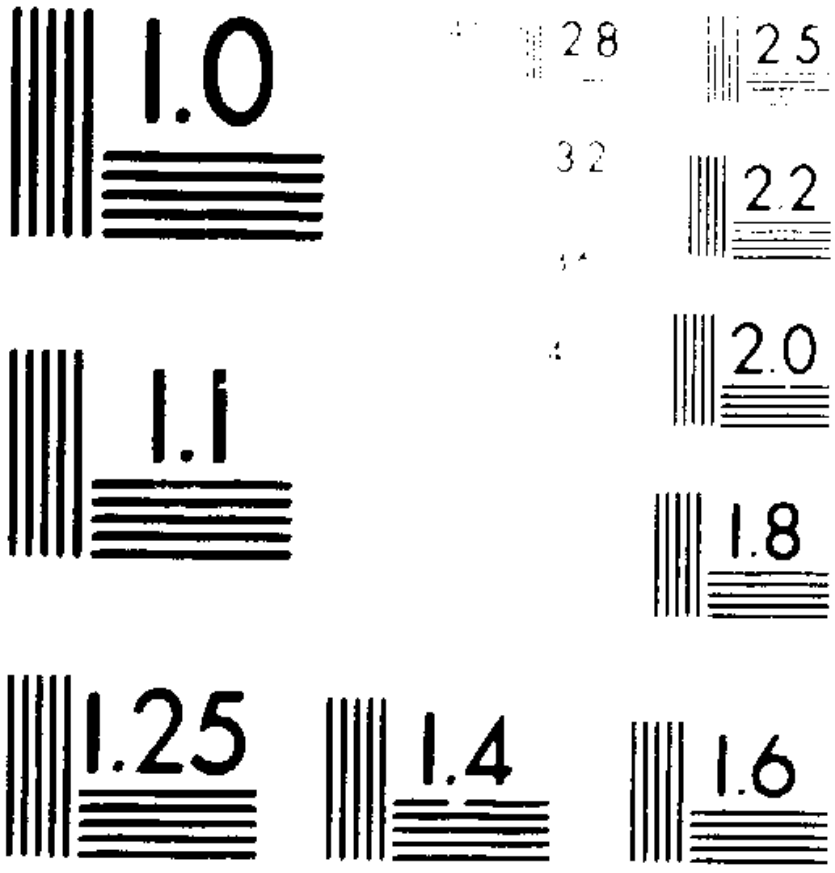

THE GROWTH AND COMPOSITION OF POPULATION

In Rancangan Repelita IV (Fourth Five Year Development Plan) of Indonesia it is stated that the annual growth rate of Indonesia's population, in rounding figure is 2.0 per cent yearly, and from that figure can be drawn the conclusion that the growth rate of West Sumatra population is 2.1 per cent per year. It is stated, furthermore, that for Indonesia the crude birth rate will decrease from 35.8 in 1978 down to 33.8 in 1983 and 29.8 in 1988 per 1,000 of population. At the some time the crude death rate will be decreasing also, that is, from 13.8 in 1978 to 11.7 in 1983 and 10.1 in 1988 per 1,000 of population. Thus, the annual growth rate of Indonesia's population will be decreasing from 22.3 in 1978 to 22.1 in 1983 and 19.7 in 1988 per 1,000 of population.

Based on the trend and projection as explained above and by paying attention to the population growth and condition of this province in the past period of 1971-1980 in West Sumatra the average crude birth rate was 36.9 and the average crude death rate was 11.2, beside net migration rate of -3,6 per 1,000 of population.[1/] Thus, the average population growth rate annually during this period of time was 22.1 per 1,000 of population. It can be added that the high rate of birth annually in this province is continuiting although the family planning program (KB program) has been implemented since past years, nevertheless during Pelita III 1979/80-1983/84 the crude birth rate can be reduced only around 10 per cent. And despite some efforts to improve health, during Pelita III the crude death rate can be reduced also around 10 per cent.

Furthermore it can be explained that for the period of 1980-1990 based on the past population trend and population policy for the future, it is estimated that the average crude birth rate is 34.9, the average crude death rate is 10.1 and

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1/ Net migration figure of -3,6 per 1,000 of population is derived from the calculation of Sulekha Patel and My Thi Vu, "Vol III Demographic Patterns and Projections, 1980-2000 by Provincial", in World Bank report, Indonesia : Selected Issues in Spatial Development, Washington DC, 1983.

the net migration rate amounts to -3.6 per 1,000 of population. Thus, the average population growth rate is 21.2 per 1,000 of population, which means the average population growth rate is 2.12 per cent annually.

Furthermore by using the percentage share of male and female population by age group in 1980 and that will be changed every five years afterward, namely , in 1985 and 1990 2/, and by using the growth rate figure of population of 2.12 per cent annually to project, so that the growth and trend of West Sumatra population in 1961, 1971 and 1980-1990 can be seen in the following Table 4.1.

Table 4.1. West Sumatra : Population Trend and Projection, 1961-1990

Year	Male	Female	Total
1961	1,117,669	1,201,388	2,319,057
1971	1,351,135	1,442,061	2,793,169 a/
1980	1,664,502	1,742,314	3,406,816
1981	1,699,361	1,778,803	3,478,164
1982	1,734,997	1,816,264	3,551,261
1983	1,771,636	1,854,445	3,626,091
1984	1,809,063	1,893,633	3,702,696
1985	1,806,983	1,924,143	3,781,126
1986	1,896,417	1,965,004	3.861,421
1987	1,936,796	2,006,843	3,943,639
1988	1,978,142	2,049,685	4,027,827
1989	2,020,577	2,093,654	4,114,231
1990	2,072,774	2,129,538	4,202,312

a/ Adjusted figures.

2/ The percentage share of population by sex and age group is calculated from the result of Special Study of Rosdiwati, Perkembangan Penduduk dan Angkatan Kerja di Sumatera Barat (The Growth of Population and Labour Force in West Sumatra). Tim Penyusunan Repelita IV Daerah Sumatera Barat, Padang, 1983, pp. 33-35.

From the above data, estimate, and projection it can be known that the sex ratio of male per 100 female of West Sumatra in 1961 was 93.3, thereafter in 1971 was 93.7 and then during 1980-1984 is around 95.5 and during 1985-1989 is around 96.5 and in 1990 is estimated about 97.3. Thus, although the number of male has increased, it will always be less than that of female. Besides, this is due to relatively more death of male babies and children, it is also estimated because of male young population outmigrating to other regions, especially to Java, in order to get better job opportunities and more advanced education.

By paying attention to the overall provinces of Indonesia according to the 1980 population census, there are 11 provinces of with the population with the sex ratio of male per 100 female are under 100.0 figures where the West Sumatra province is the second lowest after South Sulawesi which is the lowest, that is, 94.9. Especially in Sumatra island, only West Sumatra has less male population than female population, the other provinces are the pther way round.

In the regency and municipality of West Sumatra is found that only in the municipalities of Padang and Solok the male population is more than the female population.. In all other regencies and municipalities the number of female population is relatively more than that of male. Detailed figures by regency and municipality on the population distribution by sex can be seen at Table 4.2.

From the figures in Table 4.2 it can be seen that out of the regencies the sex ratio of male per 100 female of which the bighest exists in Pasaman (99.5), then followed by Sawahlunto-Sijunjung (9.4), Pesisir Selatan (96.1) and so on up to the lowest exists in Agam (89.5). While, the sex ratio of the municipalities population of which the highest one exists in Padang (10.2), then followed by Solok (100.7), and so on until the lowest one is that of Padang Panjang (91.8).

Table 4.2. West Sumatra : Population by Sex and Regency/Municipality, 1980

Regency/Municipality	Male	Female	Total	Sex Ratio (Male per 100 female)
Regency				
1. Pesisir Selatan	154,811	161,143	315,954	96.1
2. Solok	171,403	184,123	355,526	93.5
3. Sawahlunto-Sijunjung	111,829	112,532	224,361	99.4
4. Tanah Datar	152,038	167,580	319,618	90.7
5. Padang-Pariaman	222,528	237,402	459,660	93.6
6. Agam	183,720	205,307	389,027	89.5
7. Limapuluh Kota	132,178	139,-93	272,071	94.5
8. Pasaman	179,596	180,553	360,149	99.5
Municipality				
9. Padang	243,261	237,346	480,607	102.5
10. Solok	15,904	15,796	31,700	100.7
11. Sawahlunto	6,751	6,785	13,536	99.5
12. Padang Panjang	16,484	17,959	34,443	91.8
13. Bukittinggi	35,263	35,428	70,691	99.5
14. Payakumbuh	38,673	40,116	78,789	96.4
(a) Roofless,Crewman and isolated tribe	662	62	684	-
Total	1,664,791	1,742,025	3,406,816	95.6
Total not included (a)	1,664,189	1,741,963	3,406,132	95.6

Source : Biro Pusat Statistik, Penduduk Sumatera Menurut Kabupaten/Kotamadya, Seri L no. 4, Hasil Pencacahan Lengkap Sensus Penduduk 1980 (Sumatra Population by Regency/Municipality, Series L No. 4 Result of Complete Enumeration of 1980 Population Census), Jakarta, 1981.

Table 4.3. West Sumatra : Poupulation Distribution by Age Group, 1980-1990

Age Group	1980 a/		1985		1990	
	Number	%	Number	%	Number	%
0 - 4	576,456	16.7	569,203	15.0	606,767	14.3
5 - 9	474,596	13.9	540,624	14.3	547,898	13.0
10 - 14	404,600	12.1	465,553	12.3	534,235	12.7
15 - 19	355,924	10.4	403,762	10.7	459,713	10.9
20 - 24	285,675	8.4	346,684	9.2	398,169	9.4
25 - 29	211,606	6.2	276,770	7.3	338,788	8.1
30 - 34	179,253	5.3	204,273	5.4	269,456	6.4
35 - 39	171,948	5.0	172,062	4.6	197,747	4.7
40 - 44	157,141	4.6	164,068	4.3	165,343	4.0
45 - 49	145,950	4.3	148,433	3.9	156,509	3.7
50 - 54	125,907	3.7	135,720	3.6	139,472	3.3
55 - 59	102,416	3.0	114,307	3.0	124,530	3.0
60 - 64	79,839	2.3	88,473	2.4	100,852	2.4
65 - 69	60,045	1.8	65,421	1.7	74,398	1.8
70 - 74	40,286	1.2	44,823	1.2	49,848	1.2
75 +	35,175	1.1	40,949	1.1	46,536	1.1
Total	3,406,816	100.0	3,781,126	100.0	4,202,312	100.0

a/ Adjusted and orderly figure.

From the population composition by sex and regency/municipality as stated above it can be concluded that male population is relatively less than that of female (average sex ratio of 95.5). Nevertheless, the proportion of female population whic is more than that of male is concentrated in the regencies compared to that of the municipalities. Concerning this condition and tendency in Table 4.1 it can be concluded that this tendency is expected to continue at least, up to 1990. Nevertheless, with a little change, that is, the number of male population will be lighly become more and more, but is still less than that of female, with the distribution by region more or less the same as the above condition and tendency.

Population composition by age group indicates that the portion of young-population "children" especially those of 15 years of age is still big enough. It is true population 0 - 14 years of age has tended to decrease, that is, from 45.1 per cent in 1971 down to 42.7 per cent in 1980. But, on the other side, the number of population 15 - 24 years of age has inclined to increase ; that is, from 16.0 per cent in 1971 up to 18.8 per cent in 1990. This is because of the still high rate of birth in this province. Although family planning (KB) program has been implemented for long time, the birth rate is not decreas significantly.

In relation to that stated above, th
estimated that the proportion of the population group of young age and children will not change much. In the following Table 4.3 can be seen how the trend and tendency of the number and proportion of West Sumatra population by age group in 1980, 1985 and 1990, and combined with Figure 4.1 on the population pyramide of West Sumatra in 1980 and 1990.

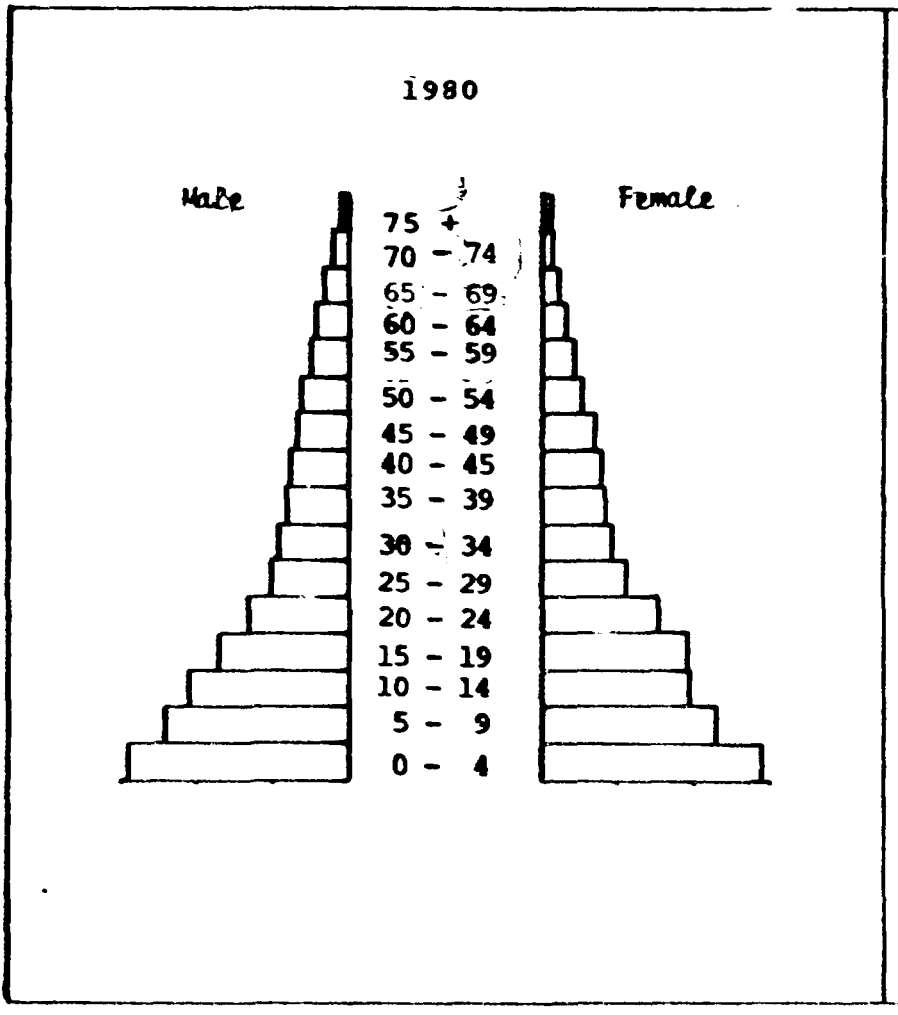
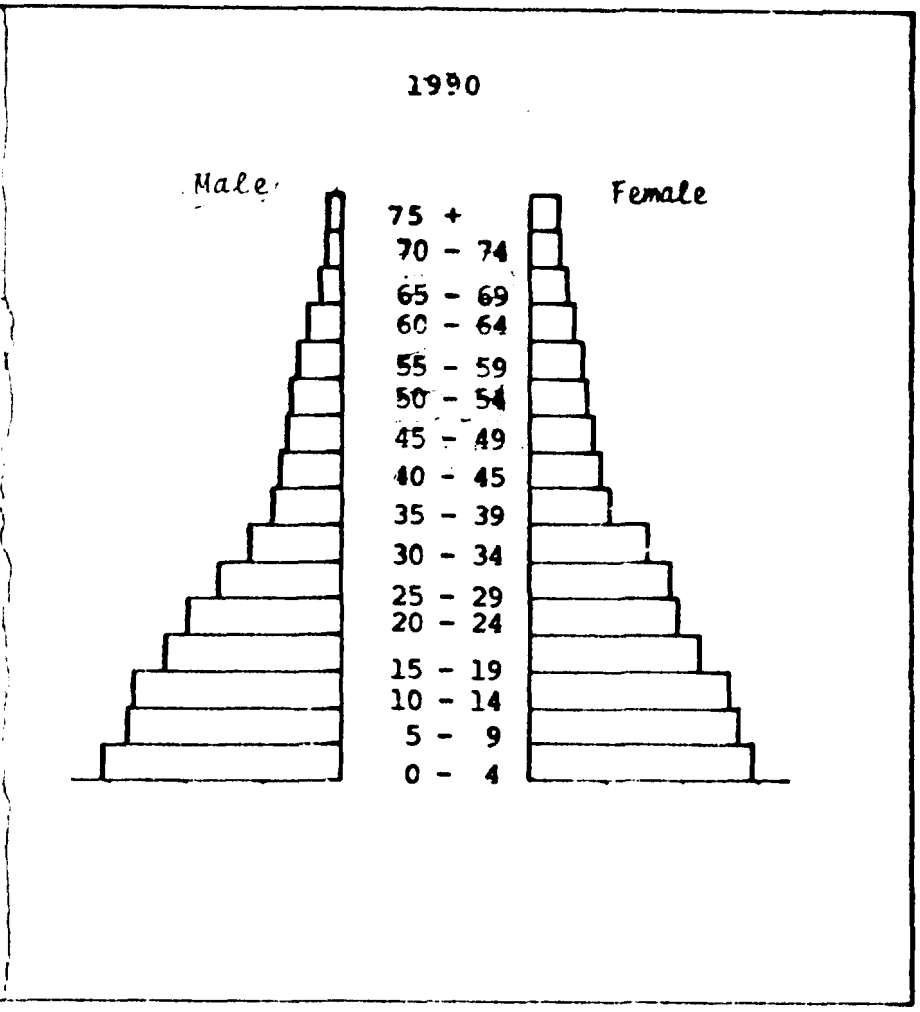


FIGURE 4.1. WEST SUMATRA :

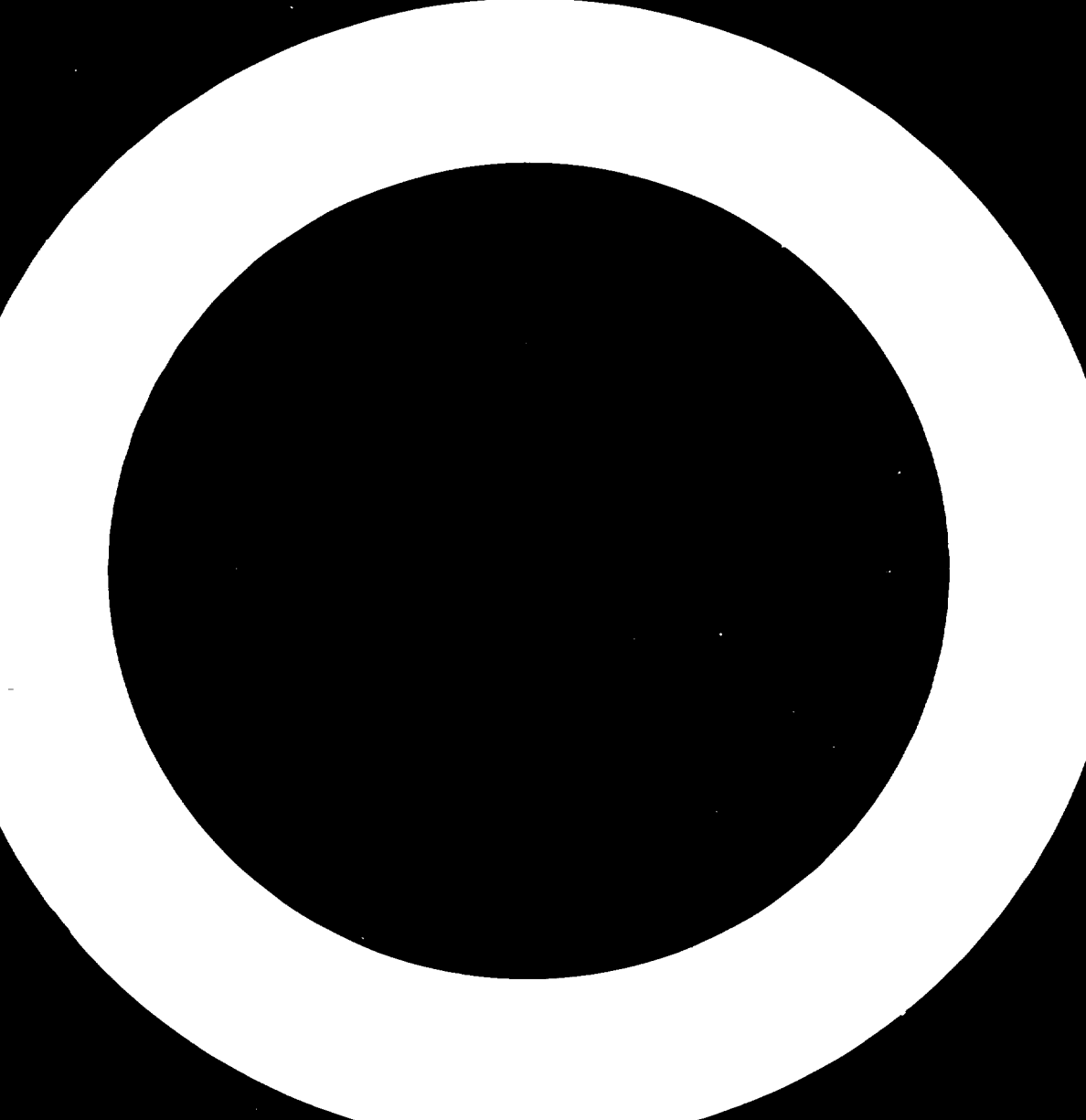


POPULATION PYRAMIDE, 1980 AND 1990

Table 4.3 above shows that it is estimated the amount of of children population of 0-14 years of age tend to decrease' that is, from 42.7 per cent in 1980 down to 41.6 per cent in 1985, and 40.0 per cent in 1990. Nevertheless the young population of 15-24 years of age is projected to increase slightly, that is, from 18.8 per cent in 1980 up to 19.9 per cent in 1985, and 20.3 per cent in 1990. Thus, the children and young population of 0-24 years of age, for the future up to 1990 will not change much, namely, during 1980-1985 will be about 61.5 per cent and in 1990 will be decreasing only down to 60.3 per cent.

With relatively big population of young people relatively big needs for education facility and employment opportunity is needed. On the other side, it means more and more supply of manpower to enter into the labour market ready to be used as manpower resource to support the development process, including to fill in the manpower for investment in the private sector. Nevertheless, of course these manpower supplies need to be supplemented by the skill and ability needed for all kinds of field of activities and investments which will be developed in in the future.

Furthermore it can be stated that the population of old age, namely 65 years of age and over, indicated the trend of going up but not so significant. While in 1971 the number of this population of old age amounted to 3.4 per cent then in 1980 it increased to the amount of 4.1 per cent. Thereafter up to 1990 it is expected not to experience significant change, that is, on average only amounts to around 4.1 per cent of the total population. This will especially occur because of the expectation that the average life expectancy for the years up to 1990 will be still not increasing yet up to the relatively



with that of urban population in West Sumatra. This is because the population growth rate of urban areas in West Sumatra developed relatively slower than that of Indonesia as a whole.

Seen from the distribution by regency/municipality in West Sumatra it is obvious that in 1980 for the regency areas the biggest population was Padang Pariaman (13.49 per cent). Then followed by Agam (11.42 per cent) and so forth and the lowest one was the regency of Sawahlunto-Sijunjung amounted to 6.59 per cent of the total population of West Sumatra. For the municipality areas the population was concentrated in Padang (14.12 per cent) and then followed by Payakumbuh (2.31 per cent) and so fourth and the lowest one was the municipality of Sawahlunto which amounted only to 0.40 per cent of total polation of West Sumatra province. Although there it will be a slight change the condition of population distribution among regions as stated and illustrated above is predicted not to change much up to 1990.The only shift for the regency areas was the position of the second biggest population shifted from Agam to Pasaman, while Pasaman was down to the third ranking. Likewise for the municipality areas, it was also found one shift, namely as in 1980 when Padang Panjang was holding the fourth position will change to the fifth position in 1990, while the fourth position will be held by Solok municipality. For clearer picture about the growth and trend of population distribution by regency/municipality in 1961-1990 see Table 4.4 supplemented by Figure 4.1 on the Population Pyramide of West Sumatra 1980,and 1990.

From Table 4.4 can be seen that there is also found the change and shift in the population growth rate of the regency/municipality areas. The growth rate of total number of West Sumatra population amounted to 2.21 per cent in 1971-1980 and it is estimated will be decreasing to 2-12 per cent in 1980-1990. Besides, this is because either may be the decreasing of

Table 4.4 : West Sumatra : Population Growth Rate and Projection By Regency and Municipality, 1961-1990

Province/Region	1961	1971	1980	1990	Annual Growth Rate		
					1961-1971	1971-1980	1980-1990
Regency	2,086,105	2,402,428	2,696,545	3,259,941	1.44	2.02	1.72
1. Pesisir Selatan	221,449	253,606	315,954	398,179	1.38	2.44	2.34
2. S o l o k	271,234	295,277	355,539	432,551	0.87	2.06	1.98
3. Sawah Lunto-Sijunjung	131,859	161,227	280,105	280,105	2.05	3.70	2.24 b/
4. Tanah Datar	246,463	291,591	319,632	352,025	1.71	1.01	0.97
5. Padang-Pariaman	442,649	555,250	459,666	544,601	2.32	1.53 a/	1.71 b/
6. A g a m	304,453	347,044	389,027	438,747	1.33	1.26	1.21
7. Lima Puluh Kota	250,687	223,993	272,072	333,937	1.13	2.16	2.07
8. P a s a m a n	217,311	274,256	360,149	479,796	2.38	3.04	2.91
Municipality	232,952	390,763	710,271	942,371	5.36	2.94	2.58
9. P a d a n g	143,699	196,349	480,922	668,620	3.20	3.49 a/	3.35
10. S o l o k	-	24,892	31,724	40,967	-	2.70	2.35
11. Sawah Lunto	12,276	12,427	13,561	14,891	0.12	0,96	0.94
12. Padang Panjang	25,521	30,711	34,517	39,083	1.89	1.29	1.25
13. Bukittinggi	51,456	63,122	70,711	79,748	2.09	1.26	1.21
14. Payakumbuh	-	63,451	78,836	99,062		2.41	2.31
West Sumatra	2,319,057	2,793,196	3,406,816	4,202,312	1.90	2,21	2.12

a/ Average population growth rate calculated by substracting the amount of population of Padang/Pariaman Regency 1971 of which the area included in Padang Municipality in 1980 (before Population Census 1930) because of the extension of administrative area border of Padang Municipality.

b/ Calculated by paying attention to the expected transmigration program for Padang/Pariaman Regency and the transmigration don't be programmed any more for Sawahlunto-Sijunjung Regency in the future.

Sources: Central Bureau of Statistics; 1961, 1971 and 1980 Population Census (Jakarta: several issus), except the 1990 is projected figures.

birth rate and of death rate is still low, or as a result of net migration rate (negative) will be still high. On the other hand, by specifying according to regency/municipality areas as components of West Sumatra region as a whole, it was found the change and shift of population growth rate. In general it is estimated that there will be decreasing of annual population growth rate. The highest decreasing of population growth rate is that of Sawahlunto-Sijunjung regency, that is, from 3.70 per cent down to 2.24 per cent, because this regency is one of the main destinations of transmigration settlement, but in the future, after 1990 it will be no more transmigration receiving areas. According to plan the new transmigration settlement in the future, especially in the period of Pelita IV 1984/85-1988/89 is the Mentawai islands of Padang-Pariaman regency, and it is also planned for Pasaman as before. For that reason, it is estimated that the population growth rate of Padang-Pariaman will be increasing from 1,53 per cent up to 1.71 per cent annually during 1980-1990.

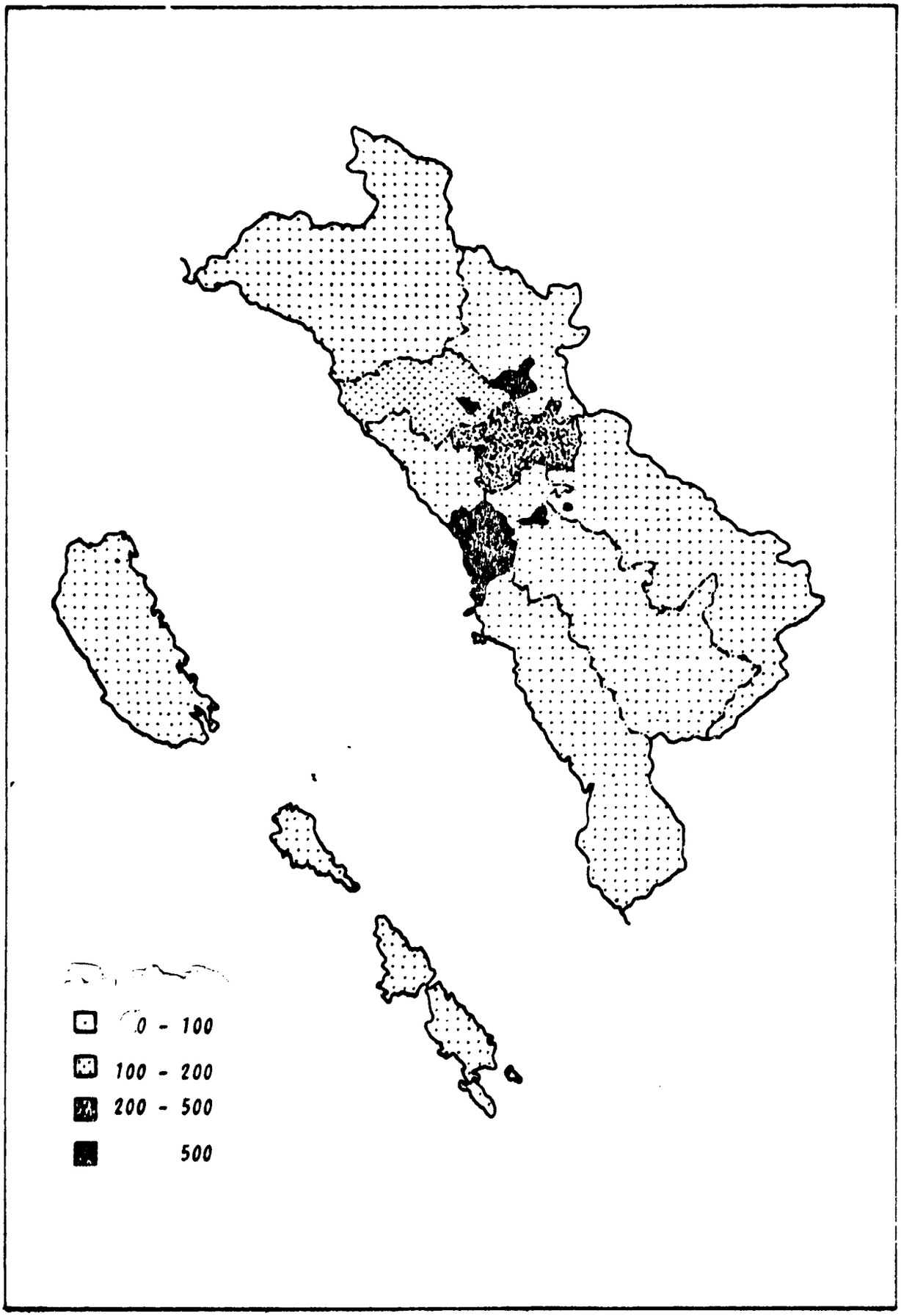
Furthermore in the case of population density it can be stated that for the regency regions from 1971 up to 1980 the highest densely populated regency, in persons per sq.km , was Tanah Datar (228), then followed by Agam (193), and so forth down to the most sparsely populated regencies were Sawahlunto-Sijunjung (37) and Pasaman (38). While for the municipality regions was found a little bit different figures, namely , there occured a change since 1980 compared with the years before as a result of the extension of administrative border of Padang municipality. Three kecamatans (districts) minus one village of Kasang of Padang-Pariaman regency were included into the administrative border of Padang municipality. Therefore if in 1971 Padang municipality was the highest densely populated region (5,896 persons per sq.km), then in

Table 4.5 West Sumatra: Land Area and Population Density Trend and Projection, 1961-1990

Regency/Municipality	Land Area (Km2)	Population Density Per Km2			
		1961	1971	1980	1990
Regency	42,076.8	50	57	64	77
1. Pesisir Selatan	5,749.9	39	44	55	69
2. Solok	7,121.2	38	41	50	61
3. Sawahlunto-Sijunjung	6,006.9	22	27	37	47
4. Tanah Datar	1,404.3	176	208	228	251
5. Padang-Pariaman	6,666.4*/	66	76	69	82
6. Agam	2,019.2	151	172	193	217
7. Lima Puluh Kota	3,571.2	70	65	76	94
8. Pasaman	9,537.7	23	29	38	50
Municipality	824.4	283	474	862	1,143
9. Padang	627.4*/	229	5,896	766	1,066
10. Solok	57.7	-	431	550	710
11. Sawahlunto	5.9	2,081	2,106	2,310	2,524
12. Padang Panjang	23.0	1,110	1,335	1,498	1,699
13. Bukittinggi	25.2	2,042	2,505	2,801	3,165
14. Payakumbuh	85.2	-	745	925	1,165
West Sumatra	42,901.2	54	65	79	98

*/ Before the extension of 1980, the area of Padang Municipality was 33.3 km2 and Padang/Pariaman Regency was 7,260.5 km2

Sources: Central Bureau of Statistics: 1961, 1971 and 1980 Population Census (Jakarta: several issus)



MAP 4.1. WEST SUMATRA : POPULATION DENSITY, 1980

1980 was down to 766 persons per sq.km . In this concern, in 1980 the highest densely populated of the municipality regions was Bukit Tinggi (2,801 persons per sq.km), afterwards followed by Sawahlunto (2,310 persons per sq.km) and so forth down to the least sparsely populated was Solok (550 persons per sq.km). The condition and composition of population density as 1980 above is expected not to change much up to 1990. For clearer picture on the growth and condition of population composition by regency and municipality in West Sumatra since 1961 up to 1990 can be seen at Table 4.5 and also supplemented by Map 4.1 as follows.

If we examine further and look at Table 4.5 and Map 4.1 it is obvious that the municipality regions are located in the central part of this province. Likewise those of the densely populated regions, namely, Tanah Datar, Agam, Padang-Pariaman, a part of Solok and a part of Lima Puluh Kota are located in the central part of the region. Thus, the central part of this province is the densely populated region. Around 65.6 per cent of the population of West Sumatra province live in the central part of this region. On the other side, the northern, southern eastern, and western parts which extend outward covering the regencies of Pasaman, Sawahlunto-Sijunjung, southern part of Solok, northern part of Lima Puluh Kota and Mentawai islands of Padang-Pariaman regency are sparsely populated but have good enough potentials of natural resources. These vast parts are settled in by around 34.4 per cent of total population of West Sumatra. In this connection, the efforts and measures toward the spreading out of population and to open more parts of these sparsely populated regions have been implemented since years ago and it is necessary to continue in the future. These efforts and measures are in the forms of opening new agricultural lands, farm crops cultivation, forestry undertaking and so forth, and plantation connected with the transmigration progams.

MIGRATION, TRANSMIGRATION AND SOCIAL ASPECT

The percentage of West Sumatra population to Indonesian total population trend to decrease a little. In 1961 the proportion of the population of the region was 2.39 per cent while in 1971 it decreased to 2.34 per cent and in 1980 it decreased again to 2.31 per cent. This is especially caused by the net number of migration from this area which is still always negative. It means that the population out migration is always bigger than that of in migration. From the calculation of World Bank it is mentioned that the net migration of West Sumatra population was -236,996 in 1971 and -427,428 in 1980. Therefore the percentage of net migration (negative) to the population in the respective year has increased from -8.5 per cent to -12.6 per cent[5/]. In this relation, as described previously, from 1971 to 1980 the average net migration was -0.36 per cent. By the average growth rate of population amounting to 2.21 per cent at the same period, it means that the natural growth rate of population in average was 2.57 per cent per year. It means that it is a little higher than the natural average growth rate of Indonesia as a whole namely 2.33 per cent per year.

Although the natural growth rate of West Sumatra population is higher than that of Indonesia, the total growth rate of population of this region (in 1980: 2.21 per cent) is lower than that of Indonesia, namely 2.32 per cent. This is caused by the fact that West Sumatra has always experienced the process of negative net migration, namely the number of outmigration is far bigger than inmigration (in this area it is popular as "merantau" = going to other countries) - including the transmigration program.

5/ World Bank Resident Staff in Indonesia "Volume IV, The Inter-Provincial Migration Study in Indonesia, Selected Issues in Spatial Development, Jakarta, 1983, pp 10-15

Outmigration or "merantau" of West Sumatra population has become a common custom in the community of this region since decades ago. Basically "merantau" is leaving a country (village) to other country/place by one's own willingness to earn one's living, to study or to gather experience for a permanent stay or return later[6/]. It can be mentioned that there are various reasons that cause "merantau" or outmigration of population of this area, that can be grouped into economic reason, educational reason, tradition/social reason and psychic reason[7/]. The economic reasons are as follows: economic oppresion, poverty, unemployment in the village, small size of existing rice fields, looking for employment, trading, etc. The educational reasons are to continue one's study at higher education, the shortage of education facility at one's own country, looking for skill/experience at other town/city, the attraction of better living condition at other town or area, etc. As the social traditional reaasons, there are social/traditional oppresion in their villages, hinering and narrow-minded tradition, matrilineal system, relative and inheritage dispute, etc.

Although there are a lot of various reasons which increase the number of outmigrants in this region it is through that the outstanding reasons are those connected with economic and eductional factors rather than the social and psychological ones. Limited agricultural land that can be cultivated which causing small size of tillable land per capita, lack of facilities nd types of certain education in this region, prospect and attraction of better living of other region, and better op-

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6/ Mochtar Naim. Merantau: Pola Migrasi Suku Minangkabau (Merantau: Minangkabau Voluntary Migration), Gajah Mada University Press, Yogyakarta, 1979, pp 2-3.

7/ Ibid, pp 249-250.

portunity at other places are all very influential in enlarging the flow of"merantau". But the existence of program of resettlement at newly opened forest/land provides with aid and infrastructure/facility by government, the ever increasing of development projects and economic activity, the more availability of educational facility and fields and others are all convincing that there will be no more flow of "merantau" or at least lessening in the future.

As described above that the population of West Sumatra is scattered very unevenly over its region namely the middle part which is the most densely populated, the outer parts namely the Northern part, the Southern part Eastern part and Western part which are sparsely populated. Since many years ago there have been various attemps made by the government, central as well as regional, to spread out the population equally, and in addition to explore and to open new areas for agriculture, to use natural potentiality existing there. Parallel to national transmigration program of Central Government, at this region, relocation of local settlement at this area has also been carried out. The areas of this resettlement are mainly those surrounding the locations of natioanl transmigration at regencies which are still sparsely populated, such as Sawahlunto-Sijunjung and Pesisir Selatan. In addition, there was also resettlement carried out due to the natural disaster at the areas which are not so far from their original place.

As to the national general transmigration program by which the inhabitants are transferred from Java to other regions has ever been executed since the period of the Dutch colonial government but it was in a small scale. This program has been given more and serious attention since the execution of the Five Year Development Plans. At the First Five Year Development Plan (Pelita I) 750 families were transmigrated, in Pelita II 4,950 families and in Pelita III 6,000 families and they were located at the regencies of Sawahlunto-Sijunjung, Pesisir Selatan and Pasaman. At the

period of Pelita IV it is planned to transmigrate about 6,000 families to Sipora at Padang-Pariaman regency and to Masang at Pasaman regency. In order to get clearer picture of the number of transmigrants and the receiving areas during the periods of Pelitas I, II, III and the plan for Pelita IV, see the following Table 4.6

If we examine Table 4.6 above, it is abvious that the national general transmigration program, together with the spontaneous local one, have attempted to distribute by filling the sparsely populated areas which possess land potentiality and rich natural-resources. The outer regions that have small number of inhabitants such as the regencies of Sawahlunto-Sijunjung, Pasaman and Pesisir Selatan which have become the areas for resettling the transmigrants. Even in the next period of Pelita IV, the locating of new natioanl transmigrants at the part of Padang Pariaman regency, namely at Sipora Island, one of the island in the Mentawai. Islands which still have sparse population but possess potential land and wealthy natural resources which are useful for the aims of country-development and national defence and security. In the period of Repelita IV and up to 1990 it is planned and predicted that the national general transmigration program originating from Java will be given priority to be transmigrated to Mentawai Islands. While the locating of transmigrants and resettlement at regions in the "mainland" of West Sumatra Province will be given priority through the program of local and spontaneous transmigration which will be regulated and planned by regional government itself.

Table 4.6 Realization of Transmigration Settlement During Pelita I, Pelita II, Pelita III and Plan for Pelita IV

Year of Implementation	Total Household	Receiving Areas	
		District/ Village	Regency
Period of Pelita I 1969/70-1973/74	750	Pancung Soal/ Lunang, Tanjung Gadang /Kamang	Pesisir Selatan Sawahlunto-Sijunjung
Period of Pelita II 1974/75-1978/79	4,950	Pasaman/Kinali Koto Baru, Pulau Punjung	Pasaman, Sawahlunto-Sijunjung
Period of Pelita III	6,000		
1979/80	500	Koto Baru, Koto Tujuh	Sawahlunto-Sijunjung
1980/81	1,500	Koto Baru	Sawahlunto-Sijunjung
1981/82	1,000	Pancung Soal/ Lunang	Pesisir Selatan
		Pulau Punjung /Tebing Tinggi	Sawahlunto-Sijunjung
1982/83	1,000	Pancung Soal/ Lunang	Pesisir Selatan
		Pulau Punjung /Tebing Tinggi	Sawahlunto-Sijunjung
1983/84	2.000[a]	Pulau Punjung /Timpeh Silaut	Sawahlunto-Sijunjung Pesisir Selatan
Period of Pelita IV 1984/83-1988/89	6,000[b]	Sipora island /Mentawai	Padang-Pariaman
		Pasaman/ Masang	Pasaman

Note: a/ as planned, and 500 households of then as realization
b/ as planned and estimated

Sources: Sumatra Barat: Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra: Draft, Fourth Five-Year Development Plan, 1984/85-1988/89), World Bank Resident Staff in Indonesia, "Volume IV The Inter-Provincial Migration Study" in Indonesia: Selected Issues in Spatial Development., Information from Transmigration Service Office of West Sumatra Province, Padang, April 1984.

Map 4.2 WEST SUMATRA: TRANSMIGRATION RESETTLEMENTS

CONCLUSION AND RECOMMENDATION

The future population of West Sumatra by 1990 is predicted to increase by the growth rate of 2.21 per cent per year, meaning that there is a little decrease compared with the period of 1971-1980 the growth rate of which was 2.21 per cent per year. This is caused, as predicted, by the proportionate decrease of birth and death rates on one side, and on the other side the figure of net migration (negative) is still high enough, although it will experience a little decrease. The effort of Family Planning with its various activities and programs, is predicted to be able to lower the birth rate and this program should be continuously multiplied and perfected in the future.

In addition to the above case, the effort to lower the number of death and to lengthen the life expectancy in average through various programs in the field of community health, which have been realized, should be more intensified and perfected. This health improvement program is not only to reduce the death rate, but also needed to raise the level of community health, so that the population and the source of manpower in the development can be of better quality and of more efficient in supporting the development.

The age composition according to age-group still shows the pyramid which is very unbalanced to the lower part, namely the proportion of children and young age groups are very high. Although serious improvement has been and will always be made toward natural and balanced proportion through various efforts such as family planning program, the future population proportion will not change so meaningfully.

Because of the great magnitude of child and young age groups, the requirement for provision of educational facilities and employment will also increase. The more real and integrated effort in the field of education and the provision of employment should get greater attention and be programmed and

carried out as well as possible in the future. The young age group that forms the important source of man-power in the development should be well prepared and provided with suitable knowledge and skill through programs of education and skill training, so that they can be well and and efficiently used in various fields of businesses and development activities. The effort to increase the employment opportunity through the program of investment (gevernmental or private), program of industrialization, program of integrated development of agriculture and village, program of transmigration and population distribution, program of efficiently technological usage and effective work, program of development of foreign and domestic trade , etc should be given more attention and stepped up in the future.

The proportion of the population of West Sumatra in percentage to whole Indonesian population (in 1980 = 2.31 per cent) appears to be nearly the same as the percentage of its size, namely 2.59 per cent. But this percentage had decreased every year since 1961 until 1980 and it is predicted to decrease continously up to 1990. By the increase of population every year, certainly its average density will also increase. Being 75 per square kilometre in 1980, it will increase to 98 per square kilometre.

Such average density of population per square kilometre does not illustrate the distribution, because this case can be illustrated by woking at the proportion of population at urban area compared with that in the rural one. Its distribution can also be reflected by the density according to regency and municipality. As the result of the slow increase of population of municipalities (except Padang), the percentage of population growth of urban areas in West Sumatra is relatively lower than that of urban areas of Indonesia as a whole. This is caused by the fact that in ge-

neral the municipalities in this region are less able to gain the inhabitants, due to the lack of service facility found in the respective towns. In this relation efforts to uplift the town service, to increase the infrastructure and facility of town activity, to provision the infrastructure and facilityfor developing industry such as by developing a mini industrial estate, etc, should get more attention in the future. By doing so, the towns will play more important role and develop over a fairly wide area, including the development of their vicinity.

In the case of unequally distributed population over all parts of this region, it can mentioned that the central part of West Sumatra is quite densely populated, in which there are all municipalities and some regencies possessing relatively dense population, such as Tanah Datar, Agam , etc. On the contrary the outer regions, which form the promising areas, lying in the northern, southern, eastern and western parts, namely the regencies of Pasaman, Sawahlunto-Sijunjung and Mentawai islands are still very sparsely populated. The effort to distribute the population equally all over West Sumatra that has been undertaken for a long time should be carried out continuously in the future time. This effort is done through program of national general transmigration by transferring people from Java island, as well as through program of local transmigration which is regulated and carried out by regional government. In the future, especially up to 1990 this transmigration program should be prepared and carried out better, more properly and integrated.

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Chapter 5

MANPOWER, LABOUR FORCE, AND EMPLOYMENT

WITH a population of 2.3 per cent, as well as the manpower [1] size, West Sumatra -- from the national point of view -- could not be considered as the major employment problems areas in Indonesia. The growth of population was lower than the national average. However, internally, the problems could be called as a mismatch between job preferences and the job availability.

The manpower quality, relatively, higher than the average Indonesian. The per capita consumption of calorie and protein were already above the basic minimum requirements.[2] Health conditions and facilities were adequate.[3] Education progress rapidly.[4] The crime rate is one of the lowest in Indonesia. Religion influenced the life of the people. And West Sumatra is the only province which has a matrilineal society in Indonesia.

This chapter will be focussed on the analysis of the employment situation in West Sumatra. Some attentions will be given also to the urban employment problems particularly in the municipalities areas. Then it will be followed up by a rough calculation on the trends and projections of the income inequality of West Sumatra up to the year 1990.

Dimensions of the Employment Problems [5]

Several factors influenced the creation and expansion of employments in West Sumatra. On the one hand, the supply of la-

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1/ Manpower in Indonesia are the population ten years of age and over.

2/ See Chapter 16.

3/ See Chapter 19.

4/ See Chapter 20.

5/ This section draws heavily on Hendra Esmara, "Kesempatan Kerja dan Pembangunan : Masyarakat Minangkabau di Dalam dan di Luar Daerah Sumatera Barat" (Employment and Development : Minangkabau Society In and Outside West Sumatra), in A.A.Navis (Editor), Dialektika Minangkabau : Dalam Kemelut Sosial dan Politik (Minangkabau Dialectic : In the Social and Political Crisis) (Padang : Genta Singgalang Press, 1983).

hour force will be influenced by the demographic factors, while on the other hand, the demand for labour will be closely related to the various development activities in the province. However, between these two poles congested the socio-cultural factors which may not bridging the supply and demand for labour.

Judging from the employment statistics only, the employment rate of West Sumatra was higher compared to the other provinces. In other words, the open unemployment rate was very low -- 1.09 per cent in 1980. The low unemployment rate could be explained in terms of two related factors. First, due to the increasing employment absorbtive capacity of West Sumatra's economy. Second, high outmigration rate particularly in the young labour force group. Both aspects reduced the unemployment rate to a lower level, however, which one of the two factors dominated in reducing the unemployment rate was difficult indeed to be identified. See Table 5.1.

The unbalanced problems of the supply and demand for labour could not be explained in terms of the quantitative factors only. The qualitative factors, however, influenced also the disparity in the labour market.

The level of education in West Sumatra is higher compared to other provinces. The primary school enrolment ratio is very high (96 %). However, the higher the educational level, the higher will be the social prestige needs. The needs, however, could not be fulfilled in the villages. The first step was to go the neighbouring towns, then to Padang. It was not very rare that the objective was to go out of West Sumatra.

The rural development facing a unique dilemma. In making the rural areas developed rapidly, the needs for skilled manpower increased rapidly. However, the educated people left the villages. The consequence was that the villages were still managed by the low educated people -- to a certain extent, in selected areas, by old men and women.

Nevertheles, the rural agricultural sector still become the major labor absorbtive sector in West Sumatra -- although with a declining trends. Over the period of 1971-1980 the employment absorbtive capacity of the agricultural sector declined from

70.16 per cent to 62.11 per cent. It is expected that employment in the agricultural sector will still be declined in the future. A large part of the employment opportunity in the non-agricultural sectors will be found in the mining and trade sectors.

The existing labour force consisted mostly of the low educated labour. At least 86 per cent of the labour force in 1980 had attained only the primary school level or less. However, the situation seems to be improved compared to ten years ago -- where the ratio was 90.42 per cent. As has been expected, the rural condition was much worse than the urban areas.

The characteristics of the unskilled were different from the skilled labour. On the one hand, the unskilled labour prefered to work in the self employed activities, while on the other hand, the skilled labour tended to enter the civil service.

The self-employed job usually occured in the informal sector -- such as hawkers, barbers, food stallers, etc. To a certain extent, the unskilled Minangkabau labour concentrated in the trade sector in addition to the agricultural labour absorbtive sector.

The local labour force avoided the manual works such as in the road constructions and other related "rough" works. It was not not surprising, however, that labour became absolutely difficult to recruite when the government constructed the Rao-Bonjol road networks, expansion of the cement plant, expansion of the Central Hospital and construction of the new low cost housing. The labour shortage has been felt in the last few years. Even in constructing the railways connection between the cement plant at Indarung to Teluk Bayur Harbour, labour had to be imported from Java. With the increasing development activities in the next Repelita IV, the labour shortage will be expected to increase rapidly.

The unwillingness to work in the manual works reflected the social status of the work in the Minangkabau society. Social prestige seems to be more important than employment. They can afford to be unemployed due the extended matrilineal system of the Minangkabau society. Food and other basic necessities will be provided by the family. The implications were quite apparent.

There were absolutely no risks to be unemployed in the rural areas of West Sumatra.

The seasonal crops patterns influenced also the supply of labour force. A regular work but rather far from home will be avoided. However, nearness to the family home will be preferable even the work is irregular. Due to this factor, the unemployment problems in West Sumatra tended to become a seasonal rather than a structural problem. Labour shortage will associated with the seasonal paddy crops patterns. The efforts to take the labour from the paddy fields during planting and harvesting time will influence the production of paddy. The disguised unemployment, like in Java, seems to be nonexistent in West Sumatra.

The socio-cultural labour behaviour of West Sumatra supressed the availability of labour. Two interrelated factors influenced the decision to work. First, the socio-cultural attitude toward the manual works seems to be low. The result was the unwillingness of the unskilled labour to take the manual work. Second, the seasonal crops patterns. The implications were seen by the labour shortage during the time needed for more labour.

This situation created a unique dilemma in creating and expanding employment in West Sumatra. On the one hand, there still existed a number of unemployed persons, while on the other hand, the increasing development activities have to import labour from Java. The unbalanced employment situation will be expected to continue in the future.

Minangkabau Labour Outside West Sumatra

Employment in the agricultural sector, which occupied most of the labour force in West Sumatra, seems to be a transitory job for the Minangkabau labour. The opening opportunity to go outside West Sumatra could be considered as the gate to go out of the agricultural sector. This attitude has made the Minangkabau outmigrants avoid entering the agricultural sector once he was outside the province -- unlike the Javanese or the Buginese. To a certain extent, the avoiding works in West Suma-

tra will be taken energeticly in the rantau. The split personality in job preference seems to confuse the analysis of the suply and demand for labour.

The struggle and the will to work intensively in the informal sector have being done mostly outside than inside the province. Outside home town has given a broader scope of action compared to the home town itself.

The entrepreneurial characteristics of the Minangkabau society are quite high indeed. Without waiting any command or suggestion, any kind of ooportunities will be taken by the Minangkabau labour.

The split personality in job preference seems to be influenced by the socio-environmental living of the people. The ability to be unemployed at home was merely reflected the socio-economic support of the family. Nevertheles, to be unemployed in the easy living condition will not be taken calmly. Some suggested that the position of men are uncertain in a matrilineal society. The will to go out of home town become greater. To a certain extent, the economic factors have pushed the men, usually in the young age-group, to leave the province.

Labour Force and Employment : A Quantitative Analysis 6/

The growth of population and manpower in the seventies were 2.21 per cent, respectively. With a declining participation rate, the growth of the labour force was lower than the growth of population and manpower -- 2.17 per cent. The participation rate, however, began declining sharply after 1978 after going through a period of increasing trends.

It was difficult indeed to trace the respons of participation rate as the results of the economic growth. Changing status from the labour force to the non-labour force groups were quite easy in West Sumatra -- especially in the rural areas. The prob-

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6/ For a detailed analysis of the problems of employment definition, see Hendra Esmara, Mengukur Pemakaian Tenaga Kerja Tidak Penuh di Indonesia (Measuring the Underutilization of Labour in Indonesia)(Padang : Institute for Regional Economic Research, 1982).

Table 5.1 West Sumatra: Trends and Projections of Population, Labour Force, and Employment, 1971-1990

Items	Unit	1971	1980	1990
Population	'000	2,793.2	3,406.8	4,202.3
Population 10+ a/	'000	1,901.9	2,355.8	3,047.8
Participation Rate	%	47.73	46.86	45.00
Labour Force	'000	907.8	1,103.9	1,371.5
Employment	'000	887.1	1,091.9	1,321.9
Agriculture		622.4	678.2	750.6
Mining		1.9	6.6	32.2
Manufacturing		41.3	61.0	84.6
Construction		13.5	37.6	48.8
Transportation & Communication		19.1	26.3	33.6
Trade		77.0	131.9	171.7
Others		111.9	150.3	200.4
Unemployment	'000	20.7	12.0	49.6
Unemployment Rate	%	2.28	1.09	3.62
Underemployment Rate b/	%	-	48.04	
Temporary Not at Work c/	%	-	2.61	
Education : Primary School and Less	%			
Population 10+ a/		90.42	86.53	
Labour Force		89.90	86.27	
Informal Employment Index	%	394	407	

a/ Population 10 years of age and over.
b/ Working less than 35 hours a week.
c/ Zero working hours.

Sources....

Sources: Calculated from Central Bureau of Statistics, 1971 Population Census: Population of Sumatra Barat (Jakarta: 1974); Penduduk Indonesia 1980 -- Menurut Propinsi dan Kabupaten/Kotamadya, Hasil Pencacahan Lengkap Sensus Penduduk 1980 (Population of Indonesia 1980) (Jakarta : 1981); Population of Sumatera Barat -- Results of the 1980 Population Census (Jakarta: 1983), and Hendra Esmara, Mengukur Pemakaian Tenaga Kerja Tidak Penuh di Indonesia (Measuring the Underutilization of Labour in Indonesia) (Padang: Institute for Regional Economic Research, 1982).

blems became more apparent since definition of working was "working at least one hour in the previous week or temporarily not working". The working hours in the rural areas -- without exception in the urban areas also -- were very flexible.

The flexibility of working hours reflected the characteristics of the works in the informal sector. Approximately, only one-fifth of the employment activities were in the modern formal sector while the rests in the traditional informal small scale activities. The proportion of employees in the employment structure of West Sumatra was lower than in the national context -- in this case about one-third of the total employment.

Another way of looking into the employment structure is through the Informal Employment Index (IEI).[7/] The IEI, however, increased from 394 to 407 over the period of 1971-1980. The trends between these periods -- due to the sampling errors -- seems to be erratic especially in 1978. The national informal employment indices were nearly halves of West Sumatra indices.

The easy movements from the labour to the non-labour force groups have made the employment figures shaky. However, the trends gave some indications on the directions of employment absorbtion in the past and the future.

The growth of employment in the seventies, 2.31 per cent, was higher than the growth of labour force. It was not surprising that the open unemployment rate declined more than half -- from 2.28 per cent to 1.09 per cent. However, the rapid increased of employment was occured mostly in the informal sector. The results could be seen in the increasing informal employment indices in the last ten years.

Modernizing the West Sumatra's economy -- as in the Indonesian context -- seems moving at a slower rate. The high economic growth in the seventies had reduced the share of the agricultural value added at a faster rate than employment. Although the national and provincial development policy tried to expanse the employment opportunities, however, the technological process have developed in such a way that the results were tending to the used of the modern capital intensive rather than labour intensive technology. With the narrowing opportunities in the modern sector, the

7/ See Chapter 3.

only alternative will be in the informal traditional sector.

The informal sector could absorb a huge labour force especially the unskilled labour. The investment requirements were very low. This made the sector became attractive to the small scale and weaker groups of the society. The entry and exit could be made easily without any government license. The informal sector acting also as the home for the urban migrants 8/

The prospects of employment opportunities in the informal sector,to a certain extent,solved the employment problems temporarily.However, the increasing employment in the informal sector could be regarded as the disguised employment expansion of the economy.

(1) The productivities in the informal sector were lower than the formal sector. The increasing employment activities in the informal sector could not increased the productivity, on the contrary, it could reduced the productivity level.

(2) The low productivity could be associated with the low investment and working hours. This trend reflected in the increasing underemployment rate-- the proportion of employment working less than 35 hours a week -- from 41.90 per cent in 1976 to 48.04 per cent in 1980. The results have made the informal employment sector to a low level income creating sector. Or in the other words, it increased the number of the poor workers.

(3) The transfer of development funds to the informal sector could reduce the expected economic growth in the future.

Although in the development process there will be a trend in the transformation of employment activities from the informal to the formal sectors,however,it could not be avoided that several problems could arises out of this transformation.

First, the self-employed and unpaid family workers usually work in a rather leisurely way and lack of discipline -- either in the social or employment disciplines. Couple with the low level of investment,the productivity will be low.

8/ Hendra Esmara,Pengembangan Sumber Daya Manusia Dalam Repelita IV : Perencanaan Kesempatan Kerja (Human Resources Development in Repelita IV : Employment Planning)(Padang : Universitas Andalas,1983).

Second, quite difference with the self-employed and unpaid family workers, the formal employee sector usually work in a more discipline way.Since the investment used in the sector were high, the productivity level also became high.

Third, transformation of employment from the informal to the formal sectors came as a schock. The informal workers entered the alien formal sector which was quite difference from their own employment cultures.

The narrowness of the formal employment opportunities,coupled with the alien nature of this sector have forced the labour force into the informal sector. The informal sector of West Sumatra mostly concentrated in the agricultural and trade sectors. Both sectors had become the main sources of employment growth in the seventies.

Urban Employment Problems and Performances : The Municipal Experience 9/

The urban population of West Sumatra decreased from17.17 percent to 12.72 per cent over the period of 1971-1980. Between the periods,the urban population seems to increase slightly. However, the decreasing trends of the urban population gave a distorted picture of the development process of West Sumatra.

One of the main reason for the decreasing trends of the urban population was the changing urban definition of the 1980 compared to the 1971 population census.10/ The problems became more complicated due the increasing number of villages which were used as the units for defining the urban areas. The urban population estimates could not used in the inter-temporal analysis but more appropriate in inter-spacial studies on a cross-sectional basis.

9/ Since the information on labour force and employment in the municipalities were very scarce, the analysis will be concentrated on the available results of the 1980 population census.

10/ Central Bureau of Statistics, A Search for a Better Definition of an Urban Village in Indonesia (Jakarta : 1977).

However, looking from a different angle, the proportion of municipal population was increased from 10.05 per cent in 1961 to 13.99 per cent in 1971 then increased again to 20.85 per cent in 1980. The relative,and absolute, increase in the municipal population was due to the rapid population growth, especially in the seventies -- more than five times kabupaten population growth. This confirmed the guesses that the rural (kabupaten) population migrated rapidly to the urban (municipalities) areas. See Table 5.2. In the meantime the population growth of West Sumatra was 2.21 per cent per annum over the period of 1971-1980.

The ability of the municipalities to attract the rural-kabupaten population were different from one municipality to another.[11/] On the one hand, Padang grew very fast either by the rapid population increase or by the expansion of the town's area.On the other hand, Sawahlunto seems to be stagnant without any major changes over the period of 1971-1980. The population growth rate of Padang was 10.35 per cent per annum while Sawahlunto was 0.96 per cent only. The figure suggested that the population growth rate of Padang has already surpassed Jakarta Raya (3.93 per cent),Medan (8.88 per cent) or Ujung Pandang (5.52 per cent).

The high population growth rate of Padang over the period of 1971-1980 was very misleading. With the expansion of the town's area -- from 34.58 km squares to 627.42 km squares -- the population comparison between the two periods was made not on the same basis. When using the same areas, the growth of population became 3.11 per cent per annum. On the basis of this assumption, the population growth rate in the seventies was much lower than the sixties. The declining population growth was occured also in Padangpanjang and Bukittinggi. This suggested that outmigration from these three municipalities were higher than the inmigration over the period of 1971-1980 compared to 1961-1971.

The problems will be more sharply focussed through the urbanization index (UI). The UI is the ratio of the municipal popula-

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11/ The analysis in this section followed the line of thinking presented in Hendra Esmara,"Pembangunan Kota dan Pembangunan Daerah : Kasus Sumatera Barat"(Urban and Regional Development: The Case of West Sumatra),paper prepared and presented in the meeting of Municipalities'Association of West Sumatra at Padang,26 September 1981.

Table 5.2 West Sumatra : Number of Population, Population Growth Rates, and Urbanization Index by Municipalities and Kabupatens, 1961-1980

Areas	Number of Population			Annual Growth Rates (%)		Urbanization Index	
	1961	1971	1980	1961-1971	1971-1980	1961-1971	1971-1980
All Municipalities	232,952	390,768	710,331	-	6.87	-	3.11
Padang	143,699	196,339	480,922 (259,550)	3.20 -	10.35 (3.11)	- (1.68)	4.68 (1.41)
Solok	-	24,771	31,724	-	2.76	-	1.25
Sawahlunto	12,276	12,427	13,561	0.12	0.96	0.06	0.43
Padangpanjang	25,521	30,711	34,517	1.89	1.29	0.99	0.58
Bukittinggi	51,456	63,132	70,771	2.09	1.26	1.10	0.57
Payakumbuh	-	63,388	78,836	-	2.43	-	1.10
All Kabupatens	2,086,105	2,402,428	2,696,485	1.44	1.28	0.78	0.58
West Sumatra	2,319,057	2,793,196	3,406,816	1.90	2.21	1.00	1.00
Municipal and West Sumatra's Population Ratio (%)	10.05	13.99	20.85	-	-	-	-

Note : The figures in the brackets denoted the number of population of Padang municipality excluding the kecamatans of Koto Tangah, Nanggalo, Kuranji, Pauh, Lubuk Kilangan, Lubuk Begalung and Bungus/Teluk Kabung (the extension areas of Padang).

Source : Hendra Esmara, "Pembangunan Kota dan Pembangunan Daerah : Kasus Sumatera Barat" (Urban and Regional Development : The Case of West Sumatra), paper prepared and presented in the meeting of Municipalities' Association of West Sumatra at Padang, 26 September 1981.

tion growth rates with West Sumatra's growth rate. If the municipal population growth rates are the same with West Sumatra's, then the UI has the value of 1. Otherwise,there will be a difference which refelected the net-migration. With the value of less than 1, a municipality has a net-outmigration. On the other hand, a net inmigration happened when the value of UI more than 1.

Out of the six municipalities in West Sumatra, three municipalities have the values of UI more than 1, i.e., Padang (with the new town's area),Solok and Payakumbuh. The three municipalities,relatively, could give more employment than the other three -- Sawahlunto, Padangpanjang and Bukittinggi. The open unemployment rates of Padang, Solok and Payakumbuh -- respectively 2.78 per cent, 0.12 per cent, and 0.69 per cent -- were much lower than the other three lagging municipalities. This suggested that Sawahlunto, Padangpanjang and Bukittinggi have less employment opportunities, relatively, than the three growing municipalities.

However, the absolute employment situation gave a total different picture. Since Padang absorbed around 68 per cent of the total population of the municipalities, it was not surprising that 81 per cent of the labour force were in Padang. With the 2.78 per cent of open unemployment, then around 73 per cent of the unemployed of all municipalities of West Sumatra were in Padang also.

Table 5.3 West Sumatra : Population, Labour Force and Employment by Municipalities, 1980

Areas	Population	Labour Force a/	Employment a/	Unemployment	Unemployment Rate (%)
Municipalities					
Padang	480,922	114,076	110,900	3,176	2.78
Solok	31,724	8,481	8,471	10	0.12
Sawahlunto	13,561	3,151	3,036	115	3.65
Padang Panjang	34,517	7,868	7,626	242	3.08
Bukittinggi	70,771	18,771	18,167	604	3.22
Payakumbuh	78,836	25,446	25,271	175	0.69
All Municipalities	710,331 b/	177,793	173,471	4,322	2.43
Urban	404,233 c/	100,717	97,672	3,045	3.02
Rural	302,533 c/	77,076	75,799	1,277	1.66
West Sumatra	3,406,816 b/	1,100,720	1,087,933	12,787	1.16 d/
Urban	433,120 c/	107,155	103,983	3,172	2.96
Rural	2,973,012 c/	993,565	983,950	9,615	0.97

a/ Worked at least two days in the previous week or temporarily not working.

b/ Complete enumeration, including the homeless, sailors, and the backward, isolated societies.

c/ Based on a 5 per cent sample. The total may not add due the sampling errors. Excluding the homeless, sailors, and the backward, isolated societies.

d/ Compared to Table 5.1. The small difference is due to the slight change of definition of working.

Sources : See Table 5.1

Labour Force and Employment :
Prospects for the Eighties

With a lower economic growth, the prospects for employment exparsion in the eighties seems not to be brighter. Although there was still no clear relationship between the respons of employment to economic growth, however, experiences in the seventies shown that the respons were not very high. The employment elasticity over the period of 1971-1980 was 0.3020. This figure suggested that at every one per cent increased of economic growth, employment increased only 0.3020 per cent -- or about one-third of the economic growth. Whether the future trends will be the same as the past depends upon several variables, such as,technology, education, etc. See Table 5.4.

However, when the same employment respons projected into the future -- then the employment will grew at the rate of 1.93 per cent per annum. The lower employment growth,compared to the seventies,is merely a reflection of the lower expected economic growth in the eighties.

The labour force supply, nevertheles, grew at the rate of 2.17 per cent per annum over the period of 1980-1990. The labour force will be determined by the population growth and the expected participation rate. The population growth is projected to be 2.12 per cent -- which is lower than the seventies,2.32 per cent per annum. However, with the increasing trends of family planning efforts, the crude birth rate will be expected to be lower. The net effect is the lower population growth at ten years of age or less. The implication is quite clear. The population structure will be moving toward a relatively old age groups, at least in the next few years.

The growth rate of manpower will started to defiate from the population -- unlike the seventies -- which is expected to be 2.61 per cent per annum. The stimates have been made with a reduced net-outmigration rate. However, the participation rate is expected to be decreased with the young age population groups going to schools insted of entering the labour force. Nevertheles,the labour force growth will surpass the employment with the end result of increasing the open unemployment rate to 3.62 per cent --

Table 5.4 West Sumatra : Employment Elasticities, Growth Rates of Gross Regional Domestic Product, and Employment and the Sources of Employment Growth 1971-1990

Industrial Origin	Employment Elasticities	Annual Gross Regional Domestic Products Growth Rates (%)		Annual Employment Growth Rates (%)		Sources of Employment Growth (%)	
		1971-80	1980-90	1971-80	1980-90	1971-80	1980-90
Agriculture	0.2417	3.93	4.20	0.95	1.02	27.25	31.48
Mining	0.5858[a]	5.31	29.31	14.47	17.17	2.29	11.13
Manufacturing	0.3441	12.73	9.65	4.38	3.32	9.62	10.26
Construction	1.8905	6.30	1.40	11.91	2.65	11.77	4.87
Transportation & Communication	0.2564	13.96	9.66	3.58	2.48	3.50	3.17
Trade	0.4955	12.29	5.39	6.09	2.67	26.81	17.30
Others	0.5680	5.81	5.14	3.30	2.92	18.76	21.79
All Sectors	0.3020	7.65	6.38	2.31	1.93	100	100

a/ Adjusted estimate.

Source : Lembaga Penelitian Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Pendapatan Regional Sumatera Barat 1966-1979 and 1975-1980 (Regional Income of West Sumatra)(Padang :); Table 5.1 and see also Table 5.5.

or more than three times the 1980 unemployment rate. See Table 5.1.

Agricultural sector will still become the main sources of employment absorbtion in the eighties -- which is expected about one-third of the total employment growth. The other employment sources of growth will be the trade, mining, and manufacturing sector.

As has been expected there will a slight difference between the sources of economic growth and employment opportunities. The agricultural and trade sectors confirmed either as the main sources of economic growth or employment opportunities. Both sectors will become the backbound of West Sumatra's economy. However, transportation & communication sector which is expected to be the main sources of economic growth failed to be the main sources for employment absorbtion. On the other hand, mining sector which can be ignored as the main sources of economic growth, surprisingly come out as the main sources for employment creation. These suggests that the transportation & communication sector will be developed on a capital intensive technology while the mining sector on the other way round.

The manufacturing sector seems to be developed on a dual technological approaches -- the modern and the traditional approaches. The expected sources of economic growth from the manufacturing sector will be about 25.40 per cent while from the employment absorbtive capacity to 10.26 per cent -- which is still high compared to the other sectors.

The quantitative approaches in making the employment projections to the year 1990 will give only a half side of the employment problems of West Sumatra. Although the macro-economic employment analysis will be useful, nevertheles, the micro project-by-project approach should to be conducted in the future.

The socio-cultural aspects of the manpower problems should not to be ignored in the future, especially in the West Sumatra. Although the open unemployment rate shows an increasing trends, it does not preclude that labour shortage will be found, either on a particular time or location.

Income Distribution

The employment patterns followed the traditional approach. The increasing employment expansion did not automatically increased the value added at the same proportional rate. The disparity between the employment and value added could be used as the measure of income inequality, known as the Kuznets index.

Kuznets, however, measured the distribution of Gross Regional Domestic Product on the one hand, and the distribution of employment -- both by the industrial origin -- on the other hand.[12/] If the contribution of the agricultural sector, for instance, to the Gross Regional Domestic Product the same as in the employment, then the agricultural productivity rate per labour will be the same as the overall productivity rate. On the contrary, if there is a difference, then there is a disparity between both productivity rates. The ratio between the contribution of the sectoral shares of the Gross Regional Domestic Product and employment, will give a yardstick as a sectoral labour productivity rate.

The trends and projections of the Gross Regional Regional Domestic Product and employment, by industrial origin, showed an increasing disparity between the sectoral groups. The transformation of labour -- from the agricultural to the non-agricultural sectors, and from the informal to the formal sectors -- gave quite an impact to the income inequality of West Sumatra.

The income inequality of West Sumatra tended to increase in the seventies and the eighties -- although the increase rate become smaller. The Kuznets indices moved from 43.06 to 55.08 over the period of 1971-1980. The income inequality still increases to 62.88 in 1990. However, the rate of increase in the eighties will be half the rate of the seventies.

12/ Simon Kuznets, Economic Growth of Nations : Total Output and Production Structure (Sambridge : The Belknap Press of Harvard University Press,1971),Chapter V. See also Richard Szal and Sherman Robinson, "Measuring Income Inequality", dalam Charles R. Frank, Jr., and Richard C. Webb (Editors), Income Distribution and Growth in Less-Developed Countries (Washington,D.C.: The Brookings Institution, 1977), h.507.

Table 5.5 West Sumatra : Trends and Projections of Percentage Distribution of Employment and Gross Regional Domestic Product, and Kuznets Index, 1971-1990

Industrial Origin	Employment			Gross Regional Domestic Product			Kuznets Index		
	1971	1980	1990	1971	1980	1990	1971	1980	1990
Agriculture	70.16	62.11	56.78	48.63	35.43	29.63	21.53	26.68	27.15
Mining	0.22	0.60	2.44	0.40	0.33	2.83	0.18	0.27	0.39
Manufacturing	4.65	5.59	6.40	8.43	12.77	18.15	3.78	7.18	11.75
Construction	1.52	3.44	3.69	3.20	2.85	1.84	1.68	0.59	1.85
Transportation & Communication	2.15	2.41	2.54	5.51	9.20	12.44	3.36	6.79	9.90
Trade	8.68	12.08	13.00	17.25	25.21	22.40	8.57	13.13	9.40
Others	12.62	13.77	15.15	16.58	14.21	12.71	3.96	0.44	2.44
All Sectors	100	100	100	100	100	100	43.06	55.08	62.88

Conclusions

The dimensions of the employment problems of West Sumatra could not be seen from the quantitative analysis only but the qualitative aspects influenced also the environmental condition of the labour force. Judging from the employment statistics, the employment problems of West Sumatra were not so severe as as in the other provinces -- especially in Java. The low unemployment rate was mainly due the increasing labour absorbtive capacity of the economy or by the increasing trend of the outmigration. The last factor seems to be more dominant than the first one.

The decision to work in the Minangkabau labour depended upon two inter-related factors. First, the socio-cultural attitude toward the manual works was rather low. This attitude restricted the employment expansion by the unwillingness of the unskilled labour to take the manual works. Second, the seasonal crops patterns. The implications were quite clear. The labour shortage will be found in a certain place and a certain time.

The unskilled labour tended to work in the self-employed activities while the skilled labour prefered the civil service jobs. However, the existing labour absortive agricultural sector seems to be a transitory employment for the Minangkabau labour. Once going outside the agricultural sector, they never inted to come back -- as seen in the attitude of the outmigrants.

The informal employment sectors were and will be expected as the main sources of employment expansion -- especially in the agricultural and trade sectors. However, the informal sector usually become a low income creating activities. With the growing trends of a few modern capital intensive sectors, the income inequality tended to increase. Nevertheles, the expected increasing income inequality rate in the eighties will be lower than the seventies.

Although the projected open unemployment rate of West Sumatra will increase in the eighties, however, it does not preclude that the labour shortage will be found at a certain time or place. The socio-cultural aspects of the labour force should be looked more carefully in the future.

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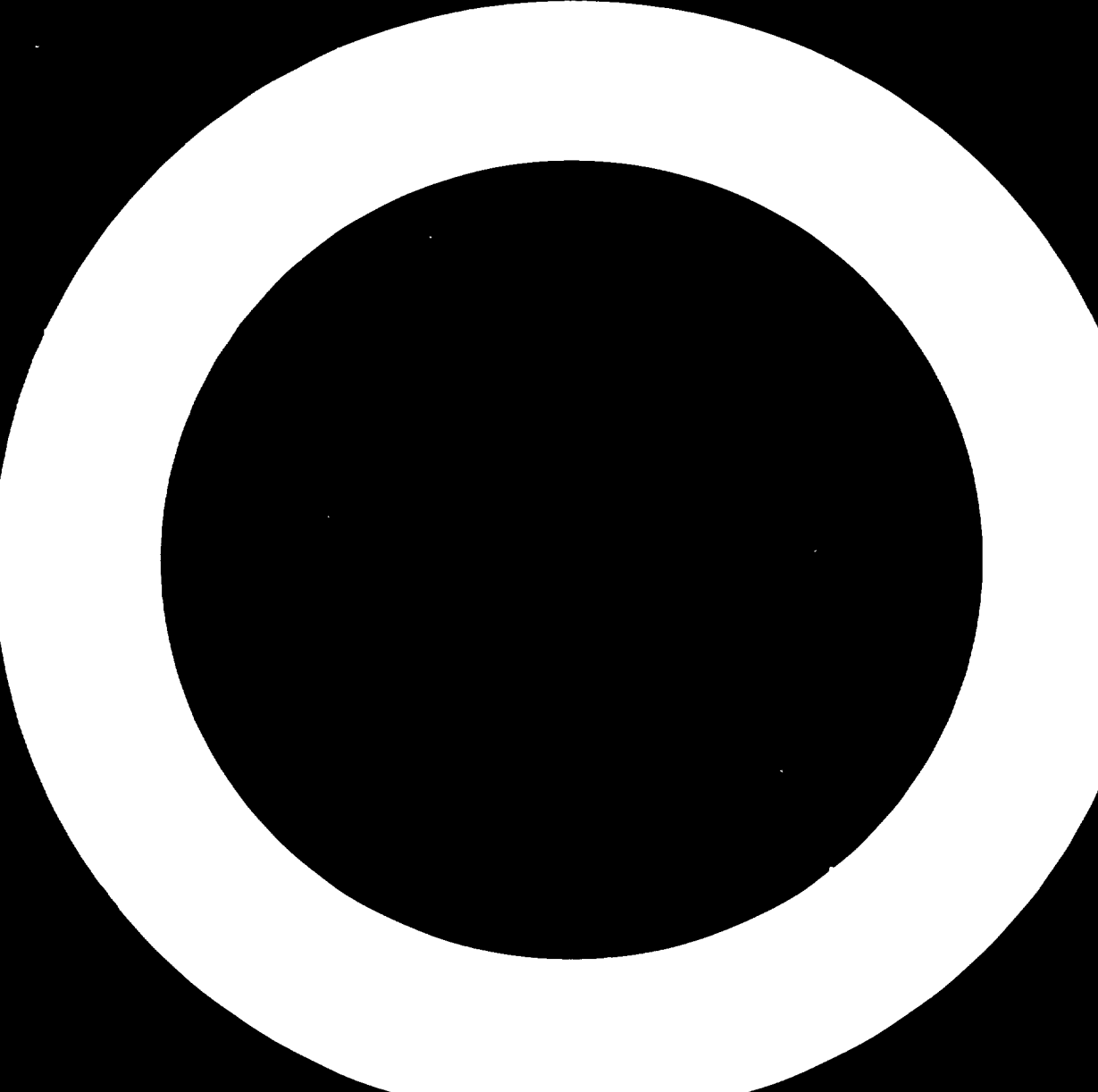
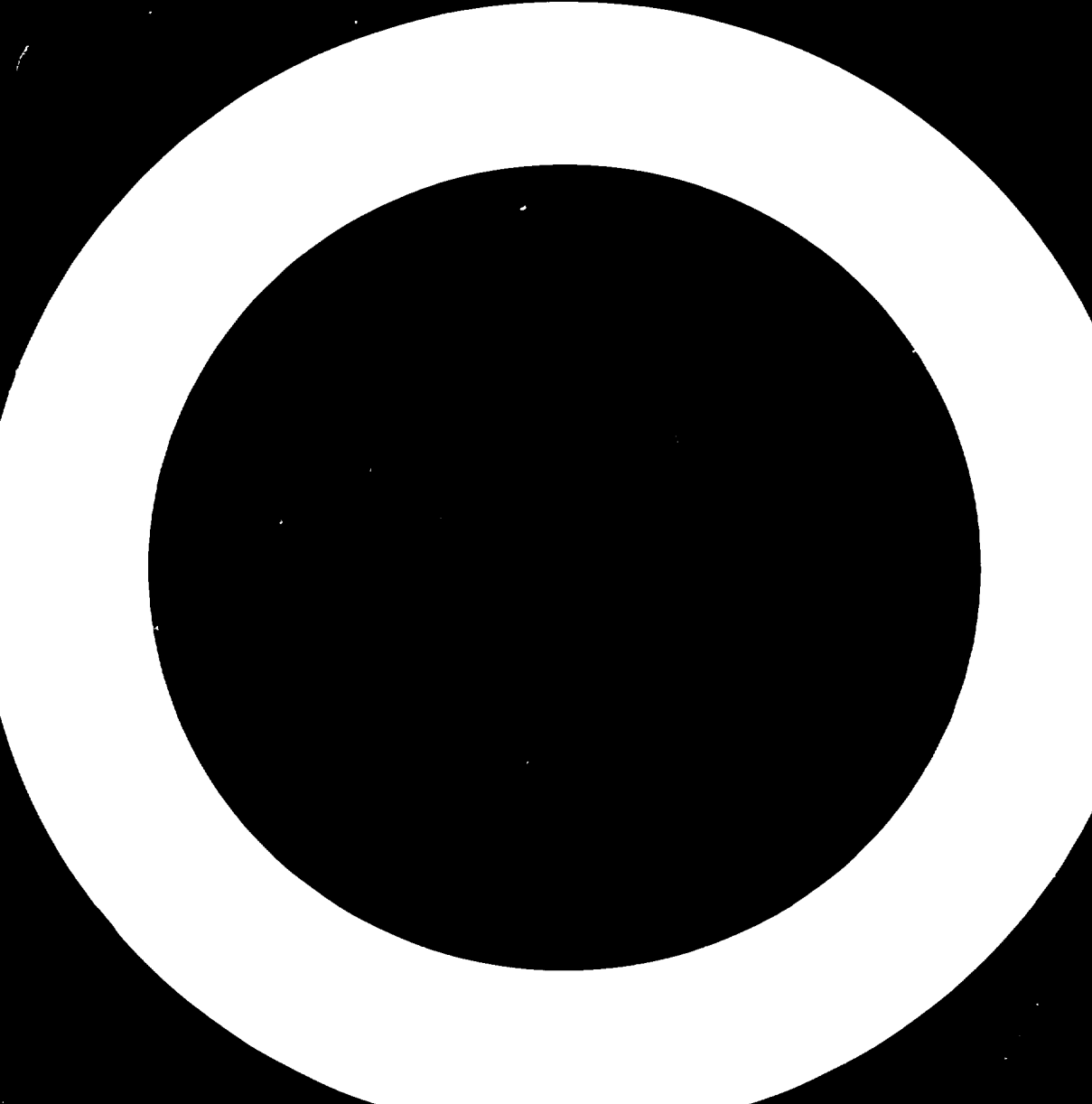


Part III

AGRICULTURE AND MANUFACTURING



Chapter 6

AGRICULTURAL RESOURCE BASE

THE AGRICULTURAL resource base covers the physical feature of the province such as land use, climate, soil, water supply, etc. The resource base will determine the potential of agricultural sector.

Food and plantation crops were the agricultural subsector which focussed on essential food crops and main plantation commodities.Five essential commodities of food crops (rice,cassava,peanuts, mize,and chilli),and five main commodities plantation crops (rubber,cassia vera,coffee,tea, and copra) were particularly selected.

The chapter will assess the potential of agricultural resource base of West Sumatra in relation to extending and intensifying programs and favourable growth conditions of those food and plantation crops.

LAND USE

Out of the total areas of West Sumatra, 4,229,730 ha, about per cent consist of the total agreed forest areas (Table 6.1). The total agreed forest areas will be maintained as the forest areas and should not be converted into other uses. The high portion of the total areas of West Sumatra classified as the total agreed forest areas shows the limited uses of the land due to the mountaneous characteristics of the areas. It has been estimated that only about 437,733 ha of the forest areas could be converted into the other agricultural-population-settlement areas. The total areas which has been used for population habitat was 849,128 ha.

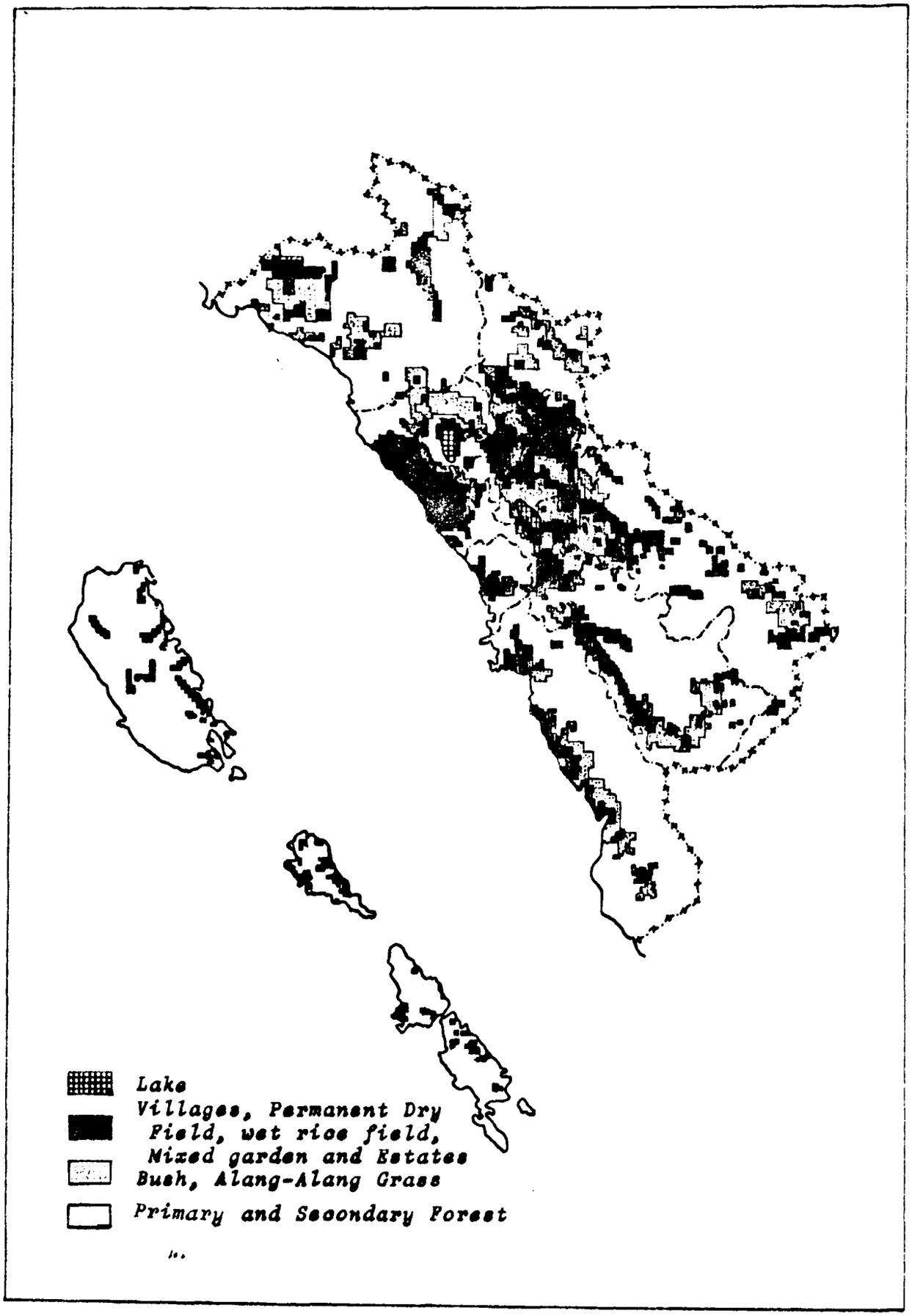
Table 6.1 Total Areas of West Sumatra by Forest Classification and Land Use, 1981

Forest Classification and Land Use	Area (Ha)
Nature Conservation Forest	599,694
Protection Forest	1,206,624
Limited Production Forest	539,707
Production Forest	596,844
Total Agreed Forest Areas	2,942,869
Conversion Forest	437,733
Others	849,128
Low Land Rice Fields	(118,878)
Farm Dry Land	(84,913)
Smallholder Commercial Crops	(101,895)
Estate Plantations	(33,965)
Barren Land	(110,387)
Other Uses	(399,090)
Total Agreed Land Exploitation	1,286,861
Total Areas of West Sumatra	4,229,730

Notes: Nature Conservation Forest will be used for the habitats of protected plants and animals. Protection Forest is reserved forest for protecting the areas from erosion and flood. Limited Production Forest will be used for timber production with a limited cutting activities -- mostly on the basis of the size of the trees. In the meantime the Production Forest has no limited cutting activities. However, both areas of the limited and production forests should be replanted with high quality tress for maintaining the balance of forest areas in West Summatra. The areas should not be converted into agricultural-population-settlement areas. The settlement areas converted from the forest are classified into the conversion Forests areas.

The total areas of West Sumatra based on this classification seems not in corformity with Table 4.5 (42,901.2 km sq.) and the central Bureau of Statistics figure (49,778 km sq.).

Source: Pusat Penelitian Tanah Bogor, Peta Rencana Pengukuhan dan Penatagunaan Hutan, Propinsi Dati I Sumatera Barat. (Bogor: 1982).



Map 6.1 WEST SUMATRA : LAND USE.

The mountainous groups along the west coast of the Su= matra island were situated from the North West to South East. This physical feature of the topography causes those areas to belong to heavy rain areas.

Land use capability of this area classified into two classes of slope, 0-2 per cent, and 2-15 per cent, respectively,

Based on the soil conservation and protection from erosion, the class of slope more than 15 per cent was not reccommended for cultivation area.

From this class of slope, there were 27.5 per cent, and 15.4 per cent of total area of West Sumatra which belong to class 0-2 per cent and 2-15 per cent of the slope. It means 57.1 per cent of total area of West Sumatra should be conserved or may not be used for cultivated area.

About 70 per cent of total area in Solok, Limapuluh Kota, and Pesisir Selatan regencies belong more than 15 per cent to the class of scope.

CLIMATE

In geographical terms West Sumatra is areas $0^{o}54'$ NL - $3^{o}30'$ SL, and $98^{o}36'$ EL - $101^{o}53'$ EL. 1/

In the western part of West Sumatra is located the Indian Ocean, North Sumatra in the northern, Bengkulu and Jambi in the southern, and in the easthern are Jambi and Riau provinces, respectively.

The climate of West Sumatra is tropical wet season (A and B types of Schmid & Ferguson or Af of Koppen type).

Rainfall each year are 1,315 - 4,337 mm, and amount of rain days are 94-243 (110-361 sq. mm each month, and 8-20 rain days).

1/ NL = North Latitude; SL = South Latitude; EL = East Latitude.

It is called wet month if rainfall is more than 200 sq.mm each month, and dry month if rainfall is less than 100 sq. mm.

Normally the rainfall occurs from September to March. In some areas there is no clear division between raining and limiting dry seasons. The temperature of West Sumatra normally is 23^{o} - 29^{o} C.

SOIL

There are several kinds of soil in West Sumatra that are classified as podsolic, alluvial, andosol, grumosol, and so on.

About 900,000 ha of the soil in West Sumatra is podsolic soil, It means more than 50 per cent of total area of soil in ~~is~~ West Sumatra. About 70 per cent of this soil could be managed as arable land (cultivated area), and 75 per cent of that arable land area is suitable for food crops.

Podsolic is acidysoil and needs lime fertilizers for increasing its productivity.

The distribution of this soil is connected with lower elevation, undulating to rolling country with vulcanic forcanic formations.

Almost all of transmigration areas and new setlement covered by the podsoloc soil. The podsolic soil is the only soil which has good potential for extending area of cultivation and settlement in West Sumatra. 2/

Podsolic is a rather poor soil, and so its needs research or good management to increase productivity.

Alluvial is normally covered in the lower elevation or plain area along the border of the rivers.

Andosol (fertile soil) is found in around the vulcanic area or in higher elevation of the country. Tea and cinnamon tres (cassia vera) grow will in this elevation, but coconut, plant normally in the lower elevation area

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2/ Nurhajati Hakim, Kapur untuk Memperbaiki Kesuburan Tanah Pertanian Bereaksi Asam (Limes for Improving Fertility of Acid Cultivated Soil). Proceeding Seminar, University of Andalas, Padang, September 11, 1982.

Rubber and coffee plants grow in almost all kind of the soil.

WATER SUPPLY

Source of water supply is not only used for drinking, bathing, cleaning, but also for agriculture, industry, fishery.

Reserved forest is essential for soil and water conservation.

The total water potential has a positive correlation with the total of water on the surface of the soil. It means that increase of total protected forest areas are also followed by an increase of the total potential of water.

In West Sumatra there are about 250 rivers of different sizes and different locations (regency).

Many of those rivers have been used for irrigations and an other purposes.

There are four lakes that could also be used for irrigation and other purposes. They are lakes Mninjau (9,950 ha), Singkarak (13,011 ha), Danau Diatas (3,150 ha), and Danau Dibawah (1,400 ha).

West Sumatra with the 42,297.30 sq. km which consist of more than 30 per cent, of slope level derived from mountainous groups and undulating areas, and only 25 per cent, of this area could be cultivated for agriculture. From this situation it is still possible to increase food crop cultivation especially rice. Increasing rice (paddy) production can be done through intensification and extensification programs by irrigation system and extending the new irrigation lowland rice area.

Until 1982, the total area of lowland rice was 210,725 ha and about 5.43 per cent, 21.30 per cent, and 42.59 per cent, were irrigated by technical, semi technical, and simple irrigations, respestively. And the rainfed rice irrigation was 30.68 per cent.

During the first year of Pelita III (1979) about 4.22 per cent, 15.35 per cent, and 53.81 per cent of the total area of lawland rice were irrigated by technical, semi technical, and simple irrigations,respectively. And the rainfed irrigation was 26.63 per cent.

The available potential irrigation for lowland rice covers 238,500 ha in 1983; however, the providing of irrigation in still supplied by the non technical system. It means that the development of irrigation project still needs inprovement

Using new technology (high yielding varieties, fertilizers, and pesticides applications) in laoland rice irrigated will also greatly increase rice production.

Panti rao and Tongar irrigations are big projects which will be realized and they are located in Pasaman regency (Northern of West Sumatra), Batang Ampu and Batang Kapar are the other irrigation projects which have already finished, they will supply the water for rice covering 2,200 ha.

In Repelita IV it was estimated for increasing total area of lowland rice irrigation (technical, semitechnical, and simple irrigation) each year 1983-1988 from 238,512 ha to 270,792 ha (Table 6.2). This estimation is based on the land use capabilities and irrigation potential of West Sumatra.

Rehabilitation priority, completion, and new irrigation project will be especially emphasized to the central region of rice production, irrigation facilities, and also would be integrated to the public activities.

Table 6.2. Estimation of Extending Irrigation Network by Total Area of Lowland Rice Irrigation (Ha)

Year	Irrigation Systems			Total
	Technical	Semi Technical	Simple	
1983	9,948	113,611	114,953	238,512
1984	12,801	128,432	101,474	242,707
1985	17,901	142,652	87,254	247,807
1986	19,701	154,886	75,020	249,607
1987	30,416	164,137	65,769	260,322
1988	40,886	171,889	58,017	270,792

Source : Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra : Draft, Fourth Five-Year Development Plan, 1984/85-1988/89).

FOOD AND PLANTATION CROPS

Food Crops

In West Sumatra, rice, cassava, maize, peanuts, and chilli plants are cultivated in many different regions from low to high areas.

The rice plant could be planted twice or three times a year in irrigated low land rice by using the high yielding varieties.

Maize needs 50 - 100 mm/month of rainfall until two weeks after planting, and need dry season during harvesting period.

Normally planting season of cassava from October-December (the first of rainfall season), and March-April for chilli (the last period of rainfall season).

The favourable growth conditions of the food crop completed in Table 6.3.

Table 6.3. The Favourable Growth Conditions of the Food Crops a/

Crops	Soil	Altitute (m)	Rainfall a. mm/year b. mm/month	Atmosphere
1. Rice	clay, fertile	0-1,200 (Opt-900)		hot and wet
2. Maize	fertile	0-1,200 (Opt-900)	a. 800-1,500 b. 50-100 until 2 weeks b. 100-125 growing period b. dry season in harvesting period.	hot and wet
3. Cassava	fertile	0-1,200 (Opt-800)	October December (planting Period)	wet
4. Peanuts	silty, sand	0-1,200 (Opt-900)	a. 1,000-1,500	hot and wet
5. Chilli	clay,silty, sand	0-1,000	March-April (planting period)	hot and wet

a/ Compiled from several texts.

Plantation Crops

Rubber and coconut plants grow and are cultivated until 500 m from the sea level. Tea, cinnamon, and Arabic Coffee grow well in the mountain and hilly areas until 1,500 m from the sea level.

Robusta,Liberica, and Exelsa coffee grew well on 400-800 m from the sea level.

Almost all of those plantation crops need much rainfall, 1,750 - 4,000 mm/year.

Rubber can grow in all kinds of soil, but cinnamon, coconut, tea, and coffee need fertile, light, pores, and good drainage of soils.

The favourable growth conditions of the plantation crops completed in Table 6.4.

Table 6.4. The Favourable Growth Conditions of the Plantation Crops a/

Crops	Soil	Altitute (m)	Rainfall a. mm/year b. mm/month	Atmosphere
1. Rubber	all	0 - 500	a. 2500-4000 100-150 (rain-day)	hot and wet
2. Cinnamon (Cassia vera)	light, porous	500 - 1,500	a. 2000-2500	wet
3. Coconut	light, shallow surface water	0 - 500	a. 1000-2250 b. equal distribution	hot and wet
4. Thea (Camellia)	fertile	500 - 1,200	a. 2000-2500 b. at least 100	wet
5. Arabic coffee	fertile, good drainage	500 - 2,000 (opt. 900-1500)	a. 1750-3000 (opt.-2000)	wet
Robusta Liberica, Exele	fertile, good drainage	0 - 900 (opt.-700)	a. 1750-3000 b. 3-4 month dry season	hot and wet

a/ Compiled from several texts.

CONCLUSION AND EVALUATION

According to land use capability, it is still possible to extend the cultivated area for good crops or pantation crops which derive from reserve forest in southern or nothern part of West Sumatra (Table 6.2).

Kind of crops which will be cultivated must be suitable the favourable growth conditions of the crops (Table 6.4 and Table 6.5) especially for the climate and soil.

The climate of West Sumatra is tropical wet season. Rainfall were 1,315 - 4,331 mm/year, amount of rainday are 94 - 243 (110 - 361 mm per month, and 8 - 20 raindays).

Podsolic soil covers more than 50 per cent of total areas of soil in West Sumatra, especially in transmigration site. The podsolic is acid soil and need lime fertilizer for increasing its productivity.

The extending area for rice cultivation should be emphasized in Pasaman regency, based on the irrigation projects which are being developed.

It need intensitvely research to make clear the boundry between the extending of arable land from the reserved forest area.

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Chapter 7

AGRO-INDUSTRIAL PROJECTS : FOOD-CROPS BASED INDUSTRIES

FOOD CROPS planning and production have become the main focus of attention in the last decade. However, the increasing production of food-crops have not being follow up by the increasing food-crops based industries with the results that a large part of the food-crops have being used as the final products or final consumption. The food-crops industrial linkages seems to be non-existent.

The food-crops based industries were and are still being developed on the simple processing activities. A large part of the paddy-rice processing plants consisted of the rice-machinery mills (RWM) and rice-water-mills (RMM) to transform the paddy into rice. The other rice-based industriea did not exist at all. Cassava-based industries are in the form of the tapioca mills. While maize, peanuts and vegetables processed in a more traditional way to fulfill the local needs.

This Chapter will discuss the investment possibilities in the food-crops based industries.

Trends and Prospects of the Food-Crops [1/]

The main sources of the agricultural growth of West Sumatra came from the food-crops activities -- particularly paddy production. The 3.7 per cent annual growth of the agricultural sector was mainly due to the achievements in the food-crops production. The production of paddy as the leading source of growth came to 4.4 per cent per annum.

The planned target of the agricultural sector in Repelita IV is projected to 4.1 per cent. The trends and projections of the food-crops production since 1969 to 1990 could be seen in Table 7.1.

1/ The analysis was based on the West Sumatra Fourth Five-Year Plan, 1984/85-1988/89, Vol.IIA, Chapter 12.

Table 7.1. West Sumatra : Trends and Projections of Food Crop Productions, 1969-1990 (Ton)

Year	Paddy	Maize	Cassava	Peanuts	Chilli
1969	797,925	6,410	86,772	3,391	6,605
1970	813,788	6,087	82,335	3,792	7,048
1971	845,455	5,335	88,033	5,572	10,015
1972	853,000	5,526	97,421	5,081	10,485
1973	918,001	6,939	96,062	5,020	12,180
1974	980,994	7,136	99,269	5,135	12,249
1975	953,879	7,607	83,341	4,168	11,176.5
1976	954,355	6,951	82,524	5,334	9,671
1977	967,617	7,330	87,840	5,641	11,301
1978	1,048,629	7,758	63,127	7,364	16,528
1979	1,125,171	9,664	66,862	7,528	14,429
1980	1,232,163	11,517	67,109	7,053	14,429
1981	1,331,635	11,535	77,687	7,822	18,123
1982	1,488,597	12,203	78,845	8,197	17,803
1983	1,554,096	12,910	80,019	8,589	18,015
1984 a/	1,622,476	13,663	81,064	9,020	19,222
1985	1,693,865	14,478	82,272	9,442	20,514
1986	1,768,395	15,293	83,498	9,884	21,893
1987	1,846,254	16,154	84,742	10,346	23,364
1988	1,927,487	17,064	86,005	10,831	24,934
1989	2,012,296	18,020	87,295	11,340	26,605
1990	2,100,837	19,029	88,604	11,873	28,387

a/ Projections begin from 1984.

Source : Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra : Draft, Fourth Five-Year Development Plan, 1984/85-1988/89.

Table 7.2 West Sumatra: Trends and Projections of Food Crops Harvesting Areas, 1969-1990 (Ha)

Year	Rice-fields		Maize	Cassava	Peanuts	Chilli
	Total Area	Total Harvesting Area				
1969	197,103	266,607	4,932	5,454	2,588	3,753
1970	197,493	266,018	6,134	5,426	3,603	3,145
1971	200,900	263,421	5,546	5,819	4,517	3,942
1972	203,500	257,796	5,038	5,808	4,071	3,970
1973	204,100	266,687	5,294	5,833	3,837	4,088
1974	209,200	270,391	6,261	5,988	4,159	3,950
1975	209,900	262,921	6,754	4,644	3,847	3,699
1976	210,100	260,383	7,757	4,947	5,208	3,934
1977	210,200	264,234	5,864	5,960	5,198	4,566
1978	210,600	261,830	5,185	4,780	4,878	5,706
1979	210,700	280,451	5,523	4,615	5,033	5,282
1980	213,200	299,171	6,152	5,623	5,094	6,896
1981	213,200	301,063	6,307	5,685	5,332	9,160
1982	214,863	303,652	6,366	5,748	5,581	13,210
1983	216,539	306,263	6,425	5,811	5,842	
1984[a]	...	308,897	6,485	5,874	5,930	8,524
1985	...	311,554	6,545	5,939	6,019	8,987
1986	...	314,233	6,606	6,004	6,199	9,476
1987	...	316,935	6,667	6,070	6,292	9,991
1988	...	319,661	6,729	6,137	6,386	10,535
1989	...	322,538	6,790	6,205	6,507	11,104
1990	...	325,441	6,851	6,273	6,631	11,704

[a] Projections begin from 1984

Source: Sumatera Barat: Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra: Draft, Fourth Five-Year Development Plan, 1984/85-1988/89).

The production of rice has already surpassed the local consumption needs of West Sumatra. The annual growth of paddy in the period of 1969-1983 was 4.4 per cent which was higher than the national figure of 4.3 per cent. With the population growth rate of 2.2 per cent, the excess production of paddy has been used to supply the needs of the neighbouring provinces.

The increasing production of paddy was mainly due to the increasing productivity -- estimated to be around 3.5 per cent annually. In the meantime, the total harvesting arras did not expand rapidly. Several factors contributed to the increasing productivity, such as the increasing used of fertilizers,pesticides, improvement in the irrigation system, and the expansion of agricultural extension services.

The productivity in the intensification programmes such as Bimas, Inmas and Insus has increased from 3.4 ton of paddy per ha in 1969 to 4.8 ton in 1983. In other words, the productivity increased about 41 per cent over the period of 1969-1983. The non-intensification programmes, however, showed a declining productivity and estimated to be less than 3 ton per ha in 1983. Selected technology-productivity oriented indicators are found in Table 7.2.

Judging on these indicators, the food crops development of West Sumatra moved rapidly toward using a higher technological technique of production in the las decade. The farmers responsed to the uses of these modern technologies seems to be quite favourable.

However, the progress in the non-paddy productions, such as maize, cassava, peanuts, and vegetables, did not folow as rapidly as in the paddy production. Since the main focus of attention was on paddy, the other non-paddy activities have been neglected.

Table 7.2. West Sumatra : Agricultural Technological Development, 1969-1983

Year	Irrigated Areas (Ha)	Fertilizer (Ton)	Pesticides (kg/l)	Farmer's Organization	Number of Extensions Workers
1969	80,810	18,070	90,100	-	-
1970	92,030	13,262	25,100	333	-
1971	93,500	14,663	24,700	797	60
1972	93,600	16,125	34,600	1,017	60
1973	93,800	25,770	37,700	1,302	126
1974	94,000	21,021	119,500	1,481	150
1975	96,300	21,050	117,800	1,671	200
1976	96,300	21,840	139,500	2,071	209
1977	106,200	20,734	129,300	2,597	355
1978	106,200	21,003	135,200	3,000	400
1979	119,700	33,369	127,300	5,316	400
1980	119,700	41,922	170,984	5,316	422
1981	119,700	49,332	145,986	6,801	425
1982	123,231	53,708	168,176	8,701	436
1983	126,866	58,472	193,739	11,132	448

Source : Sumatera Barat : Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89, Jilid IIA, (West Sumatra : Draft, Fourth Five-Year Development Plan, 1984/85-1988/89), (Padang, 1984), pp.12.22-12.25.

Rice Processing Plants

Rice-machinery-mills (RMM) [2] gradually replaced the local-technology of the rice-water-mills (RWM) [3] in West Sumatra. The RMM were preferrable than the RWM due to the various advantages, such as the higher rendement ratio, quality, processing capacity,and less processing unit costs. The RMM could buy the paddy then processed and sell, on the one hand, but could give also the processing services to the farmers by small fees, on the other hand. The large scale RMM preferred the first option, while the small scale unit, the second ones. However, due to the shortage of operating capital,it was nor surprising that the large scale RMM were operating below the maximum installed capacity.

The number of RMM was estimated to be around 3,396 units in 1981. The total maximum installed capacities were 706,704 ton. With the 414 units of RWM installed capacities of 3,882 ton, the RMM practically dominated the rice processing activities in West Sumatra. However, the total installed capacity of RMM were about 50 per cent only of the total production of paddy in 1981.

Over the period of 1975-1981, the total number of RMM has increased about 1,246 units while the RWM decreased around 2,379 units. A large part of the RMM were still consisted of the small scale units scattered throughout the province. The utilization rate of RMM, however, showed a decreasing trends over the period of 1975-1981,although the total paddy processed increased from 46 thousand tons to 355 thousands tons. The paddy participation rate (PPR) [4] in the RMM increased from 5 per cent to 27 per cent, nevertheles, it was still below the available maximum installed capacities of 50 per cent of the total production of paddy.

2/ The rice processing plants operated on the motor-power source of energy.

3/ The rice processing plants operated on the water-power source of energy.

4/ The paddy participation rate is the ratio of the total number of paddy processed by the RMM with the total production of paddy.

Table 7.3. West Sumatra : Number, Installed Capacities and Real Production of Rice Processing Plants, 1975-1981

Classification of Mills	1975		1978		1981	
	Number of Units	Installed Capacity (ton)	Number of Units	Installed Capacity (ton)	Number of Units	Installed Capacity (ton)
(A) Motor-Power Units	2,150	24,512	3,070	803,255	3,396	706,704
Large-Scale Proses-sing Units	4	384	6	5,744	14	14,460
Small-Scale Proses-sing Plants a/	2,019	22,345	2,445	565,959	2,479	384,699
Rice Milling Units	127	1,783	619	231,552	903	307,545
(B) Water-Power Units	2,793	27,009	1,767	14,820	414	3,882
Rice-Water Mills	2,793	27,009	1,767	14,820	414	3,882
Total	4,943	51,521	4,837	818,075	3,810	710,586
(C) Ratio of Real Pro-duction to Total Installed Capacity of Motor-Power Units		89		65		50

a/ Consisted of huller, Engelberg processing units and other small-scale motor power units.

Sources : Laporan Tahunan Dinas Pertanian Tanaman Pangan Daerah Tingkat I Sumatera Barat (Annual Report of Food-Crops Extension Service) -- several issues.

The recent survey of the utilization rate of the existing rice processing plants was estimated to be 45 per cent in 1983.

The low utilization rate on the basis of the production stocks seems to be misleading. The calculation of the utilization rate should be based not on the production stocks but on the production flows. The production of paddy per year is not emerged at once, but cumulatively totalled as the results of the different planting and harvesting periods throughout the province.

One way of looking into the production flows were through the rice-field intensification rate (RII). 5/ In some parts of the province, the rice-fields have being planted twice a year. While the periods of planting and harvesting the first cropping were different also from one area to the others.

The RII of West Sumatra was 1.41 in 1983. By assuming the same ratio as the RII the total production of the first cropping will be 1.1 million tons of paddy while the second ones were 0.5 million tons. Since the first cropping were made not at the same time, then it could be assumed that about half of first croppings or about 0.6 million tons will become the first production flows of paddy in West Sumatra.

On the basis the production flows, the 1983 total maximum installed capacity of RMM of 0.7 million tons were already exceeding the total production of paddy. The utlization rate has come to 83 per cent. With the lower total production of the second harvesting periods, a large part of the RMM will be operating below the installed capacity.

The new investment in the RMM seems not to be necessary, at present. However, due to the projected paddy production of 2.1 million tons in the year 1990, several policy alternatives could be thought of.

5/ The rice-fields intensification rate is the ratio of the total harvesting areas to the total rice-fields areas.

First, due to the seasonal characteristics of the RMM operations a re-allocation of the present networks could be made. In this case no new investment in RMM could be recommended.

Second, the increasing projected paddy production will be made on the intensification rather than on the extensification methods. The total rice-fields areas grew too slow compared with the growth of the production. With the increasing uses of fertilizers and other modern technological appriaches the areas to be planted twice could be increased at least to the RII of 1.7 in 1990.

Based on this calculation, the first croppings of the first harvest will be approximately to 0.7 million tons. Since the total maximum installed capacity of the present RMM is 0.7 million tons, then it seems not necessary to invest in the new RMM up to the year 1990.

Non-Rice-Based Agro Industries

The other food-crops production did not rapidly increased as the production of paddy. Except for the tapioca processing plants, the chili (red pepper) and cake & bake industries have being operated on the small scale operating units. The new established large scale tapioca processing plant has the capacity of 24,000 ton per year. In the meantime several small-scale tapioca processing units have become to household industries in West Sumatra, as well as the chili processing units.

The establishment of the new tapioca plant has become an integrated unit of the cassava plantation. The uses of the smallholders cassava production will not give a continous supply of cassava to the processing unit. Not only the production centres scattered throughout the province, but the quality of the cassava itself were different from one area to the others. The ideas of the cassava nucleus estate depended on the scale

of the cassava processing plant to be built in the future. The available land seems to be suited for the cassava plantation.

The chili processing units mostly operated on the small scale part-time operating plants. Although the total production of chili was 18,015 tons in 1983, the production capacity of the chili plant units were 3,226 tons or approximately about 17 per cent of the total chili production. New investments could be expected in the chili processing plants. The other vegetables, beside chili, have been consumed directly without any processing at all.

The maize and peanuts usually processed into the cake and bake industries. Almost of these activities were being conducted at the small scale household activities. The cake and bake industries were mostly labor intensive rather than capital intensive industries.

Conclusions

Contrary to the common thoughts, the new investments in the rice processing plants up to the year 1990 are not to be recommended. The existing rice processing plants are quite capable in handling the projected increasing production of paddy due to the seasonal characteristics of the paddy production.

Except the tapioca processing plants, which could be developed into the integrated large scale agro-industry and plantation units, the other food crops based agroindustries were mostly operated on the small scale basis. The investments seems to be small, while the industries mostly oriented toward the labor intensive rather than the capital intensive units.

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Map 7.1 WEST SUMATRA : LOCATION OF RICE MILLS INDUSTRIES

Chapter 8

AGRO-INDUSTRIAL PROJECTS: PLANTATION CROPS-BASED INDUSTRIES

THE PLANTATION crops production in West Sumatra almost entirely come from smallholder plantation although efforts have being made to rehabilitate the existing estate plantations (Table 8.1). During 1970-1980 the smallholder plantations have contributed to Gross Domestic Regional Product by 6.49 per cent, while the large scale private plantations contribution is only 0.03 per cent.

The five main plantation crops are rubber, copra, coffee, tea and cassia-vera. The existing plantation crops-based industries are, however, limited to the first four crops. And there is no significant (final) demand for the output of cassia vera industry in this region. Therefore the analysis of investment possibilities in plantation crops-based industries will be held only for crumb-rubber, coconut oil, soap, coffee powder, and tea industries.

Since the objectives of analysis are to assess investment opportunities to expand the existing plantation crops-based industries or to establish new plants, the emphasis of analysis is given to the future demand gaps by taking into consideration the availabilities of raw material. Accordingly, the components of analysis are estimation of existing capacities, product realization, level of demands, requirement, and availability of raw material. At the end of the analysis, a tentative estimation on investment requirement for establishing a new plant will be provided.

CRUMB RUBBER INDUSTRIES

Number of existing industries, production capacities and output realization of crumb rubber industries are presented in Table 8.1. Growth rate of these industries are very limited. There is a unit of industry which has been established

Table 3.1. West Sumatra : Condition of Estate Plantations, 1983

Name of Estate	Location	Area (Ha)	Crops	Year of Establishment	Employment (ton/year)	Capacity (ton/year)	Production 1983 (ton)
A. Active : Private Plantation		59,160.30			675	359.00	334.40
1. Malaban I	Limapuluh Kota	300.00	Tea	1976	268	70.00	64.14
2. Pinang Awan	Solok	1,342.30	Cinchona, Coffee	1973	227	35.00	25.56
3. Huberta	Solok	1,048.00	Cinchona, Sereh	1973	13	2.50	2.50
4. Muara Jambak	Padang/Pariaman	47.30	Coconut	1966	14	1.50	1.20
5. Pandikat	Padang/Pariaman	822.00	Rubber	1926	153	250.00	241.00
6. Incasi Raya	Sawahlunto/Sijunjung	55,000.00	Cassava	1981	n.a	n.a	n.a
B. Active : State Plantations		48,011.00			-	-	-
7. Akar Gadang a/	Solok	508.30	Tea	1980	n.a	n.a	n.a
8. Liki a/	Solok	2,484.00	Coffee	1962	n.a	n.a	n.a
9. Sangir a/	Solok	13,568.20	Rubber	1981	n.a	n.a	n.a
10. Ophir a/	Pasaman	13,200.00	Oil Palm Coconut	1981	n.a	n.a	n.a
11. Pangkalan/Kapur IX a/	Limapuluh Kota	18,250.00	Rubber	1982	n.a	n.a	n.a
C. Abandoned		35,291.05					
12. Padang Bee	Solok	302.00	Cinamon	1968	-	-	-
13. Pecomina	Solok	1,030.92	Coffee	1976	-	-	-
14. Bukit Malintang	Solok	1,799.00	-	1977	-	-	-
15. HMCA Talao	Solok	19,385.00	-	1931	-	-	-
16. Timberau	Solok	1,096.00	-	-	-	-	-
17. Teluk Sunang I	Solok	1,054.10	-	1966	-	-	-
18. Teluk Sunang II	Solok	536.00	-	1975	-	-	-
19. Bukit Kompong	Solok	854.15	-	1965	-	-	-
20. Timbulun	Solok	536.00	-	1927	-	-	-
21. Pulau Sandiom	Padang/Pariaman	340.00	Coconut	1966	-	-	-
22. Anai Duku I	Padang/Pariaman	120.00	Coconut	1927	-	-	-
23. Anai Duku II	Padang/Pariaman	425.70	Rubber	1927	-	-	-
24. Bunga Kayu I	Padang/Pariaman	170.00	-	1922	-	-	-
25. Bunga Kayu II	Padang/Pariaman	242.00	Rubber, Coffee	1966	-	-	-
26. Betung Datar	Padang/Pariaman	321.00	-	1966	-	-	-
27. Padang Mardani	Agam	3,913.00	-	1929	-	-	-
28. Padang Sawah-Sawah	Agam	374.00	-	-	-	-	-
29. Sungai Aur	Agam	972.00	Rubber	1926	-	-	-
30. Merapi	Tanah Datar	283.68	Cinamon	1968	-	-	-
31. Tanang Tala	Pasaman	724.00	-	1927	-	-	-
32. Malaban II	Limapuluh Kota	212.50	Murberry	1973	-	-	-
Total		142,462.35			675	359.00	334.40

a/ Based on the nucleus estate system.

Source : Dinas Perkebunan Daerah Propinsi Daerah Tingkat I Sumatera Barat, Statistik Perkebunan Tingkat I Sumatera Barat Tahun 1983 (Padang : 1983)

during the last eight years (1976-1983).

Table 8.2 Number of Industries, Production Capacities and Output Realization in West Sumatra, 1976-1983

Year	Number of Industry (unit)	Total Production Capacity (ton)	Total Real Production (ton)
1976	6	44,200	35,475
1977	5	38,200	33,541
1978	5	38,200	34,836
1979	5	38,200	37,798
1980	6	44,200	36,683
1981	6	44,200	36,600
1982	6	44,200	25,781
1983	7	58,000	40,056

Output realization never reaches production capacity. During 1976-1983 the average output realization was only 81 per cent of production capacity. Lack of raw material is a main constraint for reaching full capacity. Since conversion factor from raw material to crumb rubber is 0.5, for finding the output realization as shown in Table 8.2, the raw material requirements are presented in Table 8.3.

As indicated by Table 8.3 rubber production in West Sumatra is less than raw material requirement. During 1976-1983 the average rubber production was only 30 per cent of raw material requirement. The shortage of rubber production in this region has been fulfilled by import from neighbourhood provinces.

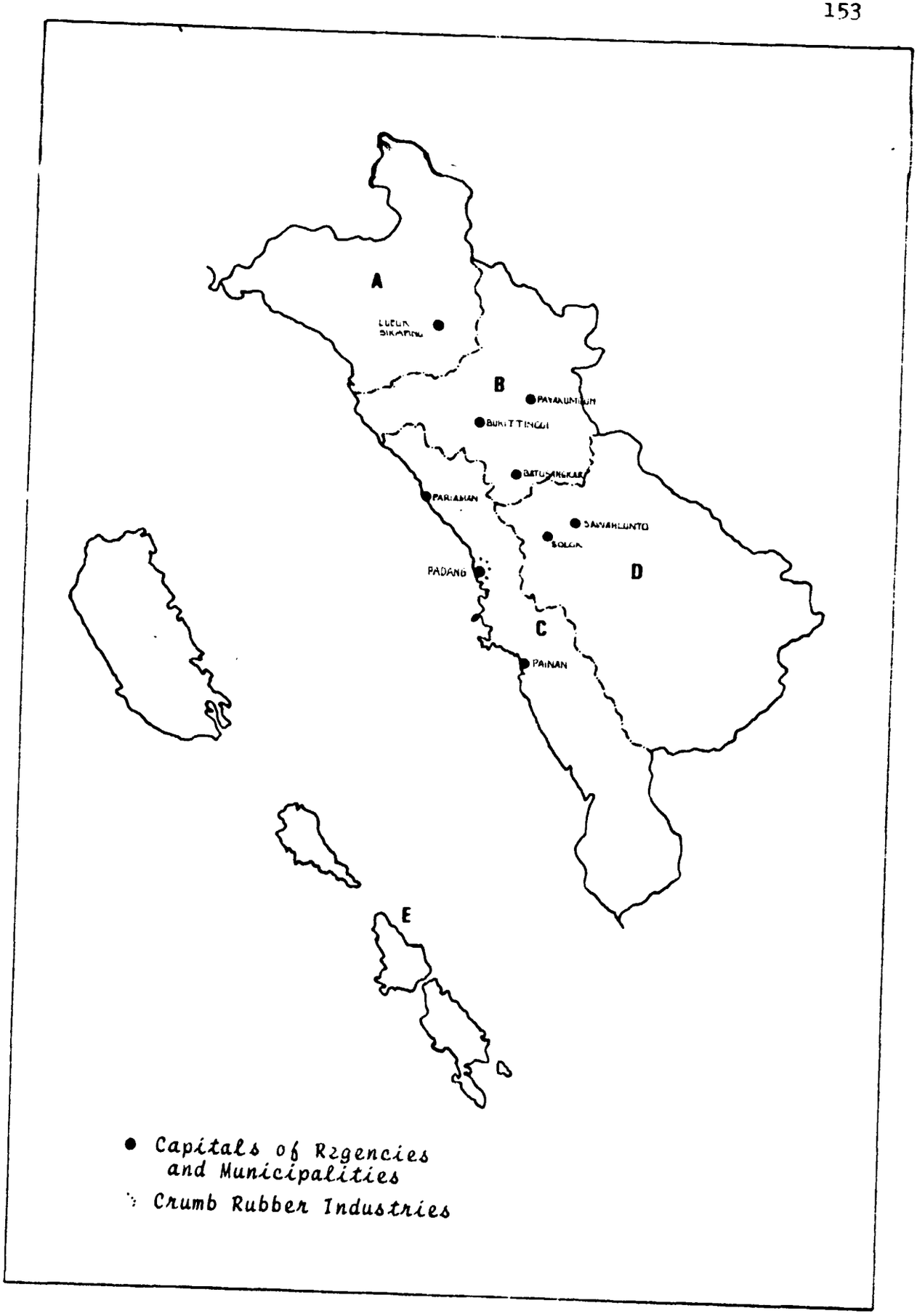
Comparing the output realization as presented in Table 8.2 and volume of crumb rubber export in Table 3.9 we know that export is higher than output realization. As in raw material case, about 21 per cent of export volume of crumb rubber are produced in neighbourhood provinces.

Table 8.3 Raw Material Requirement for the Production of Crumb Rubber and Rubber Production in West Sumatra, 1976-1983 (Ton)

Year	Raw Material Requirement	Rubber Production
1976	70,950	18,100
1977	67,082	17,900
1978	69,672	18,200
1979	77,596	19,300
1980	73,366	20,900
1981	73,200	21,700
1982	51,562	25,400
1983	80,112	27,300

Despite the shortage of raw material, it does not mean that there is no possibility for expanding the existing crumb rubber industries or for establishing new plants. Since the shortage of raw material can be supplied by neighbouring provinces, the crucial point is a potential demand for crumb rubber.

Since there are no (final) demand for crumb rubber in West Sumatra, the export volume of crumb rubber will be used as the proxy of demand. Using the export price of crumb rubber in the past and price estimate of World Bank up to 1990, through regression analysis, the projection of export volume of crumb rubber can be found, as has been shown in Table 3.9 and represented once again in Table 8.3. Even though between price and quantity of crumb rubber export there is a positi-



Map 8.1 WEST SUMATRA: LOCATION OF CRUMB RUBBER INDUSTRIES

ve relationship -- just like the supply side -- it does not disturb the export estimation as the proxy of demand. The result of analysis tells us that the main problem of export of crumb rubber lay on supply side rather than on demand side

Tabel 8.4 Projection of Demand Side and Supply of Crumb Rubber in West Sumatra, 1984-1990

Year	Demand Side		Supply Side	
	Export of Crumb Rubber (ton)	Raw Material Requirement (ton)	Production Capacity 1/ (ton)	Available Raw Material (ton)
1984	48,300	96,600	58,000	29,386
1985	51,500	103,000	58,000	31,590
1986	54,200	108,400	58,000	33,959
1987	56,900	113,800	58,000	36,506
1988	59,900	119,800	58,000	39,244
1989	63,600	127,200	58,000	42,187
1990	67,100	134,200	58,000	45,351

1/ Without expansion or set up the new plant.

Table 8.4 and figure 8.1 tells us some information about investment possibility in crumb rubber industries. Up to 1987 demand for crumb rubber is less than total production of the existing industries under full capacity. Therefore there is no possibility for investment in crumb rubber industries up to 1987. Excess demand subject to full capacity of the existing plants will begin to happen in 1988. Hence the possibility to invest in crumb rubber industries will be opened in the early sixth Five Year Development Plan period. Nevertheless it should be noted that this possibility based is on two assumptions, first, the shortage of raw material can be ful-

filed by neighbouring provinces. Second, the new comers crumb rubber industries must have a higher competitive power than the same industries in neighbouring provinces.

The investment requirement is calculated from total fixed capital needed to establish a new crumb rubber firm. Such a fixed capital includes expenses on equipment, land and building. Investment requirement in this case is excluding working capitals. Based on the primary data from the existing firms, capital requirement for the establishment a new crumb rubber firm with production capacity 6,000 ton per annum is around US $ 600,000.-. About US $ 350,000.- for equipment, US $ 125,000.- for land and US $ 125,000 for buildings.

COCONUT OIL

There are two kinds of industry that produces coconut oil in West Sumatra i.e. small scale industry and medium scale industry. According to the Manufacturing Office (Dinas Perindustrian), the latter is classified into Aneka Industri group. Total working capital is the main criteria. An industry which has working capital more than Rp 80 million is classified into medium scale.

During 1970-1978 the number of small scale industry grew at a very high growth rates. In this period the number of mentioned industries have grown by 27 per cent per annum (from 8 to 56 industries), while production has increased by 4 per cent annually. Almost all of these industries are located in the Kabupaten Padang Pariaman which had been known as a leading production centre of coconut in West Sumatra. The medium scale of coconut oil industries has a different story, during the same period its number of industries are constant, except for the one medium scale of coconut oil industry built in 1977. Three out of four of these industries are located in Padang and the other one in Kabupaten Padang Pariaman.

Number of industries, production capacity and output realization of small and medium scale of coconut oil industry du-

ring 1978-1983 are presented in Table 8.5. Due to the limited recorded data available, for the greater part data of small scale industries in this table are estimated through available data and sampling data. Number of industries each year are estimated on the basis of available secondary data in 1978 and 1982, while production capacities and realization of output are estimated through sampling data. As indicated by Table 8.5, even though the number of small scale industries much more than medium scale, production capacities and output realization are almost equal, even output realization of medium scale slightly higher. Comparing output realization and production capacity of each industry, it seems that every year realization is less than capacity. During 1978-1983 output realization was only 25 per cent of capacity for small scale industries and 65 per cent for medium scale.

Table 8.5 Number of Industries, Production Capacity and Output Realization of Small and Medium Scale of Coconut Oil Industries, 1978-1983

Year	Small Scale			Medium Scale		
	Number of Industries (Unit)	Production Capacity (ton)	Output Realization (ton)	Number of Industries (unit)	Production Capacity (ton)	Output Realization (ton)
1978	56	13,552	3,350	4	10,090	6,800
1979	53	12,826	3,180	4	10,090	7,650
1980	50	12,100	3,000	4	10,090	4,790
1981	47	11,374	2,800	4	10,090	5,930
1982	44	10,648	2,640	4	10,090	6,624
1983	41	9,922	2,460	4	10,090	7,630

Sources : Dinas Perindustrian Sumatera Barat, Laporan Tahunan, 1978 dan 1982 (Annual Report, 1978 and 1982), others, own calculation.

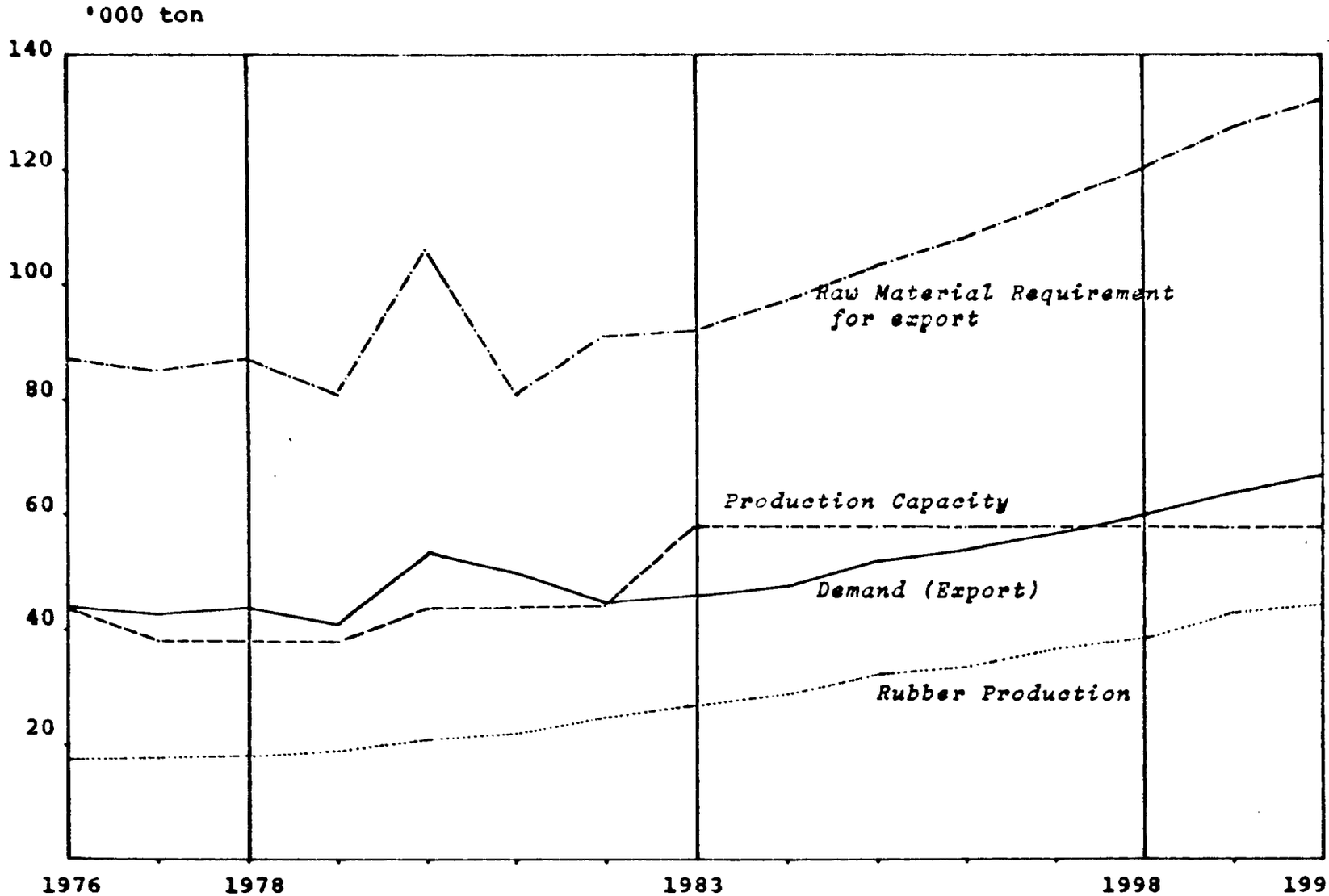


Figure 8.1 WEST SUMATRA: TREND AND PROJECTION PRODUCTION CAPACITY AND POTENTIAL DEMAND (EXPORT) FOR CRUMB RUBBER, RAW MATERIAL REQUIREMENT FOR EXPORT AND RUBBER PRODUCTION

There are three main causes such too low of output realization in small scale industries i.e. lack of demand, lack of raw material and lack of capital.

In Table 8.6 is presented total production capacity, output realization, potential demand, raw material requirement under full capacity, and availability of raw material for coconut oil industry (copra production).

Table 8.6 Total Production Capacity and Realization, Raw Material Requirement for Full Capacity and Realization, and Available Raw Material for Coconut Oil Industries, 1978-1983 (Ton)

Year	Production		Demand	Raw Material Requirement		Available Raw Material
	Capacity	Realization		Full Capacity	Realization	
1978	23,642	10,150	12,715	39,482	16,952	28,539
1979	22,916	10,830	12,454	38,269	18,087	30,390
1980	22,190	7,790	13,252	37,057	13,009	33,614
1981	21,464	8,730	14,022	35,845	14,579	37,172
1982	20,738	9,264	14,875	34,632	15,472	41,183
1983	20,012	10,090	15,798	33,420	16,851	45,378

Potential demand for coconut oil estimate is based on level of consumption and raw material in soap industries in West Sumatra. Total consumption of coconut oil is estimated on the basis of consumption per capita per annum is 3,2136 Kg (SUSENAS, 1976) and income elasticity to consume is 0.8062 1/. Raw mate-

1/ Hendra Esmara, Pola Perdagangan Regional di Indonesia (Regional Trade Pattern in Indonesia), Lembaga Penelitian Ekonomi Regional Fakultas Ekonomi Universitas Andalas, Padang, 1976.

rial requirement in soap industries in term of coconut oil are calculate as 40 per cent of total soap production. Raw material of coconut oil in terms of copra are estimated on the basis on conversion factor from copra to coconut oil is 0.6. As indicate by Table 8.6 total production capacity of coconut oil are higher than potential demand, hence there are an excess capacity. Therefore it is easy to understand that the main reason of low level output realization is lack of demand. Under this condition it seems that the producer tried to conform their output realization to the potential demand. For small scale producers,beside the lack of demand they area so faced with quality and sale promotion problems. The medium scale industries that have better quality and better sales promotion could reach much higher percentage of realization. Table 8.6 also tells us that demand for coconut oil can not be fulfilled by output realization. Therefore it is understandable the existence of the coconut oil inflow from neighbouring provinces. During 1980-1982 the average inflow of coconut oil was around 3,454 to per annum 2/.

Lack of raw material as also reported by both small and medium scale producers as a factor which hampered reaching full capacities are not borne out by copra production in this region. As is indicated by Table 8.6, there is no shortage of raw material. The availability of raw material is much higher than the requirement for output realization; since 1981 the availability of raw material has been higher than the requirement under full capacities. There are no exports of copra, apart from the 596 ton net outflow (interregional) per annum during 1980-1982, where as related to output realization the surplus of copra in the same period is 25,610 ton annually.

2/ Bappeda, Sumatera Barat Dalam Angka, 1980-1982 (Fact and Figure of West Sumatra), Padang.

Therefore it is correct to question the correctness (over estimate) of recorded data in the production of copra in West Sumatra.

Table 8.7 and Figure 8.2 tell us about investment possibility in coconut oil industry. Up to 1987 potential demand for coconut oil is less than total production of the existing industries under full capacity. Therefore there is no possibility for investment in coconut oil industry in that period. Excess demand subject to full capacity of the existing plants will begin to happen in 1988. Hence the possibility to invest in coconut oil industry will be opened in the early part of Fifth Five-Year Development Plan period.

Table 8.7 Projection of Demand and Raw Material Availability, and Production Capacity of Coconut Oil Industry, 1984-1990 (Ton)

Year	Demand	Production Capacity*/	Available Raw Material
1984	16,640	20,012	48,284
1985	17,509	20,012	51,349
1986	18,461	20,012	54,591
1987	19,441	20,012	58,056
1988	20,468	20,012	61,708
1989	21,561	20,012	65,545
1990	22,709	20,012	69,604

*/ Without expansion or set up the new plant

The investment requirements to establish a new coconut oil industry include expenses on equipment, land and building Based on the primary data from the existing firms, the rough

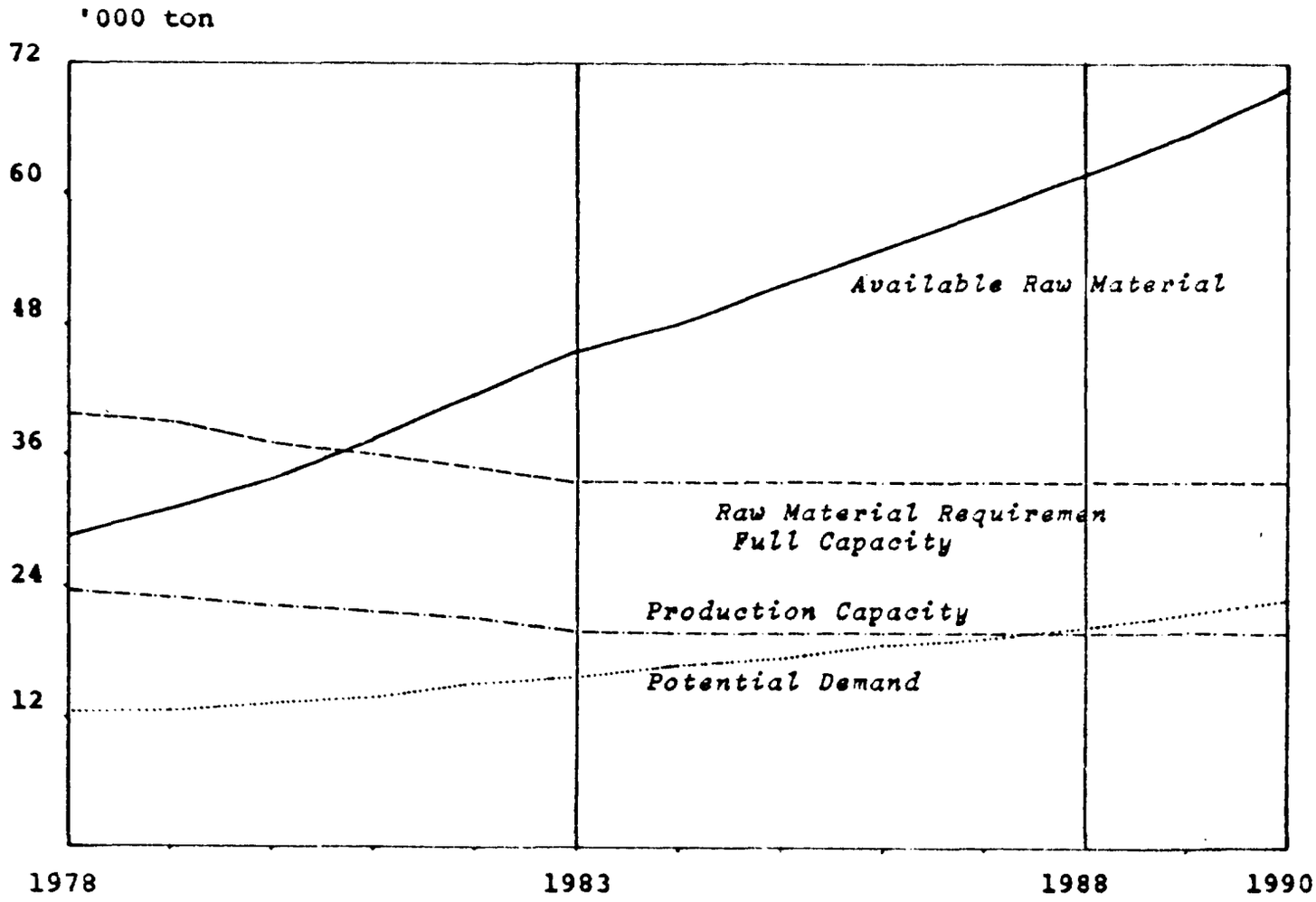


Figure 8.2 WEST SUMATRA: TREND AND PROJECTION OF POTENTIAL DEMAND, PRODUCTION CAPACITY, RAW MATERIAL REQUIREMEN FOR FULL CAPACITY AND AVAILABLE RAW MATERIAL OF COCONUT OIL

estimate is US $ 250,000.- per unit of plant with production capacity 3,000 ton per annum which consists of $ 100,000.- for equipment, $ 75,000.- for land and $ 75,000.- for building.

SOAP INDUSTRIES

These industries are included as plantation crop-based industries because copra or coconut oil is used as an important raw material. The existing industries in this region only produce soap for washing. There are only two soap industries in West Sumatra, both are classified as medium scale. These industries also operate as coconut oil industry.

The number of these industries has been constant for a long time. As indicated by Table 8.8 despite the small number of industries in this region, they always operate in under capacity. During 1978-1983 output realization of these industries is only 28 per cent of capacity.

Table 8.8 Capacity, Realization and Potential Demand for Soap in West Sumatra, 1978-1983
(Ton)

Year	Production Capacity	Output Realization	Potential Demand
1978	10,400	2,634	4,502
1979	10,400	3,050	4,645
1980	10,400	4,600	4,792
1981	10,400	2,272	4,950
1982	10,400	2,488	5,075
1983	10,400	2,509	5,238

Since there is no recorded data about soap consumption, the result of a recent survey in Kabupaten Pasaman [3/]. is used to estimate soap consumption for predicting potential demand for soap in the region. According to this survey, soap consumption per capita per annum is 2.88 Kg. Southwest Pasaman is the poorest region in Kabupaten Pasaman, and this Kabupaten is also the poorest region after the Mentawai archipelago in West Sumatra. Since soap is inferior in quality compared with detergent, soap consumption in Southwest Pasaman is much higher than soap consumption of overall West Sumatra. Therefore this study assumed that soap consumption level in West Sumatra is half of consumption level in Southwest Pasaman, which is 1.44 Kg per capita per annum.

Comparing production capacities and output realization on the one hand and demand for soap on the other, we know that demand for soap is lower than production capacity. Hence, it is easy to understand what the producers have called lack of demand as a main reason for failure in reaching full capacity. Theoretically apart from relying on potential demand, actual demand is influenced by quality and price level, especially relative price to import (inter-island and province) soap and detergent. Accordingly, because of low quality and lack of competitiveness, the existing soap industries have failed to transform potential demand into actual demand, their output realization is just being lower than potential demand.

To predict the investment possibility in soap industry in the next 1984-1990, attention should be part to capacity, requirement and availability of raw material, and potential demand. Like in previous analysis, the last existing capacity will be used as analysis base. Availability of raw material

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3/ Ismal,G., Dj. Zein dan M. Refdinal, Agrososial Pasaman Barat Daya (Socio-Agriculture of Southwest Pasaman), Fakultas Pertanian Universitas Andalas, Padang, 1984.

is estimated by two different approaches. First, the industries are assumed to use only coconut oil and not copra as theirs raw material. In this case the availability of raw material is estimated different by between coconut oil production and total potential demand (consumption). Second, soap industry is assumed to use either coconut oil or copra as the raw material. In this case, the available raw material is the difference between total production of copra and copra requirement for producing coconut oil to meet potential demand.

Table 8.9 and Figure 8.3 tell us some information about investment possibilities in soap industry. Since the production capacity of the existing plant is much higher than poten-

Table 8.9 Projection of Demand and Raw Material Availability, and Production Capacity of Soap Industry in West Sumatra, 1984-1990
(Ton)

Year	Potential Demand	Production Capacity*/	Raw Material		
			Requirement for Full Capacity	Available Approaches I	Available Approaches II
1984	5,345	10,400	6,947	13,500	28,364
1985	5,459	10,400	6,947	13,076	31,005
1986	5,574	10,400	6,947	12,647	33,818
1987	5,690	10,400	6,947	12,213	36,849
1988	5,809	10,400	6,947	11,772	40,060
1989	5,928	10,400	6,947	10,880	47,064
1990	6,048	10,400	6,947	10,880	47,064

*/ Without expansion or set up the new plant.

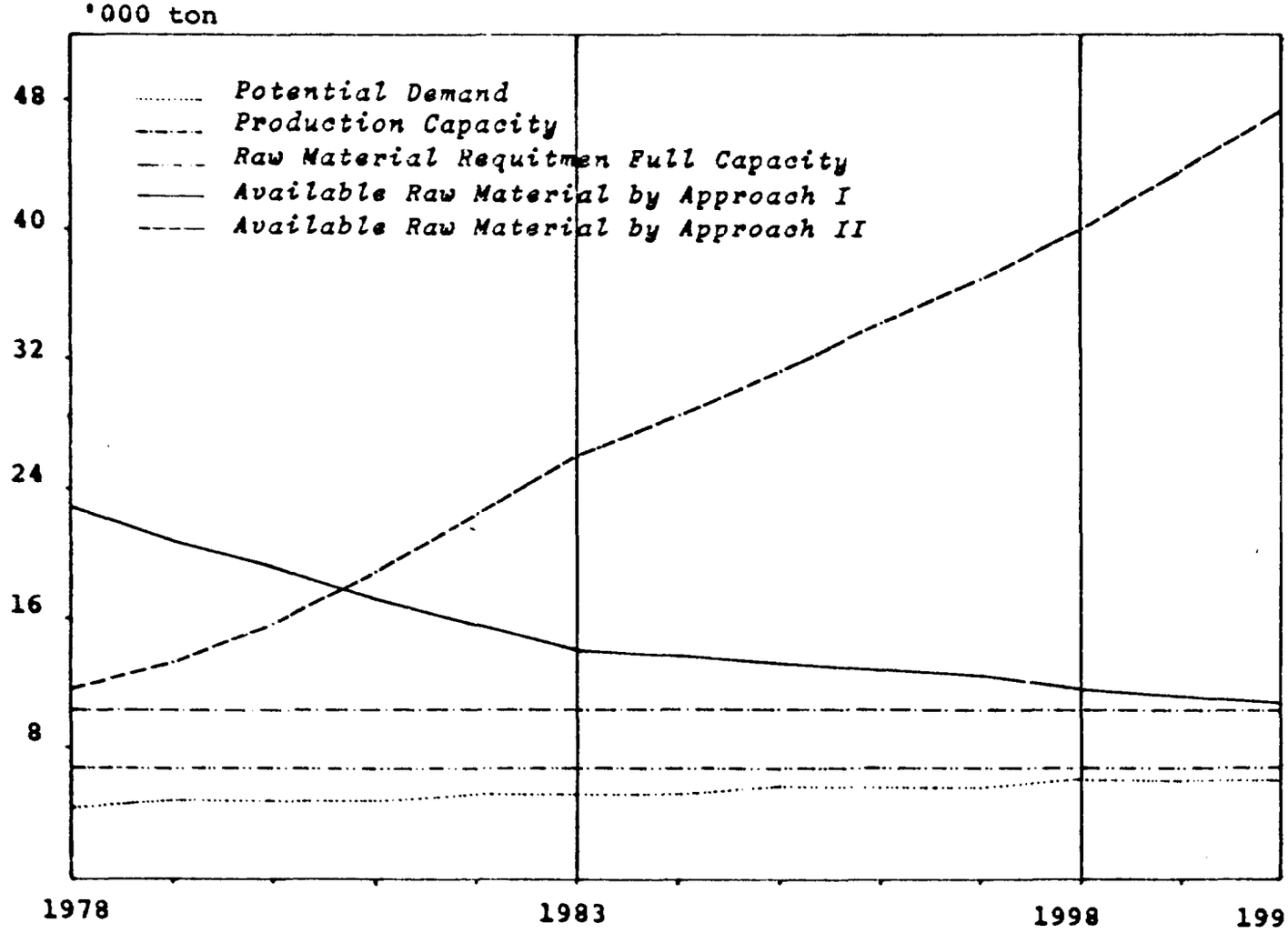


Figure 8.3 WEST SUMATRA: TREND AND PROJECTION OF POTENTIAL DEMAND, PRODUCTION CAPACITY, RAW MATERIAL REQUIREMENT FOR FULL CAPACITY, AND AVAILABLE RAW MATERIAL BY APPROACH I AND II OF SOAP INDUSTRY.

tial demand for soap, despite availability of raw material is higher than the requirement for full capacity, there is no possibility for expanding the existing plant or setting up new plant. By operating under 58 per cent capacity of the existing plant, potential demand for soap in this region, regardless of import, in 1990 can be met.

ROASTED COFFEE INDUSTRIES

All the existing coffee powder firms are classified as small scale industry. The record data on number of firms, production capacity, and output realization are available only for 1982, while for 1976. 1979 and 1980 only number of firms are available. Based on these available by means of a simple calculation, such recorded data can be completed, as shown in Table 8.10. Potential demand for roasted coffee is estimated by using coffee sonsumption per capita per annum and population. According to the National Socio-Economic Survey (Susenas) 1976, the annual per capita concumption of coffee in West Sumatra was 0.7072 kg. In the meantime, the annual per capita concumption of tea was 0.7176 kg. The consumption of coffee in West Sumatra seems rather high -- particularly in comparison with Java. However, compared to the annual per capita consumption of coffee in Outside Java in 1980, which came to 1.1950 kg, the consumption of coffee in West Sumatra seems to be reasonable.

From Table 8.10 can be known that roasted coffee firms in West Sumatra are very small scale. The average capacity per unit of firm is only around 28 ton to per annum, or 140 kg per day when these industrie have 200 working days per year. Nevertheless, this industry is still working in under capacity, where the average output realization is only 67.8 per cent of production capacity. According to the producers the main problem or constraint for reaching full capacity is lack of demand for theirs output. This is strange since the potential demand for coffee is higher than production capacity and output realization. There are other possible reasons that can be offered for explaining such strange phenomenon. First, lack of market accessibility of very small scale industry.

Table 8.10 Number of Firm, Production Capacity, Output Realization and Potential Demand for Coffee, 1976-1983.

Year	Number of Firm (unit)	Production Capacity (ton)	Output Realization (ton)	Potential Demand (ton)
1976	26	728	494	2,118
1977	33	924	627	2,164
1978	42	1,176	798	2,211
1979	54	1,512	1,026	2,281
1980	43	1,204	817	2,353
1981	50	1,400	950	2,431
1982	59	1,652	1,121	2,492
1983	69	1,932	1,311	2,573

Even though on the whole there is high enough potential demand in West Sumatra, due to lack of market accessibility, producers can not take advantage of the high potential demand. Second, the producers do not report the correct data about their production capacity and output realization, either to the Manufacturing Office (Dinas Perindustrian) or to the field worker during collecting data of the present study Third, over-estimate of coffee powder consumption level. Of course, before investment activities start, a through study concerning these problems should first be undertaken.

Raw material requirement either for full capacity performance or for output realization and raw material availability are shown in Table 8.11. Raw material requirement is calculated with conversion from coffee to coffee powder by 0.75. As indicated by Table 8.11, up to 1979 production of coffee is lower than export volume, even though there is interregional inflow, it means that raw material for roasted coffee industry

is scarce. Only in 1982 net available raw materials of coffee is higher than raw material requirement, nevertheless, output realization is still lower than production capacity at that time. It is a slight indicator that raw material availability is not a crucial point.

Table 8.1D Raw Material Requirements for Coffee Industries, Coffee Production and Export of West Sumatra, 1976-1983 (in terms of coffee beans, ton)

Year	Raw Material Requirement		Coffee Production 1/	Export of Coffee 2/	Net Available Raw Materials
	Capacity	Realization			
(1)	(2)	(3)	(4)	(5)	(6)=(4)-(5)
1976	971	659	3,713	5,592	- 1,879
1977	1,232	836	3,791	8,898	- 5,107
1978	1,568	1,064	3,834	8,885	- 5,051
1979	2,016	1,368	4,867	7,190	- 2,323
1980	1,605	1,089	5,291	4,365	+ 926
1981	1,867	1,267	5,637	4,235	+ 1,402
1982	2,203	1,495	6,790	2,423	+ 4,367
1983	2,576	1,748	7,777	5,995	+ 1,782

1/ Bappeda, Sumatera Barat Dalam Angka 1976-1982 (West Sumatra Fact and Figure), except for 1983, from Sumatera Barat : Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra : Draft Fourth Five-Year Development Plan, 1984/85-1988/89).

2/ Central Bureau of Statistics, Exports by Commodity, Country of Destination and Port of Export (Jakarta : several Issues), except the 1983 figure from the Bank Indonesia, Padang.

Table 8.12 and Figure 8.4 tell us about investment possibility in **roasted coffee industry. Demand for roasted coffee** is projected on the basis on population projection in Fourth Five-Year Development Plan of West Sumatra, 1984/85-1988/89 and consumption per capita as mentioned above. Projection of coffee production is quoted from Fourth Five-Year Development Plan of West Sumatra 1984/85-1988/1990. Like projection of crumb rubber export, regression analysis is used for projecting export of coffee. As indicated by Table 8.11 the potential demand is higher than production capacity, hence without expansion of the existing plant or setting up new plants in the future, potential demand can not be met. Therefore there is possibility to make investment in **roasted coffee industry** in this region. This possibility is supported also by available raw material, projection of where coffee production in the future is higher than projected export of coffee. According to the excess demand, it is possible to set up new plants of **roasted coffee industry** with production capacity around 500 ton per annum in the early part of Fourth Five-Year Plan and about 1,000 ton in early Fifth Five-Year Plan period.

Tentative investment requirement is estimated on the basis of capital investment of the existing small scale **roasted coffee** industries, and value adjudgement on level of technology. Rough estimate of investment requirement for a unit of **roasted coffee industry, with 500 ton production capacity per** annum, is US $ 50,000.- which consisting of $ 20,000.- for equipment, $ 15,000.- for land, and $ 15,000.- for building.

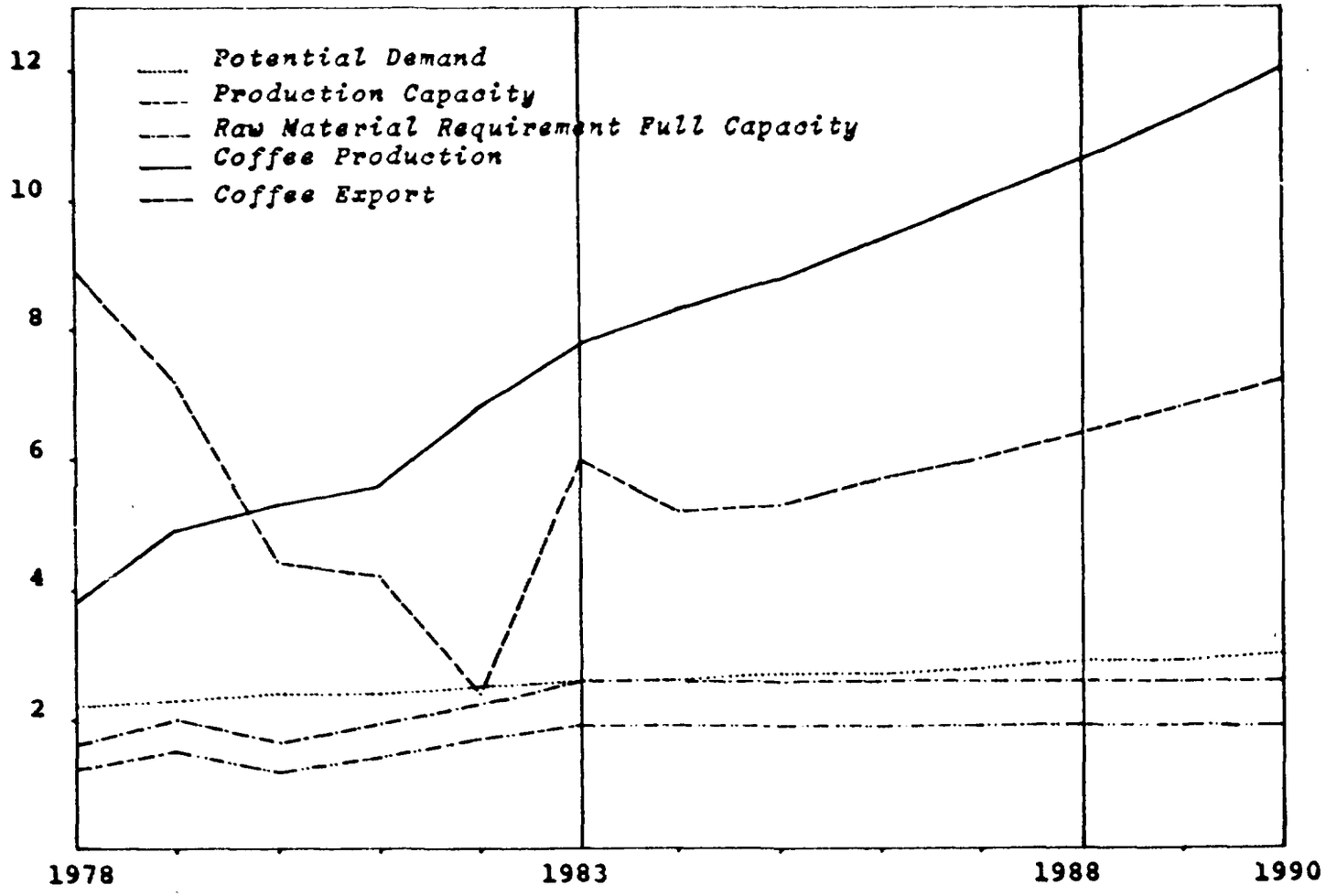


Figure 8.4 WEST SUMATRA: TREND AND PROJECTION OF POTENTIAL DEMAND, PRODUCTION CAPACITY, RAW MATERIAL REQUIREMENT FOR FULL CAPACITY OF COFFEE POWDER INDUSTRY, COFFEE PRODUCTION AND EXPORT.

Table 8.12 Projection of Potential Demand for Roasted Coffee, Coffee Production and Export, and Production Capacity of Roasted Coffee Industry in West Sumatra, 1984-1990 (Ton)

Year	Potential Demand	Production Capacity*/	Coffee Production	Export of Coffee	Net Available Raw Material
1984	2,625	1,932	8,275	5,139	3,136
1985	2,681	1,932	8,805	5,311	3,499
1986	2,737	1,932	9,368	5,655	3,713
1987	2,795	1,932	9,968	5,999	3,969
1988	2,853	1,932	10,606	6,368	4,238
1989	2,911	1,932	11,285	6,761	4,524
1990	2,970	1,932	12,007	7,203	4,804

*/ Without expansion or set up the new plant.

TEA INDUSTRY

Different from other industries which have been discussed before, due to technical aspects for maintaining quality of output, and to fit in with real fact, this study regards tea industry as a firm which consist of plantation unit and processing unit. Both producing raw material and processing activities are conducted by the same industry i.e. tea industry.

There is only one active tea industry in West Sumatra, that is Halaban Tea Plantation, located in Kabupaten 50 Kota, about 143 Km from Padang. This plantation is executed cooperatively, with concession around 300 hectares.

Production capacity, output realization, and potential demand for tea are presented in Table 8.13. Potential demand for tea is estimated by using tea consumption per capita per annum and population. According to SUSENAS 1976 data, tea

consumption level in West Sumatra is 0.7176 Kg per capita per annum. This data is used by present study, assuming this consumption level to be constant. This consumption level is higher than tea consumption which is found by SUSENAS 1980 for overall outer of Java which is 0.4836 Kg per capita per annum.

Table 8.13 Production Capacity, Output Realization, and Potential Demand for Tea, in West Sumatra, 1978-1983
(Ton)

Year	Production Capacity	Output Realization	Potential Demand
1978	300	49,15	2,243
1979	300	51,28	2,315
1980	300	66,55	2,388
1981	300	62,44	2,467
1982	300	35,16	2,529
1983	300	64,69	2,610

As indicated by Table 8.13 even though potential demand for tea much higher than production capacity, output realization of this industry still much lower than production capacity. During 1978-1983 average output realization only 18 percent of production capacity. The main reason is lack of productive area for producing raw material (leaf of tea). The existing productive area only 40 hectares out of total area 300 hectares. Of course, behind lack of productive area there are some real constraints i.e. lack of capital, lack of knowhow and lack of technology. All of these constraint are relevant to handle by investment activities.

Table 8.13 and Figure 8.5 show the possibility of investment in tea industry in this region, where the existing capa-

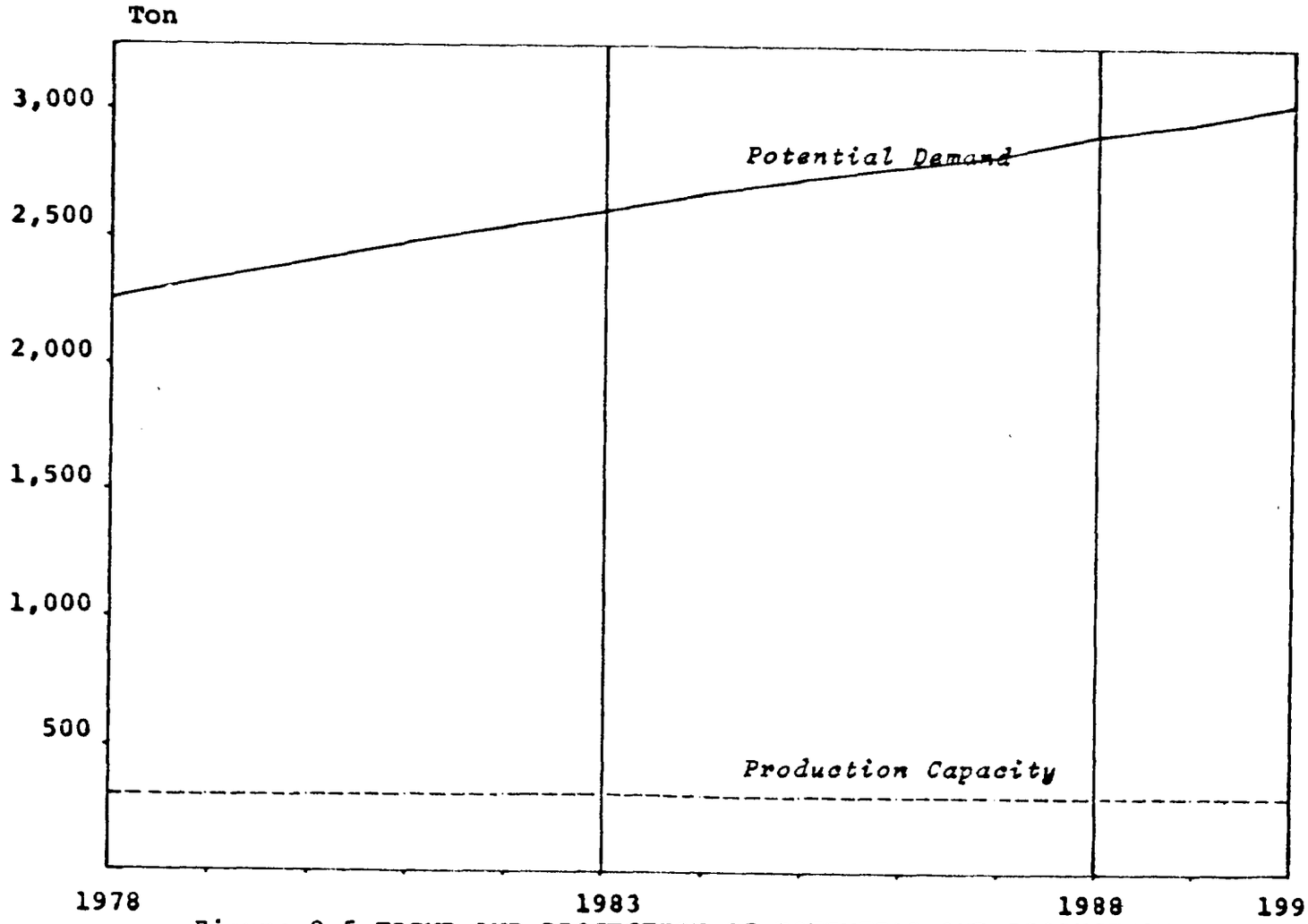


Figure 8.5 TREND AND PROJECTION OF POTENTIAL AND PRODUCTION CAPACITY OF TEA INDUSTRY.

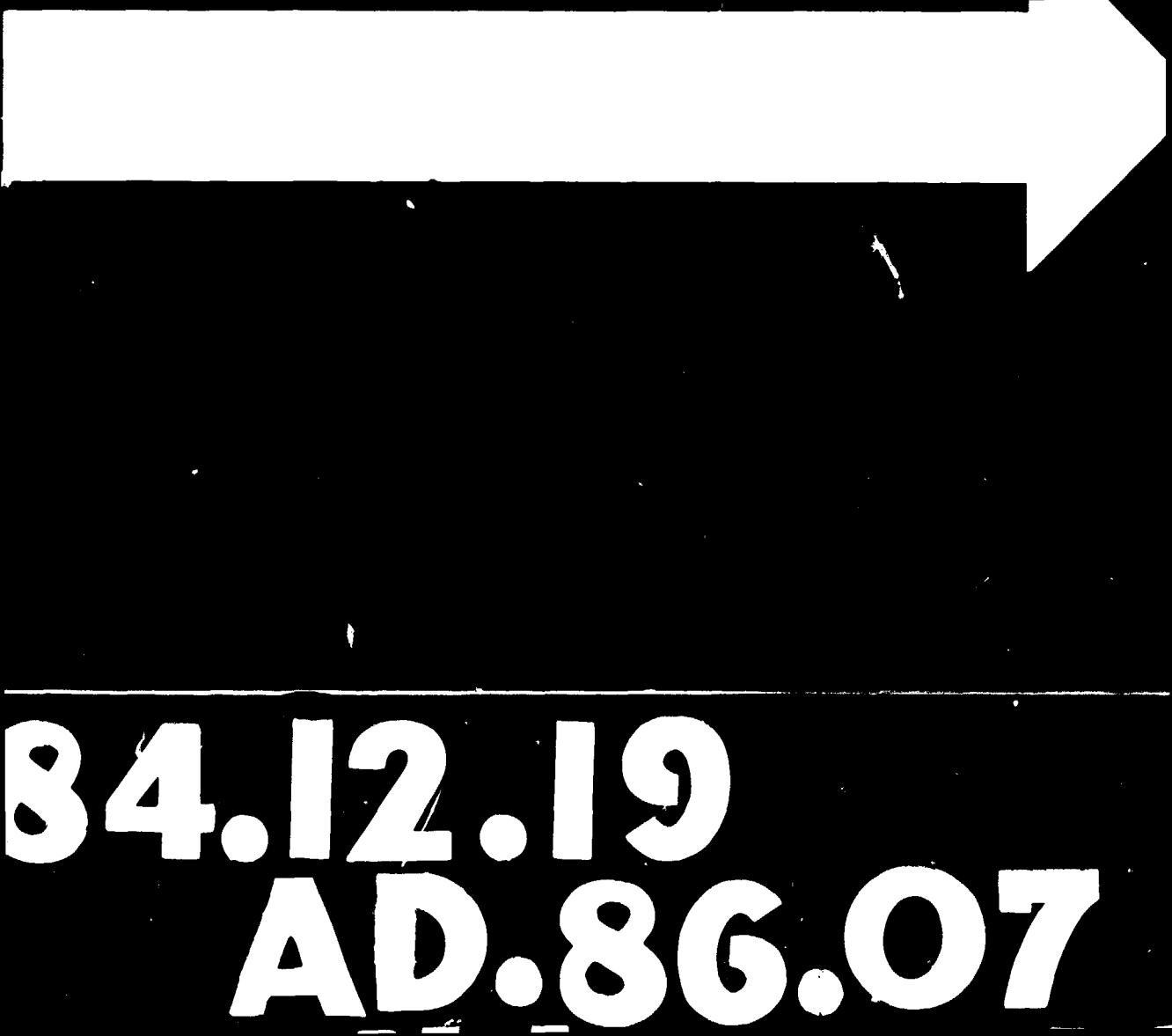
city is less than potential demand. Only 10 per cent of potential demand can be fulfilled by existing capacity. For fulfilling the excess demand the new industries should be built up. Of course, it should be remembered that excess demand here is in regional meaning regardless of existing import or inflow from the outer region. Such excess demand can be exploited only by efficient industry that have strong enough price competition power.

Table 8.14 Projection of Potential Demand and Production Capacity of Tea Industry in West Sumatra, 1984-1990
(Ton)

Year	Production Capacity*/	Potential Demand
1984	300	2,664
1985	300	2,720
1986	300	2,778
1987	300	2,836
1988	300	2,895
1989	300	2,954
1990	300	3,014

*/ Without expansion or set up the new plant.

Special natural resource condition are required for setting up the new tea industry (plantation), especially climate and land tipology. Fortunately, there are some location in West Sumatra that can fulfill such climate and land requirement. All of them are ex-tea plantation as presented in Table 8.15.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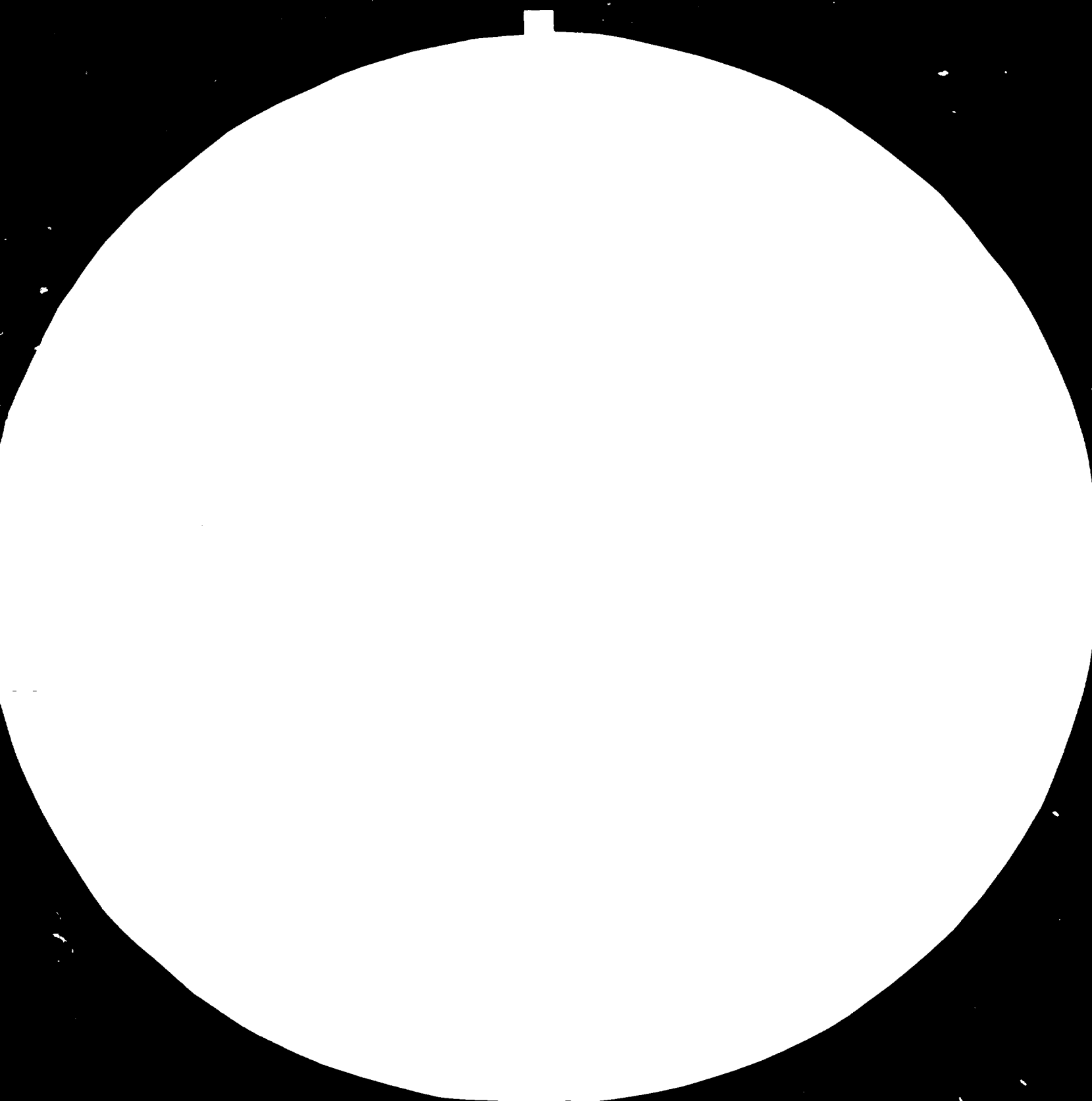

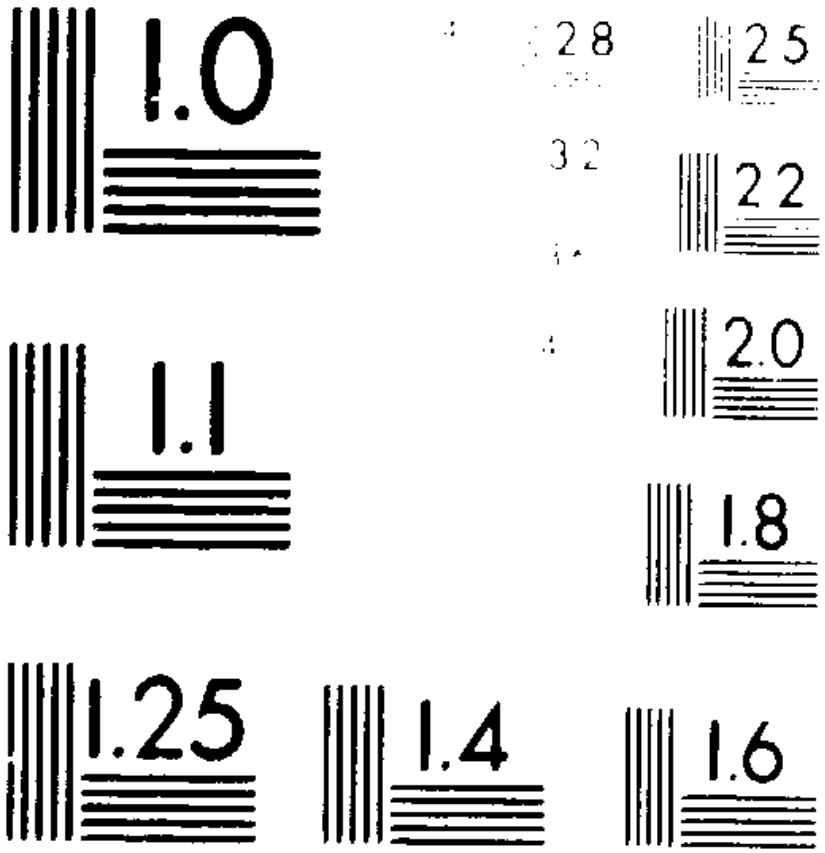

Table 8.15 Name, Location and Area of Ex-Tea Plantation in West Sumatra, 1982

Name	Location		Distance from Padang (Km)	Area (Ha)
	Kabupaten	Kecamatan		
1. Tonang Talu	Talamau	Talamau	252	725
2. Liki-Akar Gadang	Solok	Sangir	165	2,484
3. Huberta	Solok	Sungai Pagu	146	2,204
4. Pekonina	Solok	Sungai Pagu	148	1,031
5. Akar Gadang-Air Batumbuk	Solok	Gunung Talang	55	509
6. Bukit Malintang	Solok	Lubuk Gadang	-	1,799

Sources : Bappeda, Sumatera Barat Dalam Angka 1982 (West Sumatra Fact and Figure), Padang.

CONCLUSION

The plantation crops production in West Sumatra is almost entirely from smallholder plantation. The plantation main crops-based industry here are crumb rubber, coconut oil, soap, coffee powder and tea industries. Based on potential demand, existing capacity, and available of raw material, can be estimated that investment for expansion or set up the new plant only possible in crumb rubber, coconut oil, coffee powder and tea industries. For crumb rubber, under assumption

that lack of raw material can be fulfilled by neighbourhood provinces, while for coffee powder and tea industries under precondition that new plant must have strong or capable competitive power, either of price or quality. It is most important precondition because to day the potential demand for such product have been fulfilled by import good.

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Chapter 9

AGRO-INDUSTRIAL PROJECTS : FOREST-BASED INDUSTRIES

FOREST production is an important export commodity in West Sumatra. During 1978-1982, about 27 per cent of export value of West Sumatra comes from forest production. And about 74 per cent of value of forestry export comes from wood commodity. Therefore the present study in forest-based industries are concentrated on wood industries.

About 70 per cent of the total area of West Sumatra consist of forest. However, out of the 2,942,869 ha of forest areas, approximately about 39 per cent could be exploited and become the basis of timber production of West Sumatra. The Total annual allowable cut in the Mentawai Islands -- as the main source of timber in West Sumatra -- was 106.45 m3 per ha which was the highest compared to other provinces in Sumatra. The timber productivity in the mainland of West Sumatra is not as high as in the Mentawai Islands.

There are two types of lumbering company i.e. large scale company and small scale company. Large scale companies work with consession (HPH). Twelve large scale forest company (consessionaire) controlled about 86,000 ha, or more than 75 per cent of all production forest are held by these consessioners. On an average each per unit of company has about 72,000 ha. Up to 1981 the main production of this company.

is log and most of this products are exported in log form. Nowadays, according to Common Ministers Regulation that want to stop export of log, almost all of the log products are used domestically as raw material for saw mill and plywood industry. For the purpose of export activity, all of the lumbering companies have saw mill industry units. In the following section the saw-mill unit of large scale lumbering company will be called as "large scale saw-mill industry".

The small scale lumbering company is a small group of lumbermen, which have got logging concession up to 100 hectare. Meanwhile the large scale lumbering companies are processing most of theirs log production, the small groups of lumbermen being the only source of raw material for the processing industry and trader. The main processing industries are small scale saw-mills. Meanwhile the large scale saw-mill are producing sawn wood mainly for export, while the small scale saw-mills are only fulfilling local consumer demand for sawn wood. Therefore an analysis of the investment possibility in large scale and small scale saw-mill can be separated from each other, eventhough regarding raw material aspects relationship analysis will be held. Since the large scale raw-mill is a sub unit of the large scale lumbering company which produce almost all of the log in this region, the present study assume that large scale saw-mill have first priority to find the available log as raw material. Because plywood industry as large scale firm is more powerful than small scale saw-mill, the plywood industry has second priority to find available log as its raw material. Finally the small scale saw-mill uses only the remainder log. Therefore, in the following section firstly, large scale saw-mill will be discussed, and then plywood and finally small scale saw-mill.

LARGE SCALE SAW-MILL INDUSTRY

There are 8 units large scale saw-mill (LSM) industry in 1979 out of 12 large scale lumbering company in West Sumatra. In 1982 the number of LSM increased to 10 units. Since no available reliable data in output realization of LSM, sawn wood exports are assumed equal to output realization. Through Table 9.1 we can compare between export of sawn wood, log export, and log production.

Table 9.1. Production Capacity of LSM, Export of Sawn Wood, Log Export, and Log Production in West Sumatra, 1979-1983

Year	Production Capacity (M3)	Export of Sawn Wood (M3)	Export of Log (M3)	Production of Log (M3)
1979	262,500	1,994	296,650	445,944
1980	262,500	6,508	243,511	467,747
1981	286,500	46,674	60,313	505,167
1982	286,500	71,961	4,487	545,680
1983	286,500	83,109	-	584,098

Sources : Calculated from Manufacturing Office; Central Bureau of Statistics, Export by Commodity, Country of Destination and Port of Export (Jakarta : Several Issues) except 1983 figures, for log from the Bank Indonesia Padang, for sawn wood own projection; West Sumatra (1984).

As indicated by Table 9.1 on the during 1979-1982 period one hand export of log decreased very sharply, but export of sawn wood on the other increased by the lower rate of growth, and lower absolute quantity (in term of log). Using the conversion factor from log to sawn wood 0.665 1/, the total export in terms of log in 1979 is 299,648 M3 log, and in 1982 it decreased to 112,699 M3. Hence net decreace of export between 1979 and 1982 is 186,949 M3 or decrease by 62 per cent. Meanwhile, production of log during 1979-1982 have increased by 22 per cent. Therefore during the period of analysis there is a significant increase of log which is used by other demoestic industries.

1/ Bank of Indonesia, 1978, Wood Processing in Sumbar, for KIK and KMKP Lending Schemes, PPMU, Padang, p. 15.

Map 9.1 WEST SUMATRA: LOCATION OF SAW-MILL INDUSTRIES

Since it is assumed that export of sawn wood is equal to output realization of LSM, it can be estimated that LSM industry in this region is operating under capacity. In 1982 output realization of LSM was only 25 per cent of production capacity. Nevertheless it does not mean that there is no possibility to invest in new industry of LSM. Because as a new comer in international sawn wood market, of course, the LSM needs more time to get beneficial experience and to find new relations and customers, and it finally could increase the export of sawn wood. Therefore to estimate the possibility to invest in LSM in West Sumatra it is necessary to estimate (projection) sawn wood export as the potential demand in the future.

Due to the fact that export of sawn wood is a relatively new activity in wood business in Indonesia, including West Sumatra, the time series data of sawn wood export which is available is confined to the only short periods of time for time series analysis. Therefore another method should be sought. Concerning the historical performance of West Sumatra's wood exporter, it could be known that log export in 1977 was a peak point, where 342,527 m3 [2/] were exported. Let us assume that such performance can happen again in the future, but in the form of sawn of sawn wood export, rather than in log. The present study guess that such performance can be repeated in 1990, where about 227,780 M3 sawn wood will be exported. Using exponential compound growth rate for interpolation the projection of sawn wood export can be estimated as shown in Table 9.2.

Besides the potential demand for sawn wood in the future, to estimate the investment possibility in LSM industry, availability of raw material must be taken into consideration. Projection of log production has been calculated by the Fourth-Five-Year Development Plan (West Sumatra, 1984). This projection will be used in present analysis, as shown in Table 9.[2].

[2/] Bank of Indonesia, op. cit., Appendix, Table 5.

Table 9.2. Projection of Potential Demand (Export) for Sawn Wood, Available, and Requirement of Raw Material, and Production Capacity of LSM in West Sumatra, 1983-1990

Year	Potential Demand (M3)	Production Capacity a/ M3)	Requirement of Raw Material (M3) b/	Available Raw Material (M3)
1983	83,109	286,500	124,976	584,098
1984	95,984	286,500	144,337	589,200
1985	110,854	286,500	166,698	636,400
1986	128,028	286,500	192,523	687,300
1987	147,863	286,500	222,349	742,300
1988	170,662	286,500	256,635	801,600
1989	197,226	286,500	296,580	865,728
1990	227,780	286,500	342,527	934,986

a/ Without any expansion of the existing plant or set up a new plant.

b/ Raw material for potential demand in term of log.

The possibility of investment in LSM industry can be seen thrcugh Table 9.2 and figure 9.1 and 9.2. As indicated by this table, and figures potential demand up to 1990 is still less than production capacity, hence although raw material availability is higher than requirement, because no excess demand for sawn wood, there is no possibility to invest in large scale saw-mill industry in West Sumatra up to 1990. This is because output realization 80 per cent of production capacity potential demand in 1990 could be fulfilled.

PLYWOOD INDUSTRY

There is only one existing plywood industry in West Sumatra, which started operation in 1981. Production capacity, output realization and export of plywood are presented in Table 9.3.

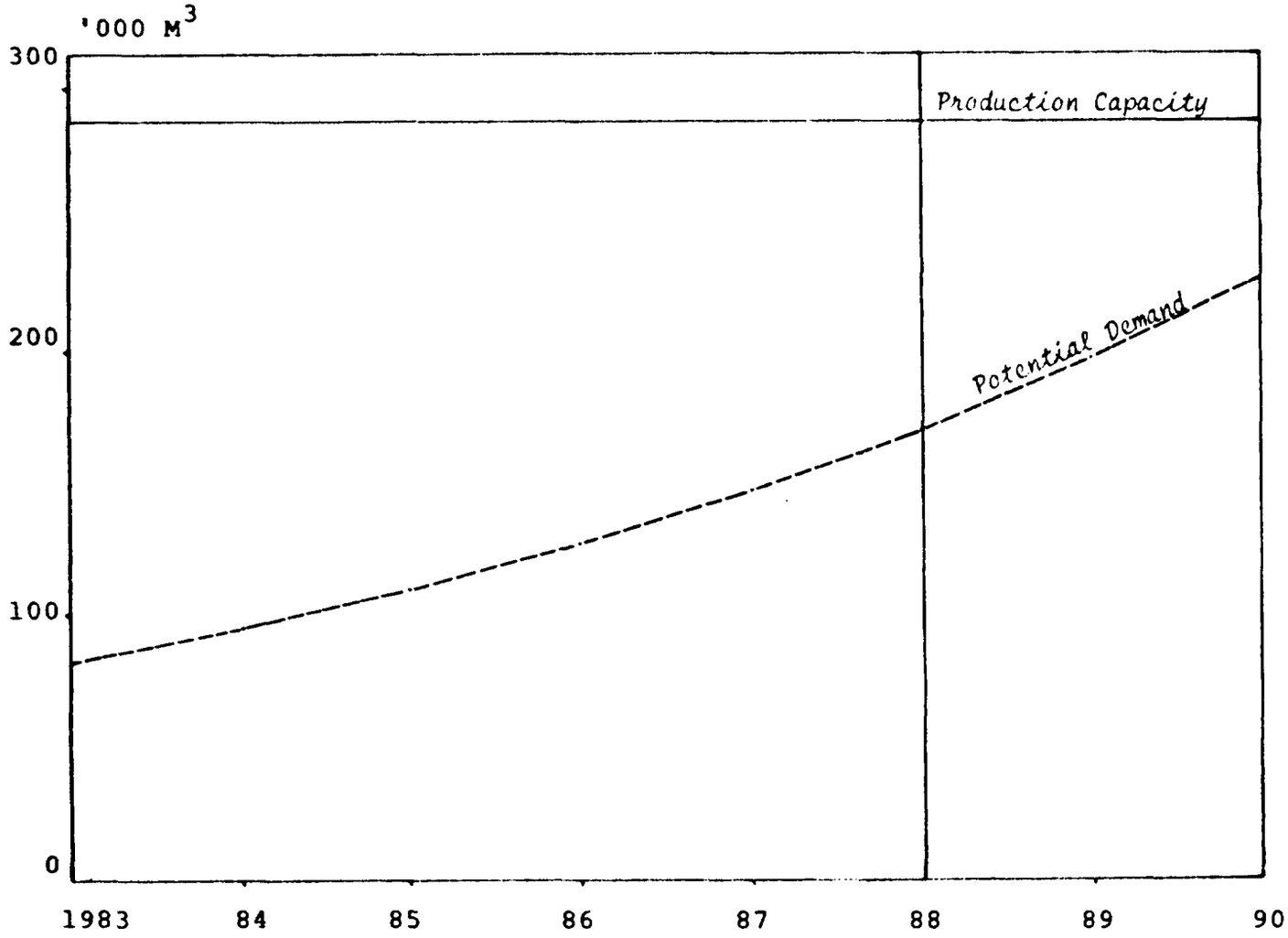

Figure 9.1. WEST SUMATRA : PROJECTION OF POTENTIAL DEMAND AND PRODUCTION CAPACITY OF LARGE SCALE SAW-MILL INDUSTRY, 1983-1990

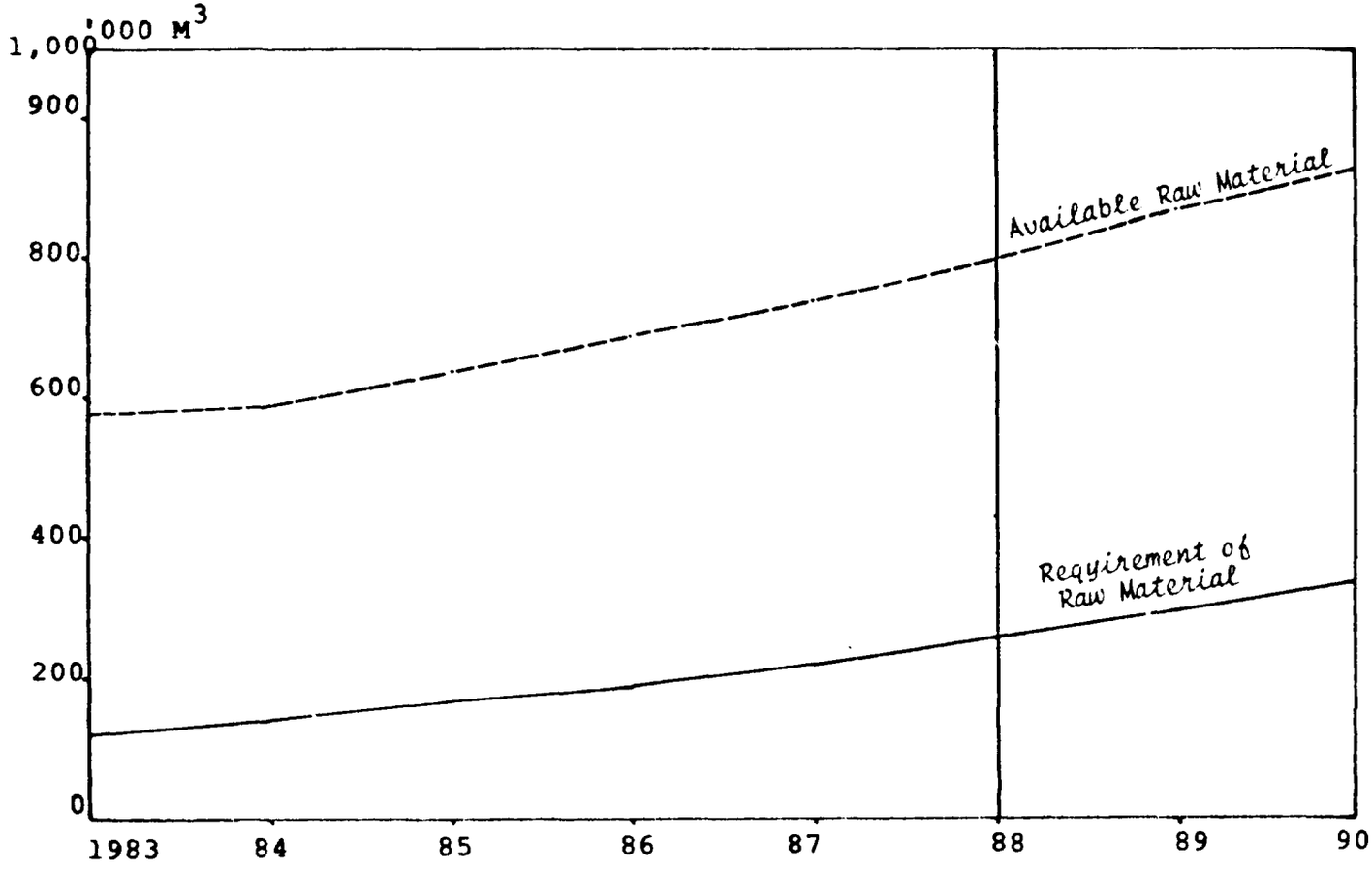

Figure 9.2. WEST SUMATRA : PROJECTION OF AVAILABLE RAW MATERIAL AND REQUIREMENT OF RAW MATERIAL FOR LARGE SCALE SAW-MILL INDUSTRY, 1983-1990

Table 9.3. Production Capacity, Output Realization, and Export of Plywood in West Sumatra, 1981-1983

Year	Production Capacity (M3)	Output Realization (M3)	Export (M3)
1981	47,000	17,385	9,089
1982	47,000	36,240	33,003
1983	47,000	46,974	44,016

As indicated by Table 9.3 this industry is running well, both in production and in marketing activities. After 3 years of operation this industry has operated under full capacity. In marketing aspect, almost all of its production can be exported, and the remainder output can be sold to local consumers. Of course this success story of this existing plywood industry does not mean that there is a good possibility for making investment in plywood industry in West Sumatra. Therefore it is worth while to study that possibility as has been done with other industries.

There are two sources of potential demand for plywood, i.e local consumers demand and international consumer demand in term of export. To estimate local consumer demand, consumption level per capita per year 0.002 M3 [3/] is used, with assumption that this consumption level is constant along the period of analysis. Projection of population quoted from Fourth Five-Year Development Plan (West Sumatra, 1984). The projection of local consumer demand for plywood are presented in colomn 2 of Table 9.4.

Like sawn wood, available time series data of export are too limited for time series analysis. Therefore another method should be used. Since in practice plywood is complementary to sawn wood rather than substitutionary, it is rational to estimate

3/ Bank of Indonesia, 1978, op cit., appendix Table 11.

the growth rate of plywood export as equal to growth rate of own wood export. As shown in Table 9.2 (potential demand), the growth rate of own wood export is 15.49 per cent per year. Using this growth rate, projection of plywood export can be calculated as shown in column 3 of Table 9.4, and in column 4 of the same table are presented total potential demand for plywood.

Table 9.4. Projection of Potential Demand for Plywood in West Sumatra, 1984-1990

Year	Local Consumer Demand (M3)	International Demand (Export) (M3)	Total Potential Demand (M3)
1984	7,424	50,835	58,259
1985	7,582	58,710	66,292
1986	7,742	67,806	75,548
1987	7,903	78,311	86,214
1988	8,068	90,443	98,511
1989	8,233	104,454	112,687
1990	8,400	120,636	129,036

The availability of raw material is an important aspect that should be taken into consideration. As mentioned before, the available raw material for plywood industry comes from the remainder of the material not used by large scale saw-mill industry (to serve potential demand). The available raw material is presented in Table 9.5.

Investment possibility in plywood industry can be seen through Table 9.5, Figure 9.3 and 9.4. As indicated by this table and figures potential demand higher than production capasity and the available raw material is higher than its requirement hence to serve this potential demand in the future the new industries should be set up. In other word, there in possibility to make investment in plywood industry in West Sumatra. Acording to this analysis a new industry with production capa-

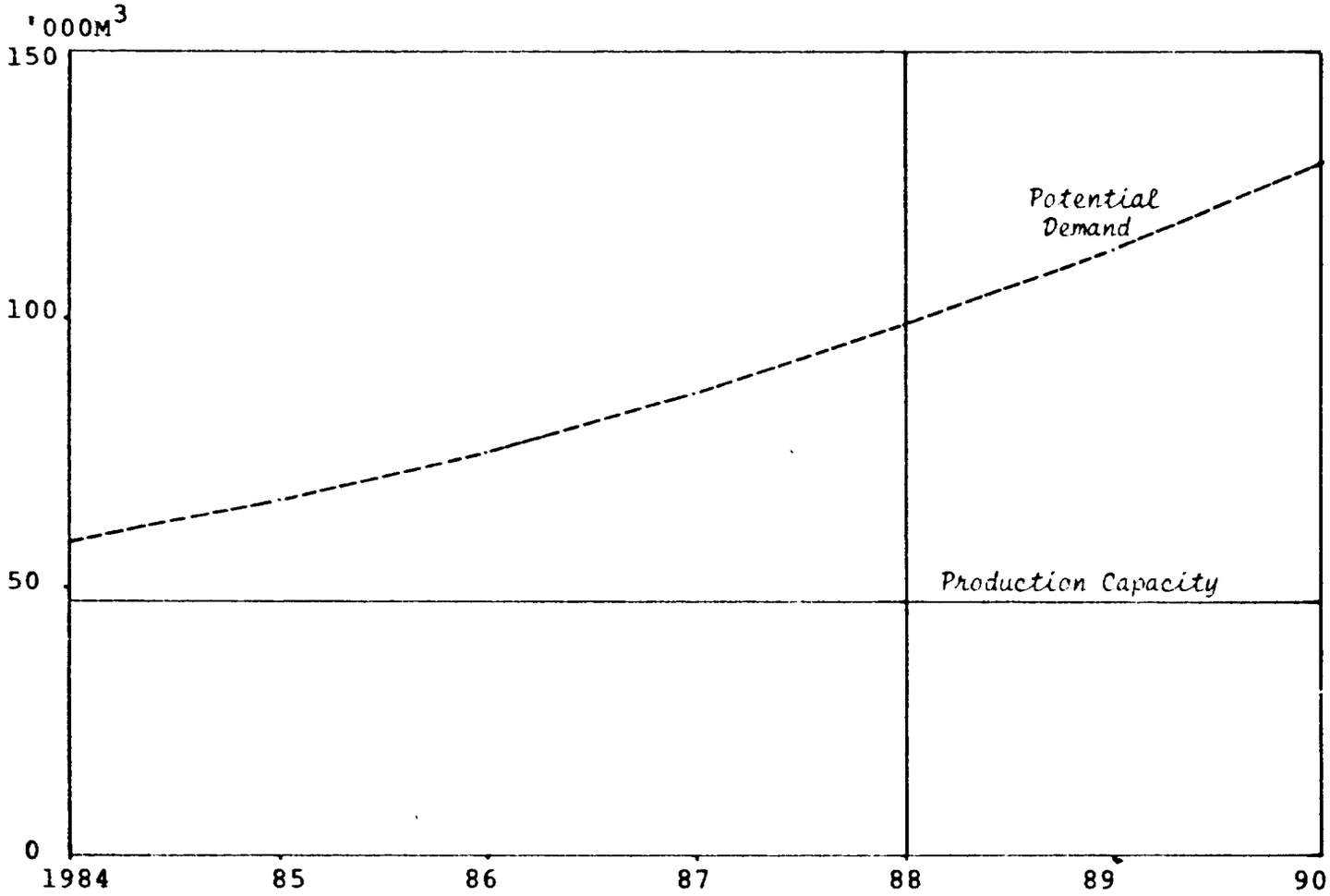

Figure 9.3. WEST SUMATRA : PROJECTION OF POTENTIAL FOR PLYWOOD AND PRODUCTION CAPACITY OF PLYWOOD INDUSTRY, 1984-1990

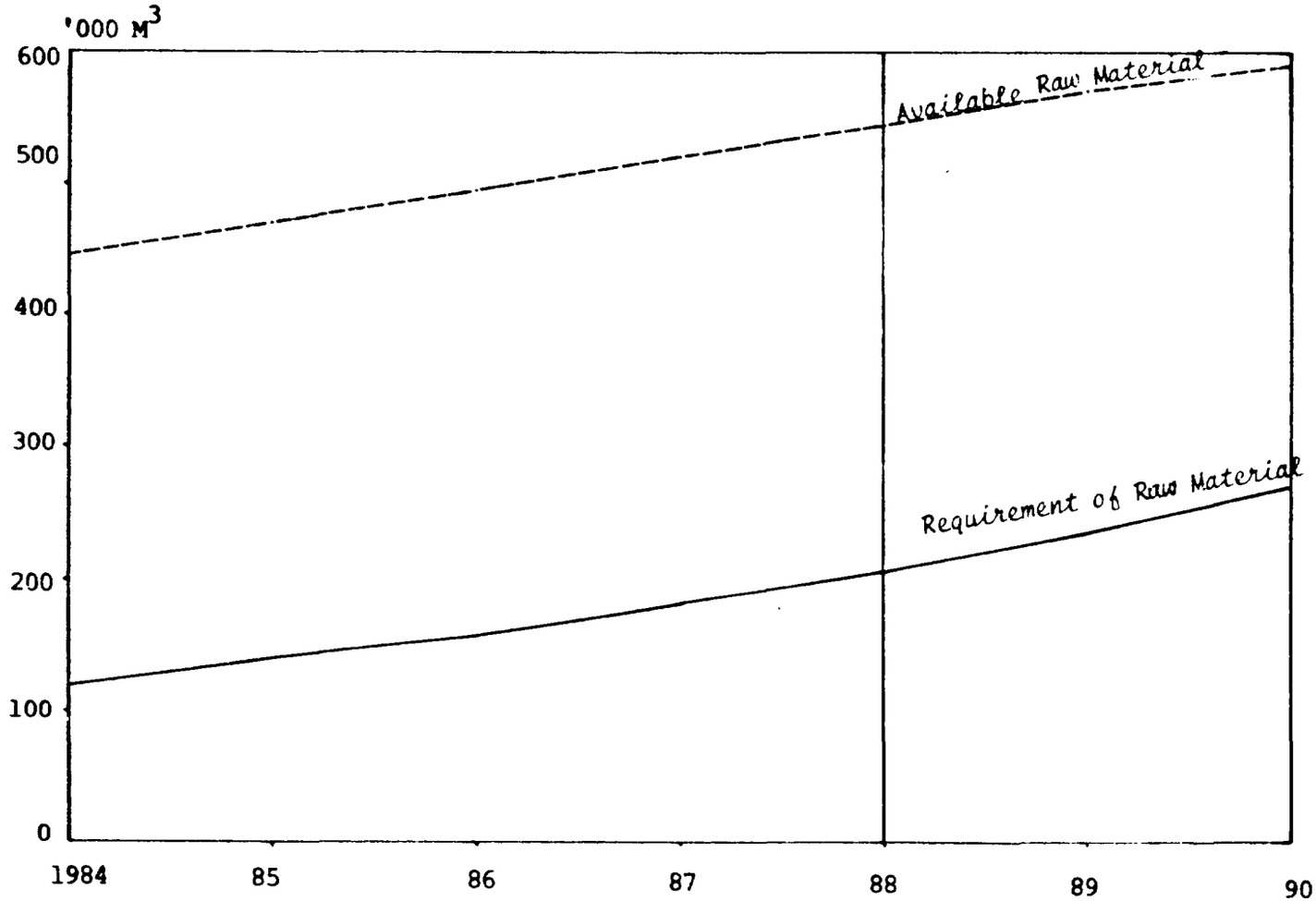

Figure 9.4. WEST SUMATRA : PROJECTION OF AVAILABLE RAW MATERIAL AND REQUIREMENT OF RAW MATERIAL FOR PLYWOOD INDUSTRY, 1984-1990

city around 40,000 M3 per year should be set up in 1987. But a new industry with lower production capacity could be set up earlier. In conformity with the result of the present study, nowadays there are two units of plywood industry which have been planned to be set up in the region.

However, due to a specific order on the basis of a specific quality of wood -- particularly merantih -- the existing plywood industry has to import incidentally the merantih wood from East Kalimantan to supplement the local production of merantih. Nevertheless, the local supply of wood for the plywood industries seems to be sufficient enough.

Crude information about investment requirement is that, the existing plywood industry (PT. Rimba Sunkyong) needs investment (realization) around Rp 4.343 billion (US$ 4,343 million), while one out of two of the planned plywood industries mentioned above, has planned investment arounc Rp 14.303 billion (US$ 14,303 million).

Table 9.5. Projection of Potential Demand for Plywood, Production Capacity, Requirement and Available of Raw Material of Plywood Undustry, in West Sumatra, 1984-1990

Year	Potential Demand (M3)	Production Capacity a/ (M3)	Requirement of Raw Material b/ (M3)	Available Raw Material (M3)
1984	58,259	47,000	121,373	444,863
1985	66,292	47,000	138,108	469,702
1986	75,548	47,000	157,392	494,777
1987	86,214	47,000	179,612	519,951
1988	98,511	47,000	205,231	544,965
1989	112,687	47,000	234,765	569,148
1990	129,036	47,000	268,825	592,459

a/ Without any expansion of the existing plant of set up the new plant.

b/ Raw material for potential demand, in term of log.

SMALL SCALE SAW-MILL INDUSTRY

In 1982 there are 29 small scale saw-mill (SSM) industry in West Sumatra. Total production capacity of these industries around 206,700 M3 per year, but realization of output only 105,044 M3, or only 50.8 per cent of production capacity. According to the producers there are two main reasons which hampered the reaching of full capacity i.e. lack of demand and lack of raw material. These two reasons do not make goodsense, because their marketing is a limited, and all of their raw material requirement is dependent on supply from another industry. Nevertheless, from this condition we can't conclude that no possibility to invest in SSM in West Sumatra.

Due to the limited marketing area, demand of local consumers is a main sources of potential demand. Using average consumption of sawn wood per capita per year as 0.044 m3 and projection of population quoted from Fourth Five Year Development Plan (West Sumatra, 1984), projection of potential demand for sawn wood can be estimated as shown in Table 9.6.

Table 9.6. Projection of Potential Demand for Sawn Wood Ex-Small Scale Saw-Mill, Production Capacity, Requirement and Available of Raw Material in West Sumatra, 1984-1990

Year	Potential Demand (M3)	Production Capacity a/ (M3)	Requirement Raw Material b/ (M3)	Available Raw Material (M3)
1984	163,322	206,700	245,597	326,263
1985	166,794	206,700	250,818	334,572
1986	170,316	206,700	256,114	340,583
1987	173,874	206,700	261,465	343,779
1988	177,490	206,700	266,902	343,423
1989	181,128	206,700	272,373	338,345
1990	184,805	206,700	277,902	327,889

a/ Without any expansion of the existing plant of set up the new plant.

b/ Raw material for potential demand, in term of log.

As mentioned before, the available raw material in the future is the remainder log after having been used by large scale saw-mill (LSM) and by the plywood industry. These available raw material can be calculated directly by substract column 5 with column 4 in Table 9.6, and add log production from traditional way. The result of those calculation are presented in Table 9.7.

Table 9.7 and Figure 9.5 give us some information about the possibility to invest in SSM industry in West Sumatra. Since potential demand for sawn wood is lower than production capacity it is no profitable to invest in SSM industry nevertheless there is an excess of available raw material. Additionally it should be noted that in reality, the existing of excess supply becomes more serious when a certain number of production of large scale saw-mill enter to local market in West Sumatra.

CONCLUSION

Forest production is an important export commodity in West Sumatra, and wood is most important forest production. There are two kind of wood industry in this region, i.e. saw-mill and plywood industries. Relating to industrial development in the future, at least up to 1990, only investment in plywood industry which have a good chance and possibilities in the future. While no place for investment in saw-mill industry either in large or small scale industry.

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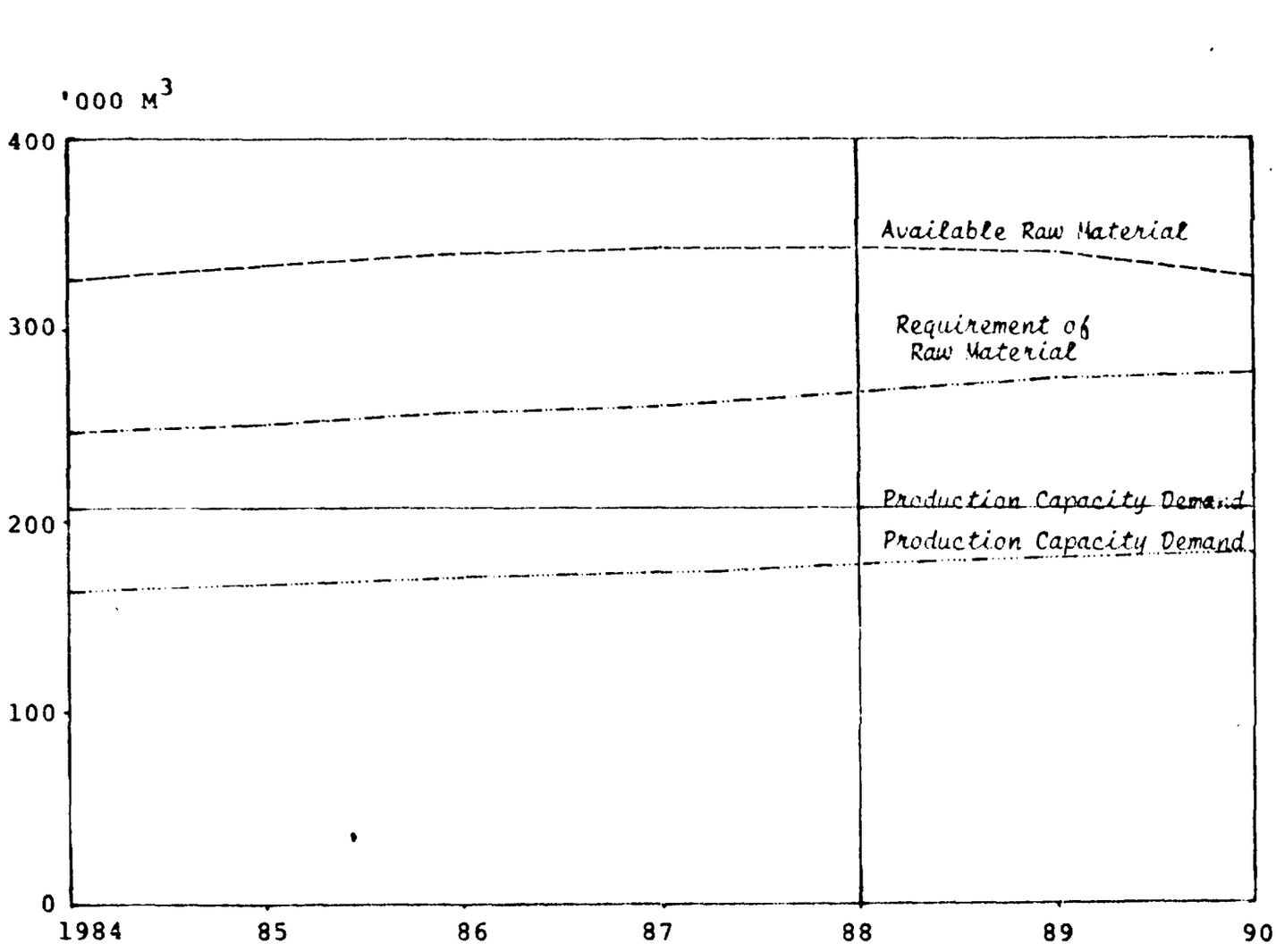

Figure 9.5. WEST SUMATRA : PROJECTION OF POTENTIAL DEMAND, PRODUCTION CAPACITY, AVAILABLE RAW MATERIAL AND RAW MATERIAL REQUIREMENT FOR SMALL SCALE SAW-MILL INDUSTRY, 1984-1990

Chapter 10

AGRO-INDUSTRIAL PROJECTS
LIVESTOCKS-BASED-INDUSTRIES

THE OBJECTIVE of livestock development is to supply animal protein (meat, egg,and milk) for people and to increase income of the farmer and to supply the raw material for industries (leather tanning, shoes and the other industries).

In Pelita I, II and III, livestock population in general has increased, mainly the population of improved chicken, the growth rate is higher than other kind of poultry and livestock.. The egg production is higher than the total egg requirement for consumption of the people. But the meat and milk production is still lower than the total minimal requirement for people consumption. The problem in this production is that the use of techlogy by the farmer is lacking , because of the knowledge about the livestock management by the majority of the farmer is still lower.

In the poultry production we can see that the majority of the farmers have used the new technology, and so the trend and projection the egg production has a big increase.

The problem of this production concerns the marketing and processing/industry of the egg. Sometime the production is so high, more than demand, but sometime the supply of egg production is lower.

The industry of the livestock product in West Sumatra consists of leather tanning and shoes industry. There are 18 leather tanning and 21 shoes industries. But the production of these industries is very low, due to the poor quality of the technique of production.

LIVESTOCK PRODUCTION

Meat Production

During Pelita III meat production in West Sumatra appeared to grow in a favourable rate. There was 13,283.02 tons of meat produced in the beginning of the period and by the end of the period it rose to 15,562.69 tons. The everage increase of production is 4.0 per cent per year. Based on this rate, meat production in 1990 can be estimated as 26,962.93 tons.

Analysis of meat production by the kinds of the livestock as shown in Table 10.1, shows that cows and traditional chicken contributed more than other kinds of meat production. The production of beef increased during the Pelita III namely 1.8 per cent per year. The increase was still relatively low, as the type of cows bred in general was local bred, the birth rate and meat product of which are low. In addition, the breeding system was still traditional and the aim of cow breeding is not for meat production, but for cultivating the farming land and for savings.

The production of buffalo meat also increased during the period Pelita III. The growth rate of buffalo meat production was 0.2 per cent per year which was also low. Buffalo is also kept as a helping power in cultivating farming land.

The production of horse meat was the same as that buffalo. The horse is also used as a beast of burden, that is why the growth rate of its meat production was also low. The people who like consuming horse meat are very limited in number, just a small group in some certain areas.

Goat and sheep production has grown with an increment that was big enough rate. The growth rate of goat and sheep meat production was 2.4 per cent per year. The low production of this meat is because people are not so interested in breeding these animals and the new system of breeding them is not available yet.

Table 10.1. West Sumatra : Trends and Projection of Meat Production of Livestock and Poultry, 1978-1990 (Ton)

Year	Cow	Buffalo	Horse	Goat/Sheep	Pig	Traditional Chicken	Improved Chicken	Duck	Total
1978	4,703.22	2,601.40	191.76	164.04	572.60	4,249.00	493,00	308.00	13,283.02
1979	4,152.60	2,526.40	133,65	173.16	616,00	4,334.00	588,00	308.00	12,831.81
1980	4,026.43	2,796.42	40.53	135.06	390.20	5,875.92	726.39	408.84	14,399.78
1981	4,198.86	2,404.40	103.65	176.16	355,00	6,178.15	777.82	434.00	14,628.04
1982	4,382.44	2,618.40	114.60	180.39	438.40	6,535.31	833.03	460.10	15,562.69
1983	4,461.32	2,623.64	99.82	184.72	483.83	7.359,53	944.61	512.85	16,670.32
1984	4,541.63	2,628.88	88.94	189.15	492.73	8,001,18	1,031.60	555.87	17,529.98
1985	4,623.38	2,634.14	75.73	193.69	515.19	8,642,86	1,118.59	598.89	18,402.47
1986	4,706.60	2,639,40	65.96	198.34	542.30	9,284.54	1,205.58	641.91	19,284.63
1987	4.791.32	2,644.69	57.45	203,04	581.16	9,926.22	1,292.56	684.93	20,181.37
1988	4,887.56	2,649,98	50.04	207,97	614.87	10,567.89	1,379.55	727.95	21,085.81
1989	4,965.36	2,655.28	43.58	212.95	650.53	11,209.57	1,466,54	770,97	21,974,78
1990	5,054.73	2,660.59	37.96	218.08	688.27	11,851.25	1,553.53	813.99	22,878.40

Pork production decreased over the first two years of Pelita III. From 1981 to 1982 it grew with a rate of 5.8 per cent per annum. It is estimated to reach 688.27 tons in 1990.

The broiler production showed a fairly great growth. This high growth rate of production is caused by the fact that people in general raise the traditional chicken as a side line job and the management of traditional chicken farming is still very simple, not done according to a new method of poultry farming . People's inclination to consume traditional chicken meat is high enough, it is even higher than that of improved chicken meat.

The high production of improved chicken meat is due to the fact that the number of poultry farming and population have increased quickly in this last decade. Most of the production of poultry meat comes from the old layers which cannot produce egg any longer and only a small part of the production is broiler. The low production of broiler was caused by the low demand and there was a smaller number of people (limited to town dwellers) who liked to consume broiler. But lately the partiality for broiler has grown bigger.

Duck production also grew in Pelita III. In 1978 it was 308 tons and then rose to 460.60 tons in 1982 and it is estimated to increase every year. Duck production projection, then, will come to 813.99 tons in 1990.

On the basis of individual need for meat of West Sumatra population, meat production shortage was 4.04 kgs or 49.88 per cent under the target in 1978. Likewise, in 1982 the shortage was 3.72 kgs per capita or 45.93 per cent below the minimum requirement standard. It is estimated that in 1990, the shortage will reduce to 1.48 kgs per capita per year.

Meat consumption by expenditure household as shown in Figure 10.1, indicates that meat consumption by the people of the expenditure groups of Rp 5,000 - Rp 6,000 and Rp 15,000 - Rp 20,000

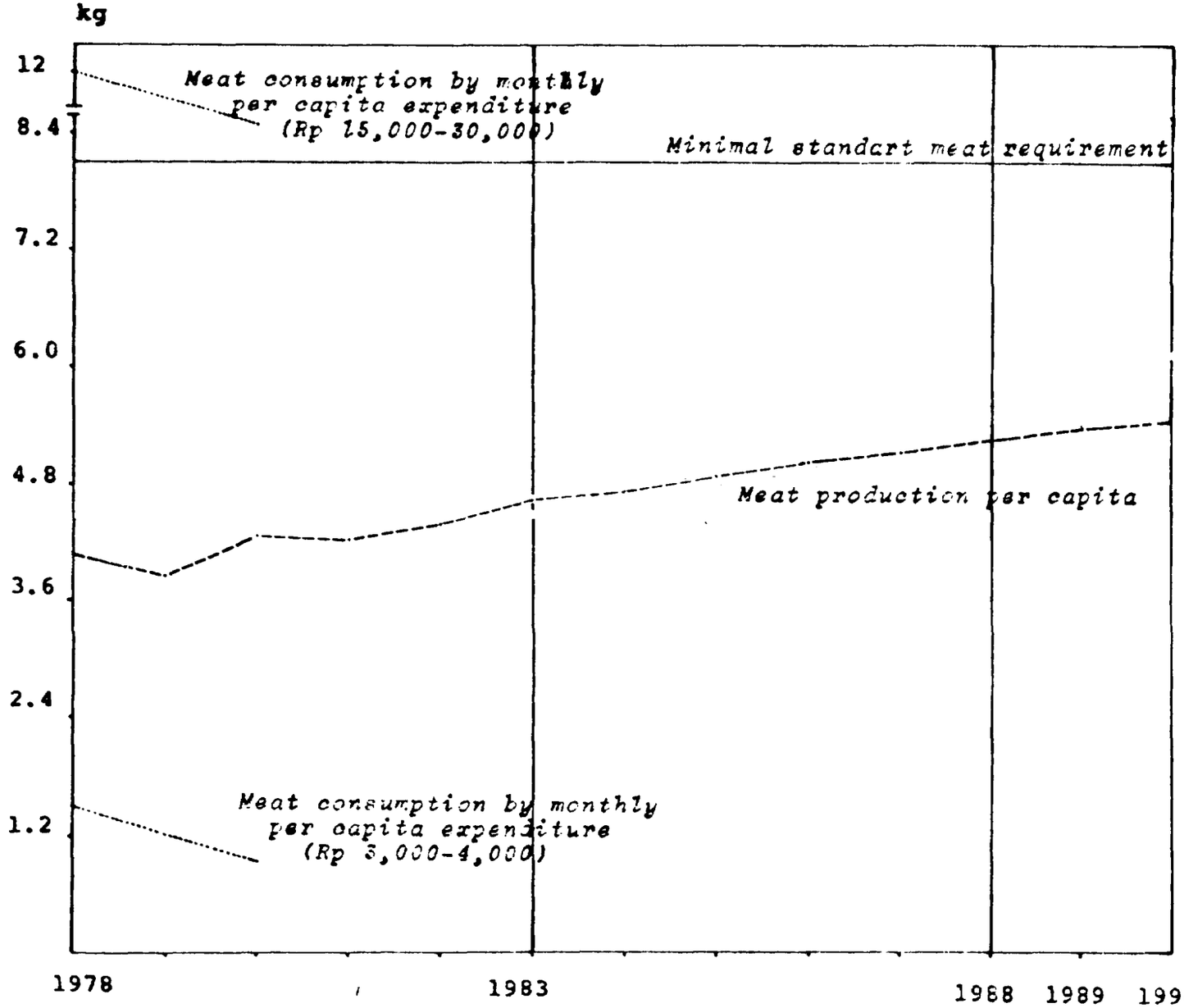

Figure 10.1 WEST SUMATRA: TRENDS AND PROJECTION OF MEAT PRODUCTION AND REQUIREMENT PER CAPITA 1978-1990.

per capita per month has decreased over the periods of 1978 and 1980. Meat consumption of the expenditure groups Rp 5,000 - Rp 6,000 per capita per month was 2.60 kgs per capita per year. In 1980 it fell to 2.55 kgs per capita per year. Meat consumption by the expenditure group of Rp 15,000 - Rp 20,000 per capita per month was 11,96 kgs per capita per year in 1978 and fell to 9.26 kgs per capita per year, or decreased by 12.79 per cent in 1980.

Meat consumption by people of high expenditure was 3.83 kgs per capita per year above the minimum standard of consumption in 1978 and was 1.16 kgs per capita per year in 1980. By people of lower expenditure the consumption of meat was 5.5 kgs per capita below the minimum standard of consumption in 1978, and 5.55 kgs per capita per year in 1980.

Although the meat production in West Sumatra grew at the rate of 4.0 per cent per year, the minimum need for meat during Pelita III was not met if we use the minimum standard of nutrition, that is 8.1 kgs per capita per year (Workshop on National Food, LIPI, 1968). There was a shortage of 7,893.32 tons of meat in West Sumatra, in which the minimum requirement for meat, according to the minimum standard of nutrition was 21,176.34. The shortage was fairly big. In the coming years, meat production is not likely to meet the minimum requirement according to the standard of nutrium. In 1990 the shortage will increase to 11,160.32 ton.

Milk Production

Trend and projection of milk production in West Sumatra is shown in detail in Table 10.2. The growth of milk production (fresh milk) during the Pelita III was 10.6 per cent per year. The increase of milk production was caused by the increasing number of cows namely those given by the president aid. From the level of milk production, the average production of a cow was still low. This is caused by the fact that most of the cows were no logner the right type for producing milk.

Table 10.2. West Sumatra : Trends and Projection of Milk Production and Requirements, 1978-1990 ('000 litres)

Year	Total Requirement a/	Production	Deficit
1978	9,773.69	1,205.50	8,568.19
1979	9,994.58	1,284.00	8,710.58
1980	10,220.45	1,702.04	8,518.41
1981	10,434.49	1,756.16	8,678.33
1982	10,653.78	1,840.89	8,812.89
1983	10,878.27	2,036.03	8,842.24
1984	11,108.09	2,251.85	8,856.24
1985	11,343.38	2,490.54	8,852.84
1986	11,584.26	2,754.54	8,820.72
1987	11,830.92	3,046.52	8,784.40
1988	12,083.48	3,309.45	8,774.03
1989	12,342.69	3,726.62	8,616.07
1990	12,606.94	4,121.63	8,485.31

a/ Calculated by Total Population and milk requirement 2.2 kg/capita/year.

Milk production in West Sumatra has not yet developed well. This is seen in the big discrepency the amount of production and that of minimum standard requirement for milk which was 9,773,690 litres while the production was only 1,205,500 litres. The shortage was 8,568.19 litres.

The shortage grew to 8,812,829 litres in 1982, that is the difference between the production that was 1,840,890 litres and the minimum requirement calculated as 10,653,780 litres. Projected to 1990, milk production will come up to 4,121,630 litres and the minimum requirement to 12,606,940 litres. The discrepency is still fairly big, that is 8,485,310 litres.

According to the minimum standard of nutrition, the discrepency between production and need was too conspicuous. In the 1978 per capita production was only 0.37 litre while the per capita minimum need was 2.2 litres. The discrepency was 1.83 litres. In 1982, however, the discrepency was reduced to 1,68 litre and in 1990 it will continue to decrease as the estimated per capita production by that time is about 1,22 litres.

Considered from people consumption, either for Rp 5,000 - Rp 600,000 per capita per month or for the Rp 15,000-Rp 20,000 per capita per month expenditure household milk consumption decreased (see Figure 10.2). Consumption by the Rp 5,000 - Rp 6,000 per capita per month expenditure household was 0,52 litre per capita per annum in 1978. In 1980, it decrease to 0,42 litre per capita per annum, it fell by 10.7 per cent per year. In 1978 the shortage was 1,68 litres per capita and in 1982 it grew to 1.78 litres per capita.

Milk consumption by household expenditure Rp 15,000 - Rp 20,000 per capita per month has reached the target of minimum standard of nutrition. It even exceeded the minimum standard by 3.88 litres per capita in 1978 and 1.23 litres per capita in 1980. The consumption during the first two years of Pelita III decreased drastically among the household expenditure of Rp 15,000 - Rp 20,000 per capita per month. In the beginning of Pelita III the consumption reached 6,08 litres per capita per annum and than dropped to 3.43 litres per capita per annum in 1980. The rate of decrease was 28.6 per cent per year. This was due to the big rise of milk production in 1980 from that was current in 1978.

Milk consumption among the higher expenditure household and the lower expenditure household had a big discrepency, considered against the minimum standard of need for milk, Among the lower expenditure household (Rp 5,000 - Rp 6,000 per capita per month) it was below the minimum standard. On the

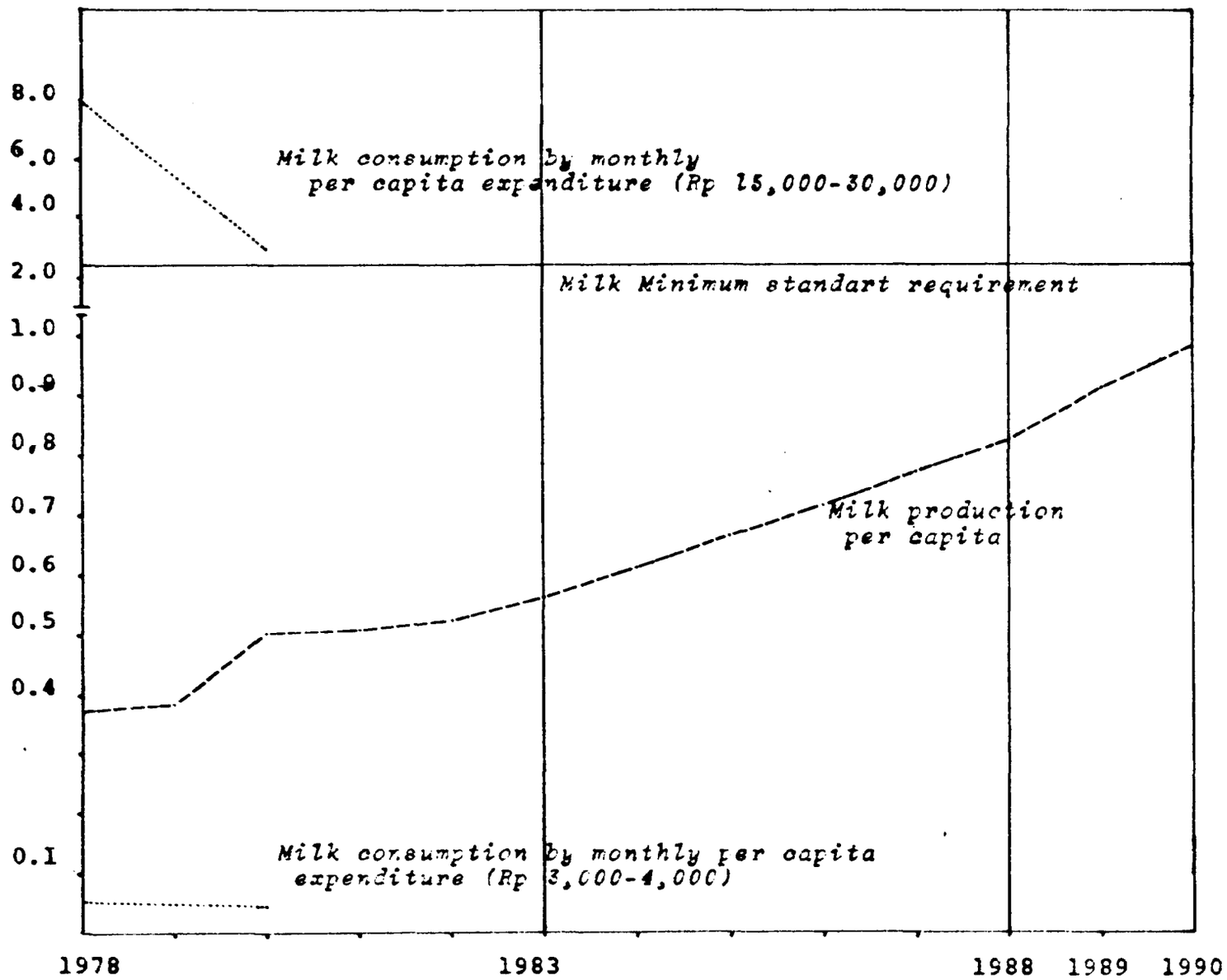

Figure 10.2 WEST SUMATRA: TRENDS AND PROJECTIONS OF MILK REQUIREMENT AND PRODUCTION PER CAPITA 1978-1990

other hand, among the higher expence group (Rp 15,000-Rp 20,000) per capita expence oer mont), it was expensaded that target.

Egg Production

During Pelita III the egg production was increase. The increase of egg production is fairly great, namely 13.10 per cent per annum. This is caused by the great number of poultry farmers and the population of layers.

The growth rate of egg production of traditional chicken is 12.7 per cent per annum. The increase of egg production of traditional chicken is predicted to continue up to 1990. This is increase is caused by the great population especially at villages. The metho of breeding is still traditional.

The increase of egg production of improved poultry is high enough, namely 15.2 per cent per annum. This is caused by the intensive method of improved poultry farming and also influenced by the increasing demand of consumers, especially townpeople.

The production of duck egg also increased during the Pelita III. The growth rate was high enough. This is was due to great number of duck population. The system of duck farming is easier than that of improve chicken. Generally duck are bred by village folk as a side line profession in a traditional method.

To the minimum standard of nutrition which is 2.2 kgs per capita per year (Workshop on National Food, LIPI 1968), which equaled to 7,200.31 tons for West Sumatra in 1978, egg production during the same year and exceeded the target. In the beginning of Pelita III overproduction was 1,057.71 tons. The overproduction continued until it reached 6,113.49 tons. Most of duck egg production was sent to Pekanbaru and Jambi.

Table 10.3. West Sumatra : Trends and Projections of Egg Production of Pultry, 1978-1990

Year	Traditional Chicken	Improved Chicken	Duck	Total
1978	1,888,506	3,288,109	3,081,405	8,258,020
1979	1,926,333	3,288,109	3,089,000	8,258,020
1980	2,611,518	4,844,955	4,088,405	11,544 878
1981	2,761,011	5,188,079	4,342,850	12,291,940
1982	3,111,659	5,976,667	4,837,935	13,926,261
1983	3,444,098	6,700,310	5,317,992	15,496,400
1984	3,772,196	7,428,018	5,794,683	16,994,897
1985	4,100,294	8,155,727	6,271,374	18,527,395
1986	4,428,392	8,883,435	6,748,065	20,059,892
1987	4,756,490	9,611,144	7,224,756	21,592,390
1988	5,084,588	10,338,853	7,701,447	23,124,888
1989	5,412,686	11,066,561	8,178,138	24,657,385
1990	5,740,784	11,794,270	8,654,829	26,189,883

Egg price dropped dratiscally in West Sumatra when the demand from Pekanbaru and Jambi decreased. Egg production projection in 1990 is still beyond the minimum standard of West Sumatra need. The overproduction is big enough compared to the production of other kind of community, that is 16,944.80 tons. (See Figure 10.3).

Per capita overproduction of eggs was 0,32 kg in 1978 and 1,72 kgs in 1982. Over production will continue till 1980. By this year it will reach 6,87 kgs per capita.

People from the expenditure household of Rp 5,000-Rp 6,000 per capita per month consumed 0.87 kg of eggs in 1978 and in 1980. Those from the expenditure household of Rp 15,000 -

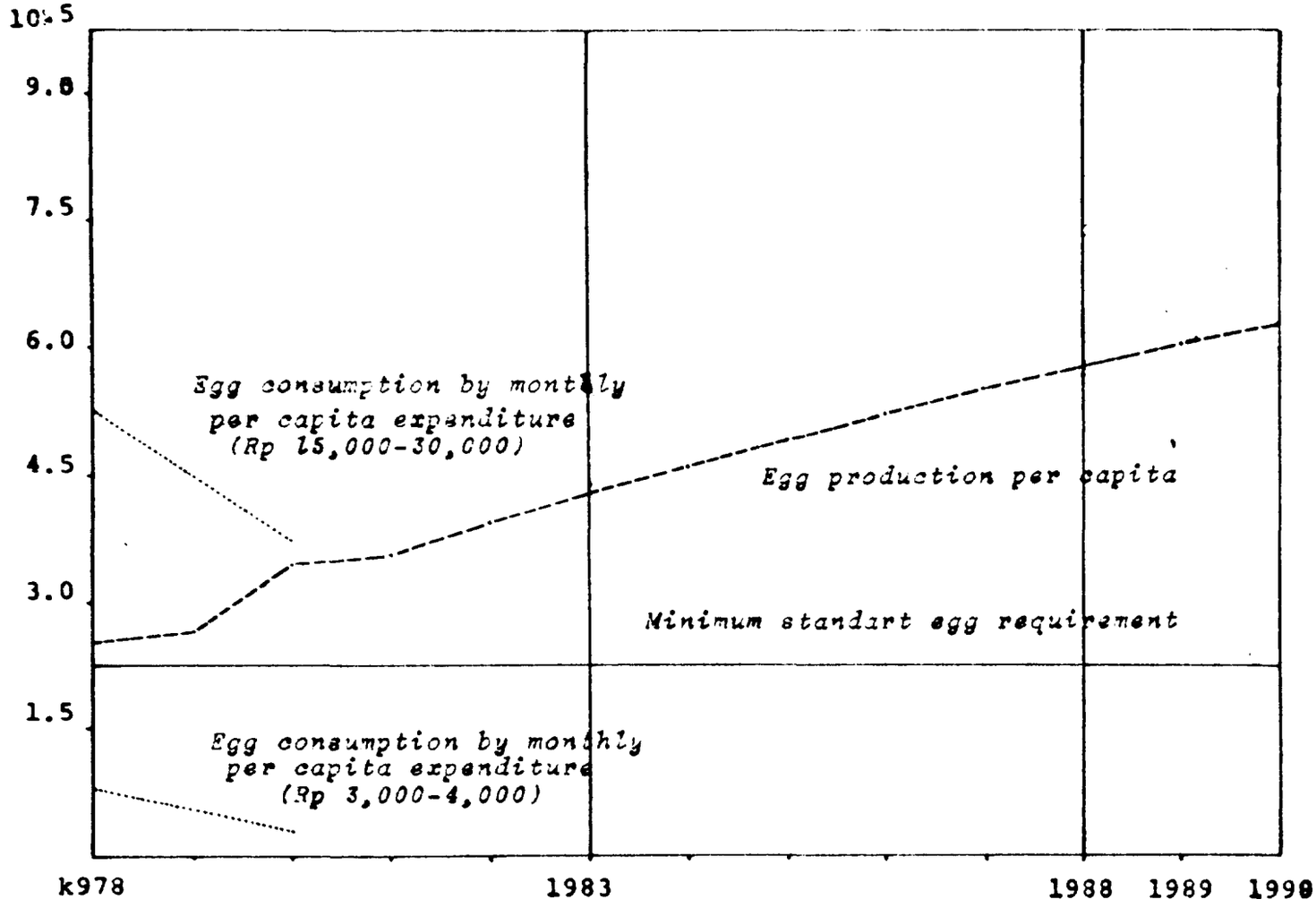

Figure 10.3 WEST SUMATRA: TRENDS AND PROJECTIONS OF EGG REQUIREMENT AND PRODUCTION PER CAPITA 1978-1990.

Rp 20,000 per capita per month consumed 4.91 kgs of eggs in 1978 and in 1980 the consumption decreased to 3.13 kgs.

To the minimum standard of nutrition per capita egg consumption of higher expenditure household differed greatly from that of lower expenditure household. Per capita egg consumption of the higher expenditure household exeeded the minimum standard of nutrition by 2.71 kgs per capita per year in 1978 and 0.93 kg per capita per year in 1980. On the other hand, egg consumption of the lower expenditure household was under the minimum standard of nutrition by 1.33 kgs per capita in 1978 and 1.6 kgs in 1980.

LIVESTOCK AND POULTRY POPULATION

In general, livestock, and poultry population growth in West Sumatra had a good tendency during Pelita III (Figure 10.4 and Figure 10.5). Improved chicken had the highest rate of growth among livestock and poultry. On the other hand, goat and sheep had the lowest rate of growth, that is 3.1 per cent per year.

The growth rate of the population of the improved chicken is higher, this is because the increasing number of the poultry farmer, and egg productivity is higher. Activities of Animal Husbandry Extension Workers and disemination of improved chicken is running well. The government also help the farmer by giving credit and some other facilities for improving chicken farming.

The population of dairy cattle is also increasing. This is because of intensification raising, improving extension work activities and the number of dairy cows from President since Pelita III.

The buffalo population is increasing 9.0 per cent per year, this is because of the slaugtering of the buffalo is relatively low and the objective of raising these animals is mainly for helping agricultural cultivation and for savings by the farmer.

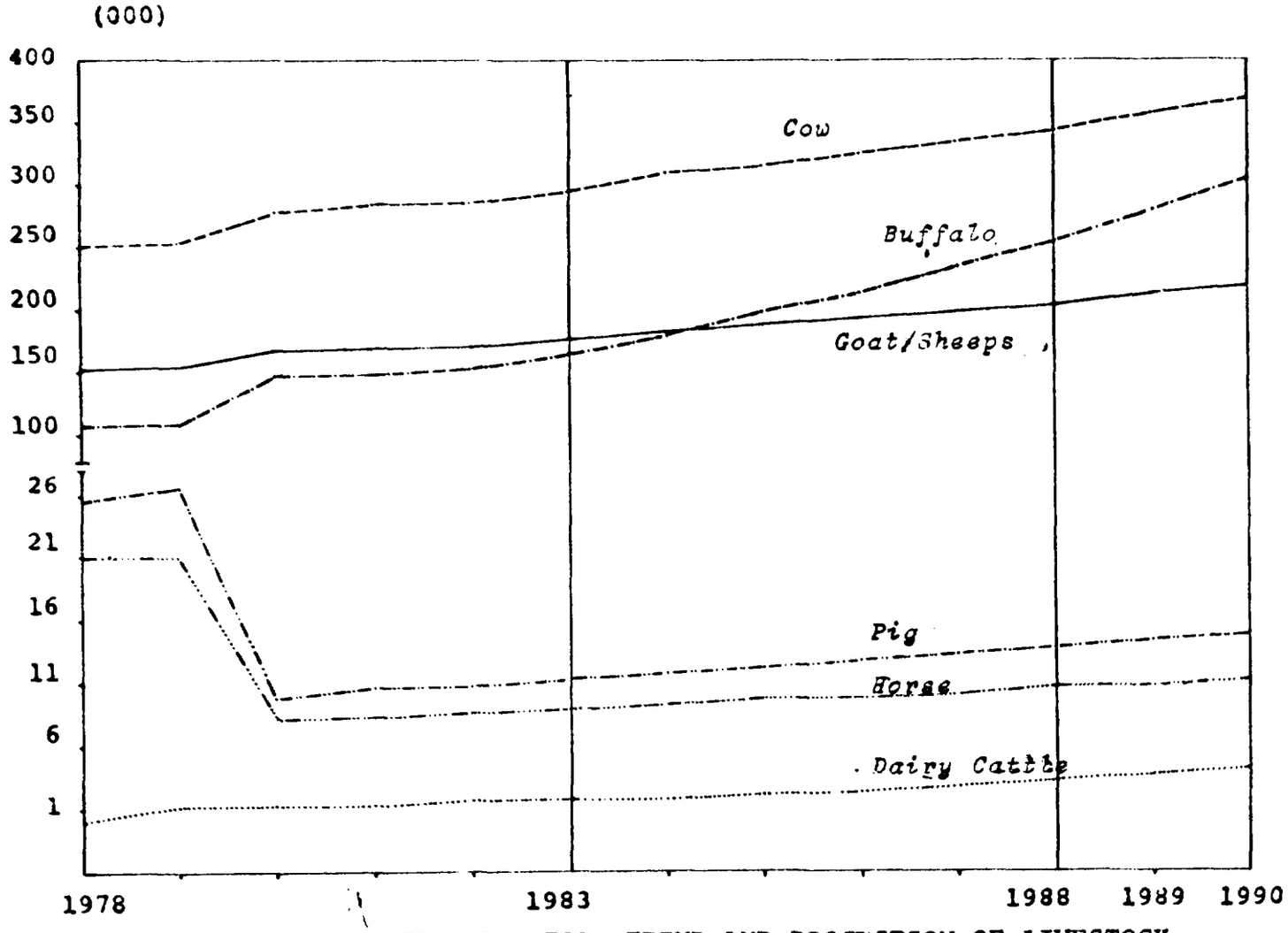

Figure 10.4 WEST SUMATRA: TREND AND PROJECTION OF LIVESTOCK POPULATION 1978-1990

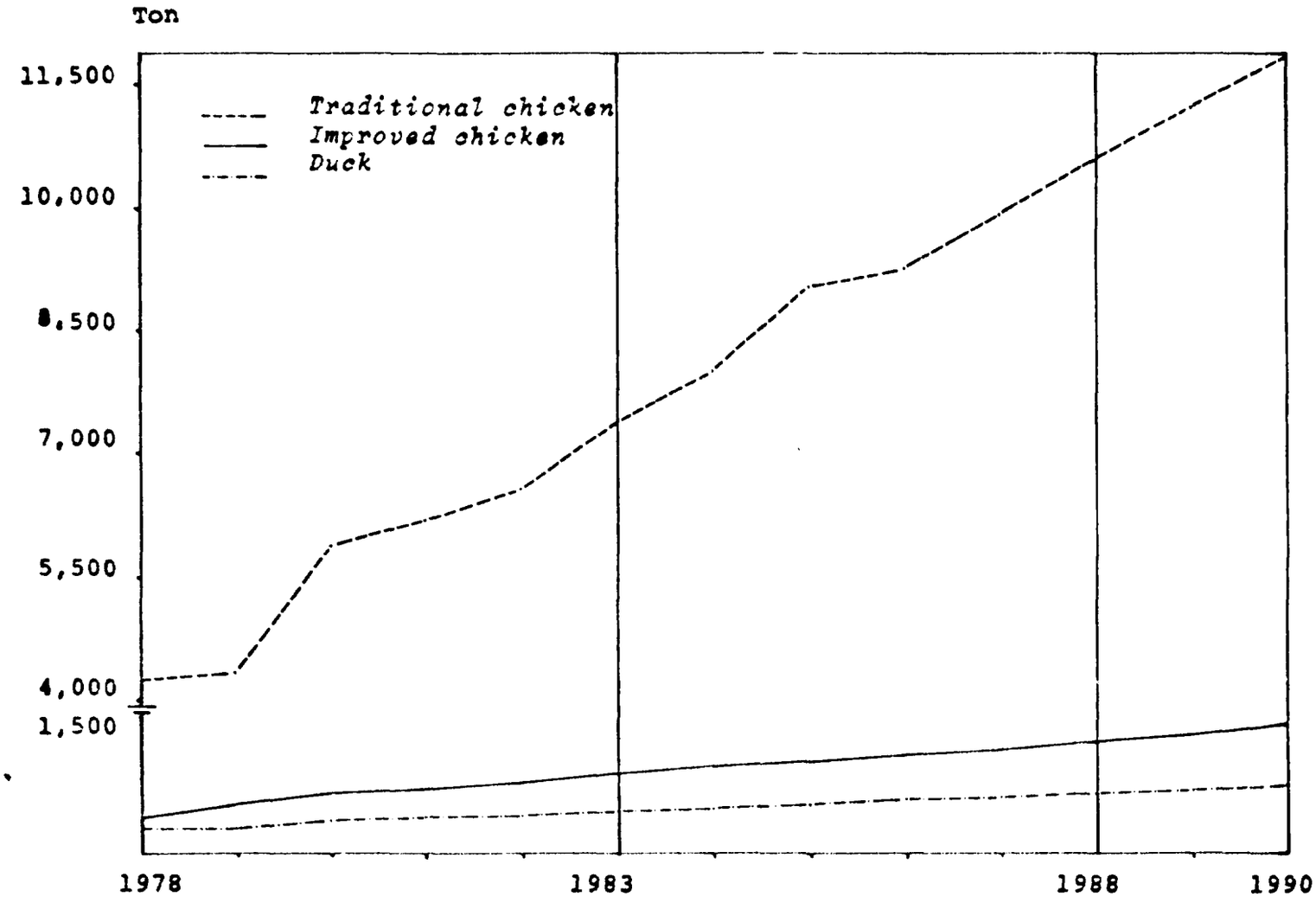

Figure 10.5 WEST SUMATRA: TREND AND PROJECTION OF POULTRY POPULATION 1978-1990

The population of horses and pigs, since 1978, had decreased but in 1982 they increased again althoufh this increase is not so meaningful as before. The decrease is caused by the great number of slaughtering and there has been no intensive effort to raise them.

The community's interest to raise horses seems to lessens, because horses are kept for transportation. As the motorized means of transportation have advanced so rapidly, horses are no longer used.

The growth of pig breeding is also always reducing, because most of West Sumatra people are Moslems. Who do not breed pigs and eat pork.

Pigs are only raised by non-Moslems who live in the outskirt of town. Certainly pig breeding and marketing find a lot of hindraces.

The duck population increase by 10.6 per cent per year and this increase is caused by the low death figure and the increasing number of duck breeders.

Table 10.4 West Sumatra: Trend and Projection of Livestock and Poultry Population, 1978-1990

Year	Number of Population of the								
	Cow	Dairy Cattle	Buffalo	Horse	Goat/ Sheeps	Pig	Native Chicken	Foreign Chicken	Duck
1978	250.543	908	105.817	21.195	150.413	25.591	2.833.000	493.000	616.000
1979	251.750	1.052	106.028	21.321	151.160	26.510	2.889.500	588.300	617.000
1980	277.969	1.306	148.301	8.060	165.571	9.976	3.917.277	726.380	817.686
1981	281.465	1.385	149.830	8.341	167.723	10.639	4.118.764	777.823	868.550
1982	284.844	1.521	151.373	8.621	169.903	10.813	4.357.476	833.050	940.253
1983	293.959	1.717	164.997	8.914	175.170	11.246	4.906.667	944.598	1.041.915
1984	307.366	1.939	179.846	9.217	180.600	11.695	5.334.490	1.031.560	1.131.920
1985	313.073	2.189	196.035	9.531	186.199	12.163	5.762.311	1.118.522	1.221.926
1986	323.431	2.471	213.675	9.855	191.971	12.650	6.190.133	1.205.484	1.311.931
1987	333.4:1	2.790	232.906	10.190	197.922	13.156	6.617.955	1.292.447	1.401.937
1988	344.100	3.150	253.868	10.536	204.058	13.682	7.045.776	1.379.409	1.491.943
1989	355.112	3.556	276.716	10.894	210.384	14.229	7.473.598	1.466.371	1.581.948
1990	366.475	4.015	301.620	11.265	216.905	14.798	7.901.415	1.553.334	1.671.954

SHOE INDUSTRIES AND LEATHER TANNING

Over the period of 1979 to 1981 shoe industries increased every year. In 1982 and 1983 the production decreased rapidly, the dominant factor is competition in quality and price which enter West Sumatra market. Demand for local made shoes decreased because of keen competition with imported shoes which were relatively higher in quality. Consequently, local industries dropped their production.

Data from research show that shoes production was only 57 per cent of production full capacity (39,515 pairs), in 1979 and 1980 production level remained unchanged, that is 51 per cent of the capacity. But in 1981 it rose to 71.5 per cent. In 1982 however, it fell to 65 per cent, and in 1983, eventually, dropped to 53.44 per cent.

Two factors that seemed to work against the demand for local leather shoes were fashions and myth about imported shoes. The types of shoes prefered by elementary school and high school students were those made of canvas. This then lowered the sales of leather shoes. Besides that, consumers were inclined to believe that imported shoes were better, no matter their quality was, when compared to that local leather shoes.

Most shoe industries could sell their products in local markets. Data from research shows that 36 per cent of industries sold their product in different places in West Sumatra 64 per cent sold in local market. No local industries sold their product in the market outside of West Sumatra.

The conditions described above lead to a conclusion that the most important thing to do is not to promote production capacity, but to improve the quality and fashion to an extent that they can compete with those of imported shoes.

Tannery industries in West Sumatra increase every year. But some obstructive factors, such as shortage of capital and

the difficult position of shoe industries as down stream industries; the growth in their productivity is so much hindered.

In general, tannery industries are short of capital so that it is hard for them to improve leather quality. This makes them unable to compete in free market. The situation is even becoming worse as more and more leather from Java enters the local market and as local tenneries keep increasing.

The difficult position of shoe industries that cannot stand the blows of their competitors makes them reduce their production. As a result, the demand for leather is reduced proportionately. The comparison between production and production capacity was very small. In 1978 and 1979 it was only 6 per cent. In 1980 it rose to 14 per cent. Over 1981 to 1982 it rose to 24 per cent.

In 1983, tannery industries started to sell leather to the markets outside of West Sumatra. It is further shown that some industries began to sell their leather to the markets outside of their localities, within West Sumatra province. Over the period of 1981 and 1983, 40 per cent of industries did so and in 1983 the persentage rose to 56 per cent while the leather products sold outside West Sumatra market grew to 22 per cent.

LIVESTOCK INDUSTRIAL POSSIBILITIES

There are several possibilities for livestock industries in West Sumatra :

The Egg Powder' Industry

The egg production during Pelita III showed more productivity. Supply of egg production is higher than total egg requirement for the people in West Sumatra. Trend and projection of the poultry population tend to increase, because the majority of the farmers have enough skill for raising the improved chicken. Marketing of this production is for consumption

by people in West Sumatra, and neighboring provinces (Riau and Jambi). The price of the egg in West Sumatra sometimes droped drastically. Considering the egg production and trend of poultry population, possibility to build the egg powder industry in West Sumatra is feasible. This industry will give much impectus to the farmer to expand their farms and to open the possibility for exporting this product.

Hatchery Industry and Improved Chicken Breeding

Till the end of Pelita III, in West Sumatra there is no hatchery industry. "Day old chick" of improved chicken was brought from hatchery industry in Java. All of population of the improved chicken in West Sumatra came from Java. The problem is the price, transportation, and interdependency. Based on this data, there is possibility to build the hatchery industry and improved chicken breeding in West Sumatra.

Development of Small/Middle Scale of the Farm/Poultry

The meat production in West Sumatra is lower if we compare with the standard of meat minimal requirement for the people . The gap is big, and this is a serious problem. To solve this problem is to increase the livestock population, to extend the small or middle scale of the livestock and poultry farming and if possible to extend the broiler and cattle farming. Sumba kontrak or sistem gaduh is a possible system relevan to increase population and farmer business. This system will create the multipossitive impact; livestock population, improving of the farmer ability, farmer business and income of the community.

Develop the poultry farm should be focused to increase form business to the middle scale (2,000-3,000 hens). This farm scale will give enough profit to the farmer and relevan with the government regulation.

CONCLUSION

The production of meat, milk and eggs in West Sumatra in Pelita III increased quite well. In sprite of that, the production of meat and mild could not meet the minimum nutrient need of West Sumatra population. This was caused by the fact that the types of cattle raised to produce meat were local ones which had low birth rate and small meat production, an in addition the way of raising is still traditional.

The production of fresh milk was still low due to the existence of well-bred cows.

The egg production has exceeded the minimum nutrient need of West Sumatra population. This is due to the increasing number of layers bred by poultry farmers.

The shoe and hide-tanning industries have production lower than the existing capacity due to inability to compete in the market.

The possibility of investment in the sector of animal husbandry that can be developed is the establishment of industries of egg flour, harchering, and improved chicken breeding. The thing to develop is the raising or breeding of cows, goats , sheep, and dairy cattle. This can be carried out by cattle farmers by Sumba Contral system or by establishing the small ranch or medium scale.

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Chapter 11

AGRO-INDUSTRIAL PROJECTS : FISHERY-BASED INDUSTRIES

WEST SUMATRA, a province located on the west coast of Sumatra has a shore bordering Indonesia Ocean of approximately 375 kms long, excluding the coast of Mentawai islands. Pasaman, Padang Pariaman, Pesisir Selatan regencies and Padang municipality are situated along this coast.

Marine fishery potential has not been much exploited by the fisherman. About 70 per cent of marine fishery remains potential wealth to be developed. As the existing fish production does not cover consumers' need for fish, there is a challenge to promote marine fish production in West Sumatra.

Marine fish consumption is low due to production and marketing factors that are not yet conductive. Some problems in developing marine fishery potential in West Sumatra, among others, are that (1) the majority of fisherman still use traditional method of fishing, (2) production pattern that emphasizes short term need, (3) the marketing organization of fish production is still weak, and (4) the fishermen's attitude that is difficult to change.

The problems are the fishermen's conditions look of skill, capital shortage, lack of technology, lack of education, lack of organizational skill and motivation to learn along with the lack of education. All this will give an impact to production capability.

To improve fishermen' skills in production techniques, marketing, and self organization is necessary to solve the problem.

Some of the major objectives of fishery development are (1) to increase fishermen's income and improve welfare by promotion of fish production, (2) to promote and supply people nutrition (food), (3) to arise government revenue from fo-

reign receipt by promoting fish export, and (4) to expand job opportunity (labor market) in fishery sector.

THE PRODUCTION OF MARINE FISH IN WEST SUMATRA

There are five species of marine fishes, according to a survey [1/], that are in fish production in West Sumatra : (a) herring (cakalang, tongkol), (2) plaice (kembung, layang, selar, tombang, bawal), (c) coral fish, (d) demersal fish, and (e) other.

The largest part of fish production consists of herring (29.3 per cent) and plaice (50.3 per cent). The rest consists of coral fish (2.15 per cent), and others (6.5 per cent).

Considered from degree of economic importance, fishes may be classified into two major categories, economically important category of fishes, that is the class of fishes that are relatively high in value and wider market share and otherwise economically less important category of fishes. Among thousand of species produced in Indonesia, there are less than 50 species qualify the economically important fishes.

A portion of 82 per cent of marine fish total production belongs to the economically important category of marine fish, consisting of 29.3 per cent of large plagic, 50.5 per cent of small plagic, 2.4 per cent of shrimp. The rest, 18 per cent consist of fishes belonging to economically less important category.

1/ I.C.B. Uktelseya, A prelimenary Report on Fishery Development Project of West Sumatra Survey, 22 Pebruary - 6 April 1975 (unpublished), p.1.

Although the production of economically important fish makes the largest portion, as presented above, the production process is still traditional. Fishing is predominantly carried out by using boats without motor. With such boats the activities are limited to in-shore fisheries, that is about 15 miles off the shore. Motorization that is encouraged in Pelita III seems to bring about positive effects in further development.

The marine fish production in West Sumatra during the Pelita III increased by 9.5 per cent per year. This increase is predicted to last until 1990. Although fish production was high enough, it could not meet the mean minimum need of the community.

The low fish production, especially marine fish, is mainly caused by the use of traditional catching equipment. Just a small number of fishermen use fising boats fitted by in board or outboard motors. Besides, the marketing is still not good.

Catching Tools

Fish catching tools used in fish production in West Sumatra are simple devices of simple technology that are commonly used in in-shore fisheries. Such devices include fishing hooks, troll lines, seine nets, snares, gill nets, monofillament nets, and danish seine, beach seine. In operation, commonly used boats are sail boats, rowing boats and recent development, motor boats and motor ships. Productivity by the kinds of catching tools are presented in Table 11.2.

Seen from Table 11.2 fish catching tool with highest productivity in 1976 was troll lines motor averagely 16.84 tons per unit per year. The second highest in productivity was lift net motor with 13.98, and the third highest in pro-

Table 11.1 West Sumatra : Trends and Projection of Marine and Inland Fishery Production, 1978-1990
(Ton)

Year	Fresh Marine Fishery	Inland Fishery		Total
		Cultured	Inland Open Water	
1978	16,632.1	3,675.0	2,329.3	22,536.4
1979	21,189.3	3,742.4	2,446.4	27,378.1
1980	22,009.3	4,039.5	2,576.8	28,625.5
1981	24,680.0	4,152.3	2,960.0	31,447.7
1982	24,335.4	4,973.1	3,246.2	32,524.7
1983	26,647.26	5,343.49	3,515.63	35,516.97
1984	29,178.75	5,776.31	3,887.43	38,748.53
1985	31,950.73	6,244.19	4,123.45	42,352.71
1986	34,986.05	6,749.98	4,465.70	46,201.73
1987	38,309.73	7,296.72	4,836.35	50,504.83
1988	41,949.15	7,887.76	5,237.77	55,150.46
1989	45,934.32	8,526.67	5,672.50	60,224.31
1990	50,298.08	9,217.33	6,143.32	65,764.95

ductivity was scoop net motor with 5.59 tons per unit per year. It is obvious that motorization provides for higher productivity. The fact is that the operation of boats without motors is still in the majority.

The trend in the use of motors among fishermen has started. Since 1980, it has risen from 461 in 1980 to 741 in 1982. The rate of increase in Pelita III (1978-1982) was 23.70 per cent per year.

Table 11.2 West Sumatra : Productivity by Kind of Fish Catching Tools, 1976-1980

Kinds of Tools	1976			1980		
	Number (units)	Production (tons)	Productivity	Number (units)	Production (tons)	Productivity
Beach Seine	688	1,355.5	1.97	409	1,933.0	4.73
Seine Nets	483	510.1	1.06	394	1,027.3	2.60
Danish Seine	228	416.6	1.83	457	1,499.3	3.28
Gill Net	141	415.6	2.95	85	372.8	4.38
Monofillament Net	355	335.5	0.95	281	565.9	2.01
Scoop Net Motor	54	301.7	5.59	133	688.3	5.18
Scoop Net	591	295.9	0.50	917	1,919.1	2.09
Lift Net Motor	405	5,660.0	13.98	499	5,873.3	11.77
"Ranggung"	214	655.4	3.06	454	974.7	2.15
Troll Lines Motor	174	2,930.6	16.84	472	7,100.0	14.95
Troll Lines	95	125.2	1.32	108	419.8	3.88
Total	3,428	13,002.1	3.79	4,209	22,373.5	5.32

The use of motor ships did not seem to develop, as shown in Table 11.2 it did rise until 1981, but soon after that it dropped. It was caused by the increasing price of fuel in 1981 which affected production cost and, in turn, lowered the net receipt of the fishermen. As a result, some fishermen decided not to operate motor ships. There is a tendency among the fishermen to replace their ship motors with

engines with lower capacity in order to be more economical with fuel.

The increase rate in the use of motor ships in Pelita III was 6.1 per cent. It is necessary to encourage the use of motor ships to promote fish production. It is important for both the fishermen and the government to find out solution. One possible solution is to use more productive catching tools, to promote fishermen's skills in development and conservation of fishes.

The number of boats without motors does not seem to increase in proportion to the increase of fishermen population. It may even be inferred that the number of fishermen who use boats withouts motors does not increase. This is because of the change in the use of production tools. There was some change in the fishermen's tools, from non motor to motor boats. The increase rate of non motor boats in Pelita III was 2.3 per cent per year.

Trend and projection of non motor, motor boats, and motor ships in Pelita III and the projection up to 1990 appears in Table 11.3

It is clear from the table that non motor boats were predominantly used. But in later development, the number of such boats reduced drastically over the period of 1979 to 1981. By inference, the decreasing use of non motor boats was due to the increasing use of out-board motor boats, as the fishermen, either individually or in groups, chose to employ then. However, the use of non motor boats had again increased, which was possibly caused by the rise of production cost.

At the rate of 23.70 per cent, as achieved in Pelita III, the estimated number of out-board motor in 1990 will grow to 4,062. In the same way, at the increase rate of 6.10 per cent, the estimated number of in-board motor will develop to 520 in 1990.

Table 11.3 West Sumatra : Number of Motorized and Non Motorized Boats

Year	Non Motorized Diesel Boats	Out Board	In Board
1978	2,873	362	254
1979	3,212	279	312
1980	2,769	461	303
1981	2,662	665	336
1982	3,149	741	324
1983	3,221	917	344
1984	3,296	1,134	365
1985	3,371	1,403	387
1986	3,449	1,735	411
1987	3,528	2,146	436
1988	3,609	2,659	462
1989	3,692	3,284	490
1990	3,777	4,062	520

Estimated number of both, in-board motor and out-board motor may even grow bigger if full prices in the coming years are steady.

Fish Supply for West Sumatra Consumption

By nutrition standard of 18 kgs per capita per year, fish production is still not enough. In 1982, requirement for fish was 63,435.56 tons while the supply was only 32,524.7 tons. In order for supply to meet the requirement for fish by the nutrition standard, the production in 1982

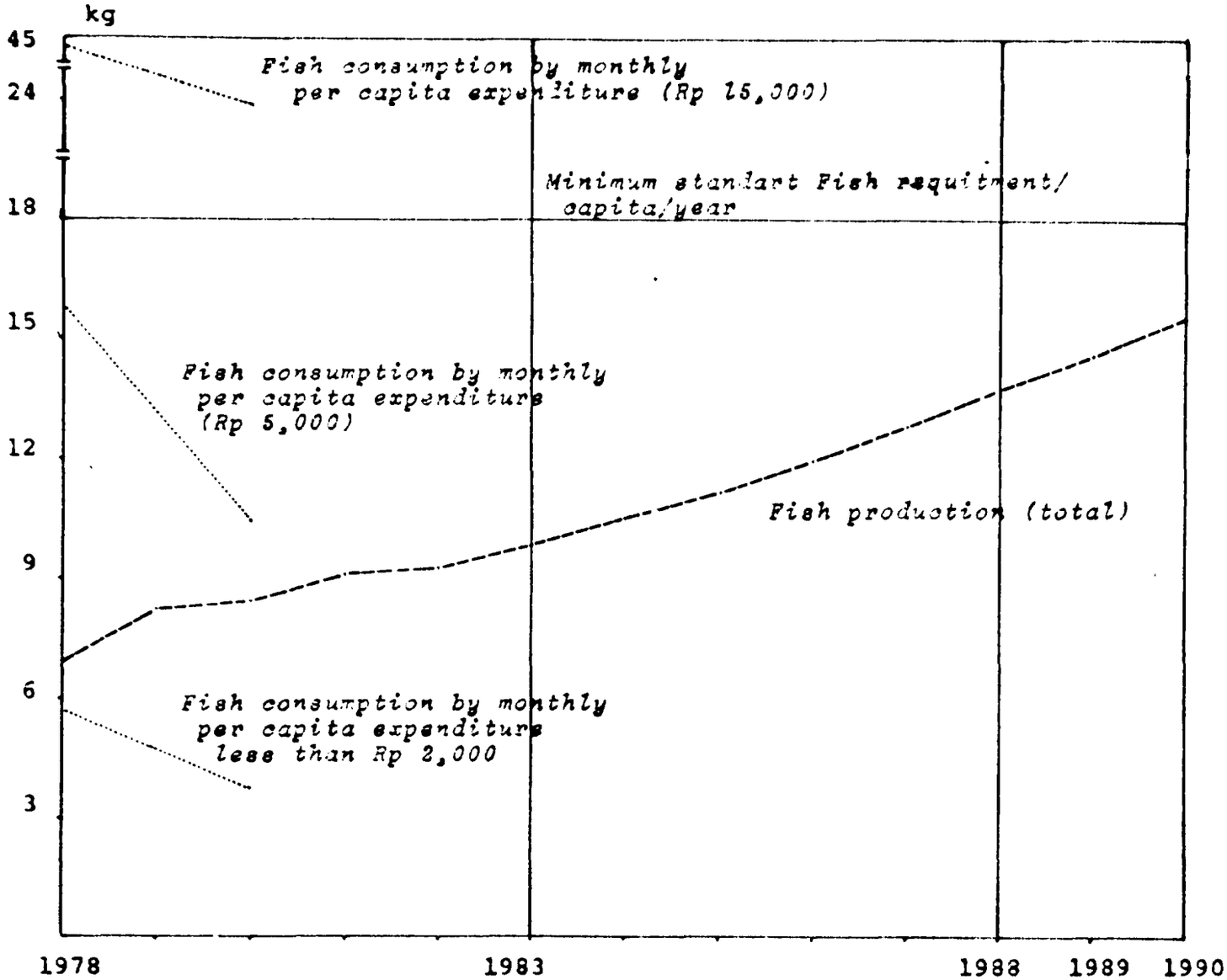

Figure 11.1 WEST SUMATRA: TRENDS AND PROJECTION OF FISH REQUIREMENT PRODUCTION PER CAPITA 1978-1990

should have been increased by 100 per cent. Considering population growth rate and fish production projection in 1990, the estimated shortage of fish supply is approximately 10,000 tons.

Even if the total production was consumed by all the population of West Sumatra in 1982 it could supply an average of 9.2 kgs per capita per year. This means that West Sumatra fish supply from production was 50 per cent below the minimum standard of nutrition, as shown in Figure 11.1. From the figure it is clear that fish supply in 1978 was far below the standard minimum requirement for consumption.

At the rate of 9.2 kgs per year, fish supply from West Sumatra will still lag behind the demand, according to the minimum standard of nutrition of 18 kgs per capita per year. The shortage is still large enough. It is necessary to encourage effort to promote production.

Fish annual per capita consumption by some monthly per capita expenditure groups (data from Census, Central Bureau of Statistics, for rural and urban areas outside Java) is as follows. Annual per capita fish consumption by people with monthly per capita expenditure of Rp 15,000.- Rp. 30,000 was 40 kgs in 1978. By people with monthly per capita expenditure below Rp 2,000 it was less than 6 kgs.

From Figure 11.1 it is clear that fish supply was mostly consumed by the people of higher income group. Fish prices were too high for the people of lower income to pay. Compared to people fish consumption in 1978, fish consumption in 1980 decreased (data from Central Bureau of Statistics). From 40 kgs per capita per year in 1978 it dropped to approximately 20 kgs per capita per year, by higher expenditure group. The same trend also applied to the people of lower expenditure.

It goes without saying that fish production to supply the average consumption need of the people is still low.

This condition encouraged competition among the people across monthly per capita expenditure groups.

THE PROBLEMS

A number of critical problems the challenge the sector of marine fishery in West Sumatra are identified as the problems of (1) low production, (2) the use of fishing equipment, (3) fishermen's attitude, and (4) local market orientation.

Fish Production

West Sumatra fish production is not sufficient to supply the consumption need of the people. By the minimum standard of 18 kgs annual per capita, between existing production and needed supply there is a big gap, while fishery potential for development is considerable.

The Use of Fishing Equipment

The majority of fishermen still use traditional fishing tools such as in-shore fishing nets, "colok", and fishing hooks, and for marine mobility, they still use non motor boats so that their fishing area is narrow, limited to in-shore fishery. More productive fishing tools and motor boat or ships are used only by a very small number of fishermen. Besides deficiency in necessary skills and lack of responsiveness toward innovation, the fishermen have low purchasing power to buy more productive tools.

Government effort to help the fishermen by offering loan to get motor boats or motor ships for more fishermen is hindered by their inability to warrant the loan.

Fishermen's Mental Attitude

Most fishermen's have narrow orientation in their way of thinking, limited to a subsistence level, localism oriented, unwilling and difficult to adopt new technology. Efforts to

organize themselves in the from of cooperatives or other social organizations are very limited.

THE INVESTMENT REQUIREMENT

The investment requirement in the sector of marine fishery is especially to increase marine fish production in order to be able to meet the need of consumption for West Sumatra people. It is predicted that the fish production should rise by about 50 per cent of the present production. The present production to meet the minimum requirement of fish is 18 kg per capita per year. For this, investment is required substantially especially in the increasing usage of facility for catching fish such as fishing motor boats.

The number of in-board motor needed is about 200 per cent and out-board motor 100 per cent of the present number. Up to 1990 it is expected that 20-30 per cent of fishermen will have used out-board motor or in-board motor. For this, the tools are needed to build up the industry of out board motor suitable for the need of West Sumatra fishermen, the industry of spare-parts and reparation services. If 20 - 30 per cent of fishermen have used fishing motor-boats, the industries of fishing boats spare-parts and boat reparation are seriously needed.

In addition, investment is required for educating and training the fishermen to develop their skill to use the fish-catching tools, to improve the processing and marketing of fish.

In order to reach 20 - 30 per cent of fishermen of West Sumatra using motor-boat, the education/training for the fishermen is seriously needed. At least 25 per cent of the fishermen can attend this education/training every year.

CONCLUSION

The fish production, especially marine fish, in West Sumatra is relatively low and not enough to meet the minimum nutrient need of the population. The low fish production is caused generally by the simple catching method and the tye of the equipment used by the fishermen. The number of fishing boats with in-board or out-board motor is far less than the sailing or rowing boats. The fishermen do not have enough capital do buy motorized fishing boats. They do not have enough skill and knowledge of catching fish either.

The capability of investment that is better developed in the sector of fishery is the motorization of fishing boats and the developing of skill and knowledge, especially concerning fishing equipment, processing and marketing.

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Chapter 12

AGRICULTURAL RELATED INDUSTRIES

LOOKING to the prospect in the future,the analysis on the agritural related industries will covers five main industries, i.e. tractor, thresher, hoe, chicken feed and fertilizer packaging industries.

There is no tractor industry in this region. Nevertheless, because the utilization of tractor has a good chance to develop in the future, it is worth while to study this industry. The other four industries are found in this region and have given the significant contribution to the agricultural sector.

TRACTOR INDUSTRY

Tractor utilization in Indonesian agriculture began in 1952,and the significant development started just in early 1970's when small tractor (mini-tractor and hand-tractor) were utilized in sawah land preparation. In West Sumatra the utilization of small tractor started in late 1970's. In 1979 the number of tractors which had operated in West Sumatra is 87 units, in 1981 it increased to 156 unit, and finally in 1983 the number increased to 246 units. Almost all of these tractors operating in land preparation of sawah. Therefore the following analysis will be directed to tractor as equipment for land preparation of sawah for rice crop. Since hand-tractor is easier to move on unfavourable field, in the following section hand-tractor is used as the base of analysis, hence the term of tractor means hand tractor. But it does not mean that mini-tractor can not be used in West Sumatra.

Since there is no tractor industry in West Sumatra, the present analysis will be focused on the demand side. Hence

the main question here is how many tractors do we need in the future.

For estimating the need for tractor in a region, the length of land preparation period (LPP) is a crucial point. By definition LPP is number of months in one year during which land preparation is underway. In this period of time (a couple of months) every capable unit of power (labor or machine) if needed is ready to do the job in land preparation activities.

In the previous studies LPP was obtained by assumption only, without any calculation. Such LPP is usually an under estimate, which causes on over-estimate of need for tractors. For example, a Bank of Indonesia's report and Faculty of Agriculture's report, assumed that each season a 7 week land preparation period or LPP is equal to 3.5[1/] . Indeed LPP in a region, either a district or a village, can be calculated on the basis of distribution of monthly transplanting area in one year. Since a village is too limited on area in relation to tractor mobility, a distric (kecamatan) is considered as the operational area of a tractor. Based on two district samples the average LPP in West Sumatra is 9.85 months[2/].

Besides the LPP, for calculating the average capacity of tractor in land preparation of sawah (in hectares per year), the following aspects are taken into consideration:

1/ Bank Indonesia, Tractorization In West Sumatra's Agriculture, A proposal for selective KIK/KMKP lending, Preliminary Report No.12 PPMU-West Sumatra. (Padang: 1978)., Fakultas Pertanian Universitas Andalas, Kemungkinan Pengembangan Pemakaian Traktor Pertanian Pada Tanah Sawah di Beberapa Daerah di Sumatera Barat (Possibility of The Development of Farm Tractor Utilization in Selected Region in West Sumatra), Padang, 1977.,

2/ Djaswir Zein, Penaksiran Dampak Ekonomi Penggunaan Traktor Dalam Pengolahan Tanah Sawah di Sumatera Barat (Estimation of the Economic Impacts of Tractor Utilization in Sawah Land Preparation in West Sumatra), Doctorate Dissertation In Economics, Gadjah Mada University, Yogyakarta, 1983 p.108, 158.

1. There are two types of power combination in land preparation for rice crop i.e. TO type (tractor + human) and TC type (tractor + human + animal). And it is assumed that 75 per cent of tractor power is used in TC type and 25 per cent in TO type .
2. Capacity of tractor (work hour per hectare) based on farmer and operator's experience in the field, that is 34.44 hour per hectare in TO type, and 27.56 hour per hectare in TC type.
3. Work-hour per day of tractor is 8, and work-day per month is 20.

Based on the above components and assumption it can be estimated the average capacity of tractor in land preparation of sawah as 54.33 hectares per unit of tractor per annum[3/]. It should be remembered that 54.33 hectares in term of cropping area rather than land area.

Because of land condition, not all of sawah could be prepared by tractor. Therefore sawah which can not be prepared by tractor must be excluded from other analysis. According to Zein (1983), on the basis of data from 8 subsample villages, it can be estimated that 33.78 per cent of sawah area in West Sumatra could be prepared by tractor. Since the transplanting area is used for estimating cropping area, potential need for tractor in West Sumatra in certain year is

$$\frac{T \times 0.3378}{54.33}$$, where T = Transplanting area of rice.

Using the projection of sawah- rice transplanting area as shown in Table 12.1, potential need for tractor in 1984 is

$$\frac{312.978 \times 0.3378}{54.33} = 1.946 \text{ units.}$$

3/ All of coefficient and variables are quoted from Zein, 1983, Ibid.

Table 12.1 Projection of Transplanting Area, Potential Need for Tractor and Target in West Sumatra, 1984-1993

Year	Transplanting Area of Rice (Ha) a/	Potential Need (Unit)	Target (Unit)
1983 b/	310,310	1,929	106
1984	312,978	1,946	305
1985	315,670	1,963	378
1986	318,384	1,980	468
1987	321,122	1,997	581
1988	323,884	2,014	720
1989	326,799	2,032	892
1990	329,741	2,050	1,106
1991	332,709	2,069	1,371
1992	335,703	2,087	1,699
1993	338,724	2,106	2,106

a/ Calculated for sawah-rice from projection Harvesting Area of Rice at all, Sumatra Barat: Rancangan Rencana Pembangunan Lima Tahun Keempat, 1984/85-1988/89 (West Sumatra: Draft, Fourth Five-Year Development Plan, 1984/85-1988/89).

b/ 1983 as base year.

By the same manner, potential need for tractor per year can be found up to 1993. Of course, not all of the potential need can be fulfilled in the short period. Like the 1983 case, even though potential need for tractor is 1,929 units, the existing number of tractor is only 246 units. Let us call the number of tractors which be expected to exist in the future as target.

I believe that we have to wait for a long enough time before all of the possible sawah-lands, are cultivated by farmer using the tractor. Therefore this study assumed that all of

possible sawah-lands at the end of Fifth-Year Development Plan period are cultivated by farmer using the tractor, as shown in Table 12.1 potential need are equal to target.

By interpolating between target in 1983 (existing number of tractor) and target in 1993, using compound exponential rate of growth method, yearly target can be found as shown in Table 12.1.

Using the yearly target, yearly potential demand for tractor in the future can be estimated. The definition of potential demand here is additional tractors which are required to keep the total number of tractor in certain year equal to its target.

Assumed that all of the existing tractor in 1983 are bought during the last five year an equal number is bought every year. Hence, using the economic life of tractor as 5 years, every year in the next five year one fifth of tractor number becomes disqualified. For simplicity of calculation, Table 12.2 is presented. The first horizontal topic indicats the buying of tractor and the vertical topic indicats the using of the tractor. Let us confine ourself to 1984. According to the above assumption 20 per cent of the existing tractors in 1983 are disqualified. Hence, the remainder is 197 unit, whereas the target which should be fulfilled is 305 unit, therefore 108 units of tractor are short or 108 units of tractor have to be bought in 1984. In 1985 the remaining tractor from 1983 is 148 units and from 1984 is 108 units. Since the target in 1985 is 378 units, 122 units of tractor have to be bought in 1985, or 122 units of tractor are needed. Using the same manner, demand for tractor in another year up to 1993 can be found as presented in the last column of Table 12.2.

Haw far the potential demand will transform to actual demand, depend on many factors, especially economic ferfomance of tractor utilization. There are four factors involved

Table 12.2 Calculation of Projected Potential Demand for Tractor in West Sumatra, 1984-1993

Using Year	Buying Year											Target	Potential Demand
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993		
1983	246											246	
1984	197	108										305	10[illegible]
1985	148	108	122									378	122
1986	98	108	122	140								468	140
1987	49	108	122	140	162							581	162
1988	0	108	122	140	162	188						720	188
1989	0	0	122	140	162	188	280					892	280
1990	0	0	0	140	162	188	280	336				1,106	336
1991	0	0	0	0	162	188	280	336	405			1,371	405
1992	0	0	0	0	0	188	280	336	405	490		1,699	490
1993	0	0	0	0	0	0	280	336	405	490	595	2,106	595

in tractor utilization on sawah-land preparation i.e farmer (as renter of tractor service), tractor owner, hired farm laborer, and society at large. The benefit of tractor utilization from the farmer's side can be discribed by the difference of land preparation cost between tractor using and hoeig labor or animal using. According to some studies, as presented in Table 12.3, land preparation cost per hectare of sawah-by tractor was lowes than by hoeing labor or animal. Can it be that rupiah devaluation in 1978 is the main reason for the too big difference between Bank of Indonesia data and Zein's data.

Table 12.3 Land Preparation Cost per Hectare of Sawah-Land by Kind of Power/Equipment in West Sumatra
(Rp)

Kind of Power/ Equipment	West Sumatra		Sumani
	1978[a/]	1980[b/]	1980
Human only (Hoing)	42,250	130,720	-
Human + Animal	36,800	81,205	97,053
Human + Animal + Tractor			
Mini-tractor	-	53,664	-
Hand-tractor	-	65,661	72,307
Human + Tractor			
Mini-tractor	32,500	46,852	-
Hand-tractor	-	59,840	-

a/ Bank of Indonesia, Tractorization .... Op.cit

b/ Djaswir Zein, Penaksiran ..... Op.cit

c/ Mendrial, Pengaruh Penggunaan Traktor Pada Tanah Sawah Terhadap Beberapa Aspek Usaha Tani Padi Sawah di Kanagarian Sumani Kecamatan X Koto Singkarak Kabupaten Solok (Impact of Tractor Utilization on Some Aspects of Sawah-rice Farm in Sumani Village, Distric of X Koto Singkarak, Regency of Solok), Thesis Fakultas Pertanian Universitas Andalas, Padang, 1982.

From the above analysis and explanation we know that there is a big enough potential demand for tractor, and ecocomic performance of tractor utilization is beneficial to farmer, tractor owner and society at large. Therefore, since there is no existing tractor industry here, it is possible to invest in tractor industry in West Sumatra.

THRESHER INDUSTRY

Like tractor, utilization of thresher in West Sumatra started in late 1970's. Nowadays 550 units of thresher are operating in this region. To study the investment possibility, let us start with demand side.

For estimating the need for thresher, as in the tractor case, the Length of Hearvesting Period (LHP) is the crucial point. By definition LHP is the number of months in one year, during which employments in harvesting are available . In this period of time (a couple of months) every capable unit of power, if needed is ready to work in harvesting activities. A village is considered as on operational area of thresher. Therefore LHP should be calculated in village base, rather than distric base. Since distribution of harvesting area is the same as the distribution of transplanting area, LHP in a village can be calculated on the basis of distribution of transplanting area in one year. Using LPP of 53 villages[4/] found the average LHP in West Sumatra about 7.4 months.

Besides the LHP, for calculating the average capacity (in term hectare) of thresher per unit per year, the following aspects are taken into consideration:

1. Capacity of thresher is 0.5 ton paddy per hour per unit

4/ Djaswir Zein, Penaksiran ....., Op.cit, p.347-348, this source use symbol g for the length of land preparation period (LPP).

2. Work-hour per day of thresher is 6, and work day per month is 20.
3. Yield per hectare of rice crop is 4 ton.

Based on the above components, the average capacity (in term of hectare) of thresher can be estimated as 111 hectares per year, in terms of harvesting area. Therefore, potential need of thresher in a certain year can be calculated by $\frac{H}{111}$, where H = Harvesting area. Using the projection of harvesting area of sawah-rice as shown in Table 12.6, potential need for thresher in 1984 is $\frac{302,132}{111}$ = 2,722 unit. By the same manner, potential need for thresher per year up to 1993 can be found.

Table 12.6 Projection of Harvesting Area, Potential Need for Hresher and Target in West Sumatra 1984-1993

Year	Harvesting Area of Rice (Ha)	Potential Need (Unit)	Target (Unit)
1983[a/]	299,556	2,699	550
1984	302,132	2,722	651
1985	304,731	2,745	769
1986	307,351	2,769	910
1987	309,994	2,793	1,076
1988	312,660	2,817	1,273
1989	315,474	2,842	1,506
1990	318,314	2,868	1,781
1991	321,179	2,894	2,106
1992	324,069	2,920	2,491
1993	326,986	2,946	2,946

a/ 1983 as base year

Let us call the expected existing number of thresher in the future as target. Of course, we have to wait for a long enough time before all of harvesting areas are harvested by thresher use. This study assumed that this situation will materialize the end of Fifth Vive-Year Development Period or in 1993, as shown in Table 12.6 potential need for thresher is equal to target. By matupalating target 1983.

Like the tractor case, assumed that all of the existing threshers in 1983 are bought during the last five years and each year the equal number is bought. Using the economic life of tresh r as 5 years, every year in the next five one fifth of thresher becomes disqualified. Table 12.7 are presented for calculating the potential demand for thresher. In 1984, according to above assumption, 110 units of thresher became disqualified, hence the remaining threshers are 440 units, whereas the target at that time is 651 units; therefore 211 units more of thresher are needed. Further more by 1989, all of the existing threshers in 1983 and all of 211 units of thresher which had been bought in 1984 will have been disqualified. But as 228, 251, 276, and 307 units which have been bought in 1985, 1986, 1987 and 1988 respectively are still running well. Since the target in 1989 is 1,506 units the potential demand for thresher in that year is 444 units. Using the same manner, yearly potential demand for thresher up to 1993 can be found, as presented in the last column of Table 12.7.

Different from the tractor case, there is thresher industry in West Sumatra. According to recorded data from Manufacturing Service (Dinas Perindustrian) there is only one thresher industry in this region. But later near the ending of the present study, new information about thresher industry came to hand. According to it there are 14 units of thresher industry in West Sumatra. Because of lack of time and

Table 12.7 Calculation of Projected Potential Demand for Thresher in West Sumatra, 1984-1993

Using Year	Buying Year											Target	Potential Demand
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993		
1983	550											550	
1984	440	211										651	211
1985	330	211	228									769	228
1986	220	211	228	251								910	251
1987	110	211	228	251	276							1,076	276
1988	0	211	228	251	276	307						1,273	307
1989	0	0	228	251	276	307	444					1,506	444
1990	0	0	0	251	276	307	444	503				1,781	503
1991	0	0	0	0	276	307	444	503	576			2,106	576
1992	0	0	0	0	0	307	444	503	576	661		2,491	661
1993	0	0	0	0	0	0	444	503	576	661	762	2,946	762

further information, only one new industry can be observed. Accordingly, production capacity and output realization are estimated by using data of two observed industries. Since the remaining thresher industries are smaller than the two observed industries, this study assumed that production capacity and output realization of the remainder are equal to onethird of observed industry. Therefore, it can be estimated that production capacity of thresher industry in West Sumatra in 1983 is 827 units and output realization 369 unit. Lack of demand is the main reason for failure to reach full capacity. Usually this industry operation is subject to order from sales agency or from direct the consumer.

Table 12.8 and figure 12.1 tell us about investment possibility. Since production capasity of the existing industry is higher than the potential demand, it is not profitally to make investment in this industry in West Sumatra.

Table 12.8 Production Capacity and Projection of Potential Demand for Thresher, 1983-1993
(Unit)

Year	Production Capacity a/	Potential Demand
1983	827	
1984	827	211
1985	827	251
1987	827	276
1988	827	307
1989	827	444
1990	827	503
1991	827	576
1992	827	661
1993	827	762

a/ Without plant expansion or set up the new plant.

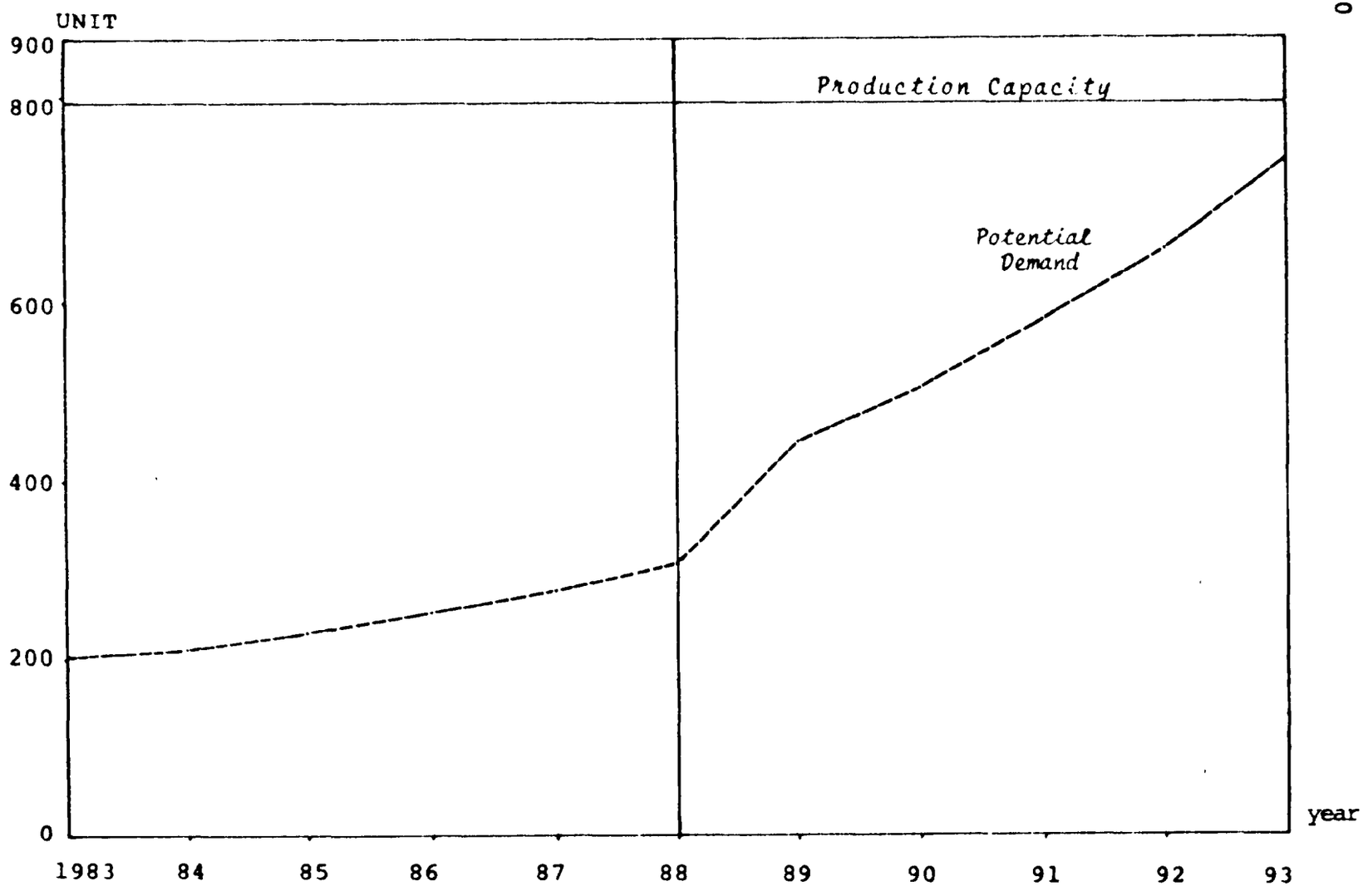

Figure 12.1 WEST SUMATRA : PRODUCTION CAPACITY AND PROJECTION OF POTENTIAL DEMAND FOR THRESHER

HOE INDUSTRY

Including in this industry is the making of spades , choppers, and sikles. Hence, term "hoe" is used for traditional agricultural tool in general. To study the investment possibility in this industry, firstly, the analysis will be directed on demand side.

There are no recorded data about the number of hoes used by the farmers in West Sumatra. Therefore this study has to estimate the existing number of that tool. Number of farmer household is used as base of estimation. Every farm household has 3 units of hoe. Demand for hoe emerges from the incease of agricultural activities and need for replacement of the disqualified tool.

Growth rate of agricultural activities is estimated through the growth rate of employment in agricultural sector. This approach is more reliable than the use of the growth rate of farm household, because it is possible that the number of farm household increases, while agricultural land areas remain the same. Therefore need for new equipment grew at a lower rate than the growth rate of farm household. Usind data from Population Census of 1971 and 1980, it can be inferred that agricultural employment grew at 0.9 per cent growth rate. Estimation result of existing number of hoes in 1983 and the projection of need for hoes in the future are shown in Table 12.9.

According to agricultural Extension Service (Dinas Pertanian) the technical life time of hoe is about 7 years. Since other toll's life time is much longes than hoe's, this study uses 10 years as technical life time in general. Using this technical life time and target as mentioned above, potential demand for hoes can be estimated, as presented in Table 12.9.

Table 12.9 Calculation of Projected Potential Demand for Hoe in West Sumatra, 1984-1990

Using Year	Buying Year								Target	Potential Demand
	1983	1984	1985	1986	1987	1988	1989	1990		
1983	1,540,284								1,540,284	
1984	1,386,255	167,883							1,554,138	16,883
1985	1,232,227	167,883	168,023						1,568,133	168,023
1986	1,078,198	167,883	168,023	168,141					1,582,245	168,141
1987	924,170	167,883	168,023	168,141	168,269				1,596,486	168,269
1988	770,142	167,883	168,023	168,141	168,269	168,398			1,610,856	168,398
1989	616,113	167,883	168,023	168,141	168,269	168,398	168,525		1,625,352	168,525
1990	462,085	167,883	168,023	168,141	168,269	168,398	168,525	168,656	1,639,980	168,656

Like a tractor and thresher, this estimation assumed that all of the estimated existing hoes in 1983 are bought during the last ten years, and each year the equal number of hoes. Using the technical life time of hoe as 10 years, every year in the next ten years one tenth of hoes will be replaced.

In 1984, according to the above assumption 154,028 units of hoes are disqualified, hence the remaining hoes are 1,386,255 units, while the target in this year is about 1,554,138 units, therefore 167,883 units of hoes are demanded. Using the same manner, yearly potential demand for hoe up to 1990 can be found, as presented in the last column of Table 12.9.

There are many hoe industries in West Sumatra all of them are clasified as small scale industry. The available recorded data about the performance of this industry is only for 1982, At that time 37 units of industry were in operation. Total production capacity was about 186,550 units of hoes, while their output realization was only 76,500 units. According to producers, lack of demand is the main reason for failure to reach full capacity. Relating to the potential demand mentioned above, this reason is difficult to understand, because the output realization is much lower than potential demand. Maybe, besides potential demand problem, this industry also faces the more serious weakness, that is poor quality and weak competitive power. Further more, from that recorded data it can be known that this industry is very small with its average product per day is only about ten units of hoe.

To know the investment possibility of this industry in the future, it is worth while to compare the projection of potential demand with the existing capacity, or capacity in the future without any investment. Since no available data to calculate or to estimate production capacity in 1983, production capacity in 1982 will be used for 1983. Such compa-

rison is shown in Table 12.10 and Figure 12.2. As indicated in this Table and Figure, since the production capacity of the existing industry is always higher than the potential demand, ever up to 1990, there will be no investment possibilities in hoe industry during that period.

Table 12.10 Production Capacity and Projection of Potential Demand for Hoe in West Sumatra, 1983-1990
(Unit)

Year	Production Capacity a/	Potential Demand
1983	186,554	
1984	186,554	167,883
1985	186,554	168,023
1986	186,554	168,141
1987	186,554	168,296
1988	186,554	168,398
1989	186,554	168,525
1990	186,554	168,656

a/ Without plant expansion or set up the new plant.

CHICKEN FEED INDUSTRY

With the increasing cultivation of high breed chicken, chicken feed industry in West Sumatra has significant development. To study the possibility of investment in feed chicken industry, firstly, the analysis will be directed on demand side.

Based on recorded data from Manufacturing Service (Dinas Perindustrian) and primary data conducted by this study we know total capacity of production and output realization of chicken feed industry, in 1982 and 1983 as shown in Table 12.11. While basing on chicken feed requirement 1.1 ons/head/

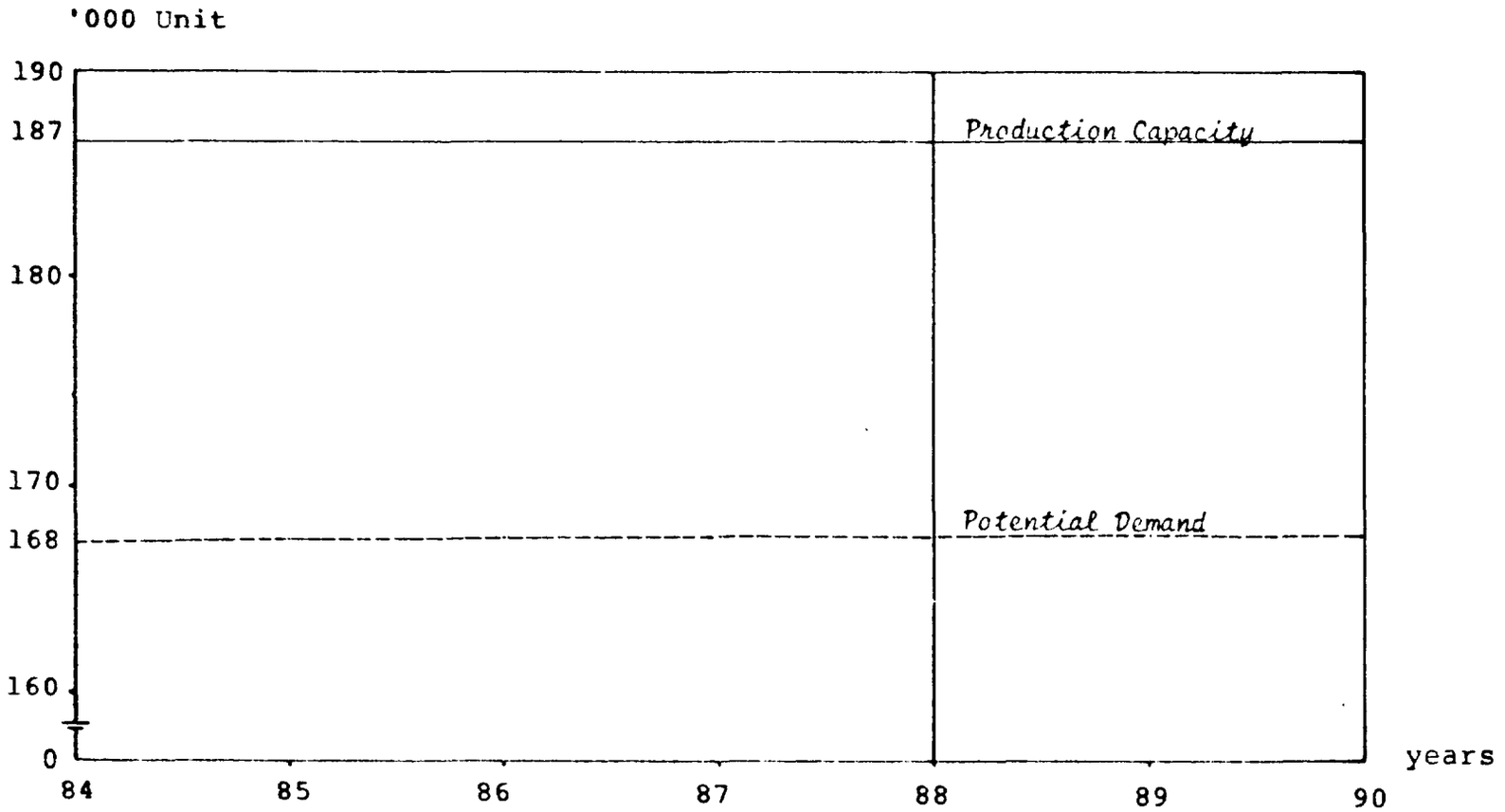

Figure 12.2. WEST SUMATRA : PROJECTION OF PRODUCTION CAPACITY AND POTENTIAL DEMAND FOR HOE, 1984-1990

day and population of high breed chicken in 1982 and 1983, total need of chicken feed each year can be calculated as presented in Table 12.11 also. As indicated by this table, output realization of chicken feed industries is much lower than production capacity, while the output realization is also much lower than feed requirement, where output realization is 41 per cent of capacity and 19 per cent of feed requirement. Looking at this phenomenon simply one may make a conclusion that there is an excess of demand for chicken feed. According to producer's report, however, the main reason for failure to reach full capacity condition is lack of demand for their product, chicken feed. Therefore I believe that the real problem is the most of high breed chicken farmers do not yet use chicken feed from chicken feed industry. In other word, those farmers use the chicken feed they made themselves. It is possible that by this way the cost per unit of feed is lower, although the quality is not as high as feed from industry.

Table 12.11 Production Capacity and Output Realization of Chicken Feed Industry, and Chicken Feed Requirement in West Sumatra, 1982-1983

Year	Number of Industry (Unit)	Production Capacity (ton)	Output Realization (ton)	Feed Requirement (ton)
1982	26	19,340	7,964	38,825
1983	28	20,828	8,577	45,851

For estimating potential demand for chicken feed, the willingness of the farmer to use the high quality of feed from feed chicken industry should be taken into consideration. Using output realization of chicken feed industry and feed requirement in 1983, it can be estimated the persentage of

chicken feed which comes from feed industry, or percentage of high breed chicken which have consumed feed from industry, is 18.70 per cent. This study assumed that such percentage will increase in the future, and at the end of Fifth Five-Year Development period, 1993, all of the farmers will use the high quality feed sours the output of chicken feed industry. By interpolating through compund interest rate of growth method, from 18.70 per cent in 1983 to 100 per cent in 1993, the percentage of the farmer that uses (or high chicken breed which consume) the output of chicken feed industry can be estimated, as shown in Table 12.12. Using this percentage and projection of feed requirement during 1984-1993, the potential demand for industrial chicken feed can be predicted, as shown in the same Table.

Table 12.12 Projection of High Breed Chicken Population, Feed Requirement, Percentage Demand and Potential for Chicken Feed Ex-Industry in West Sumatra, 1984-1993.

Year	Population High Breed Chicken (Head) a/	Feed Requirement (ton)	Percentage of Demand (%)	Potential Demand (ton)
1983	1,142,000	45,851	18.70	8,577
1984	1,348,000	54,122	22.11	11,966
1985	1,591,000	63,879	26.15	16,704
1986	1,878,000	75,402	30.92	23,314
1987	2,217,000	89,013	36.57	32,552
1988	2,617,000	105,073	43.24	45,438
1989	3,087,000	123,943	51.14	63,384
1990	3,643,000	146,266	60.47	88,447
1991	4,299,141	172,610	71.51	123,433
1992	5,073,459	203,699	84.56	172,247
1993	5,987,241	240,387	100.00	240,387

a/ Quated from West Sumatra (1984).

Maize is the main raw material of feed chicken industry, 0.4 kg of maize is medded to find 1 kg chicken feed. Projection of maize production is quoted from West Sumatra (1984) with extrapolating to 1990. To find available maize as chicken feed raw material, projection of total consumption of maize must be excluded from maize production. Projection of consumption is predicted by using consumption per capita per year around 2,184 kg[5/]. Projection of maize production, consumption and available raw material are presented in Table 12.13.

Table 12.13 Projection of Maize Production, Consumption and Available Raw Material of Chicken Feed in West Sumatra, 1984-1990
(Ton)

Year	Maize Production	Consumption	Available Raw Material
1983	12,910	7,755	5,155
1984	13,663	7,914	5,749
1985	14,478	8,082	6,396
1986	15,293	8,253	7,040
1987	16,154	8,425	7,729
1988	17,064	8,600	8,464
1989	18,020	8,776	9,244
1990	19,029	8,955	10,074

Table 12.14 and Figure 12.3 can be compared production capacity, potential demand, need for raw material and availability of raw material. With respect to investment possibility, up to 1986 there is no possibility to invest in chicken feed industry, because during that period production capacity is higher than potential demand. To strive after work under full capacity of the existing plant the increasing de-

5/ Central Bureau Statistic, Socio Economic National Survey (SUSENAS) 1976.

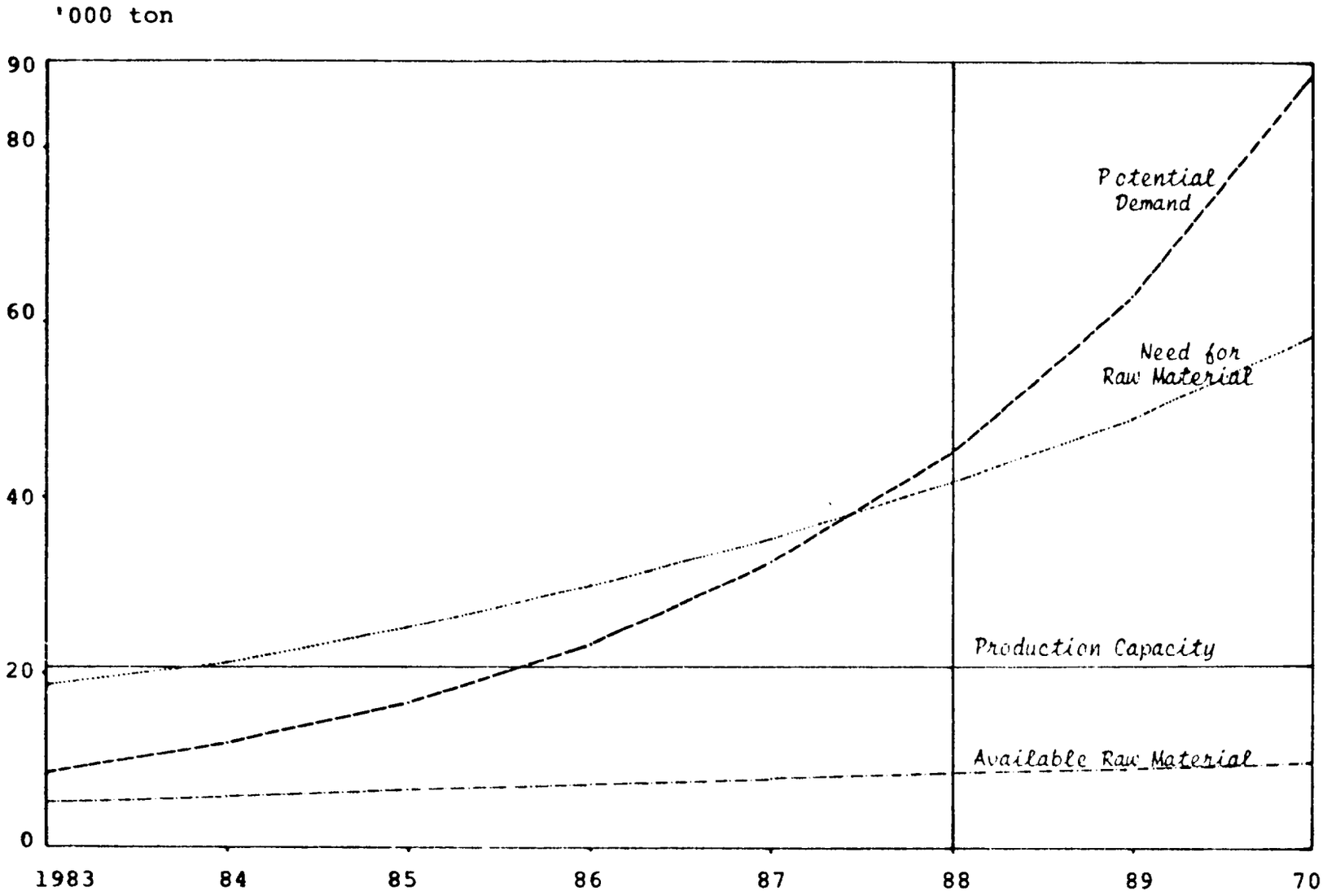

Figure 12.3. WEST SUMATRA : PROJECTION OF PRODUCTION CAPACITY AND POTENTIAL DEMAND FOR CHICKEN FEED, NEED FOR RAW MATERIAL AND AVAILABLE RAW MATERIAL

mand could be met. After 1986 the possibility to make investment profitable in this industry exists. Yet, it should be remembered that there is lack of maize as raw material . Such short of maize will become higher in the future. Therefore the possibility to invest as mentioned above is on condition that maize in this region can be added by importing it (inflow) from neighbouring provinces. The other implication is that special program to increase maize production in this region should be carried out.

From the primary data, it can be estimated the rough investment requirement for setting up a new plant. For 1,000 ton production capacity per year around US $ 15,000 is needed, consisting of $ 5,000 for machines and equipment, $ 8,000 for 650 m^2 land, and $ 2,000 for the building.

Table 12.14 Projection of Production Capacity and Potential Demand for Chicken Feed Ex-Industry, Need for Raw Material and Available Raw Material in West Sumatra, 1984-1990.

Year	Production Capacity (ton) a/	Potential Demand (ton)	Need for Raw Material (ton) b/	Available Raw Material (ton)
1983	20,828	8,574	18,340	5,155
1984	20,828	11,966	21,648	5,749
1985	20,828	16,704	25,551	6,396
1986	20,828	23,314	30,160	7,040
1987	20,828	32,552	35,605	7,729
1988	20,828	45,434	42,029	8,464
1989	20,828	63,384	49,577	9,244
1990	20,828	88,447	58,506	10,074

a/ Without plant expansion or set up the new plant.

b/ For total chicken feed requirement, either ex-industry or not.

FERTILIZER PACKAGING UNIT INDUSTRY

There is only one fertilizer packaging industry in West Sumatra, that is a unit of PT. Pupuk Sriwijaya. From Palembang as central office and manufacture, the fertilizer is conveyed to West Sumatra and Riau via Teluk Bayur harbour by pouring-ship. Therefore before transporting it to the market or the farmer, that fertilizer must be packaged in this industry. All the three kinds of fertilizer, Urea, TSP and KCL are handled by this industry. According to the industry which is responsible for fertilizer supply in this region, there is no inflow of packaged fertilizer (fertilizer in package) in West Sumatra.

Since almost all of fertilizer is used in sawah-rice cultivation, the available recorded data about fertilizer use is only for rice crop. Trend of rice intensification area and fertilizer utilization are shown in Table 12.15. From this table it can be known that growth rate of intesification area during 1969-1983 period is 8.3 per cent per year, while rate of growth of fertilizer utilization is slightly higher, that is 8.9 per cent. Hence, besides the increase of intensification area there is also an increase fertilizer use per hectare.

Table 12.15 Intensification Area and Fertilizer Utilization for Rice Crop in West Sumatra 1969-1983

Year	Intensification Area (Ha)	Fertilizer Utilization (ton)
1969	100,504	18,070
1970	101,162	13,262
1971	99,607	14,663
1972	150,977	16,125
1973	169,288	25,770
1974	113,964	21,021
1975	116,335	21,050
1976	165,964	21,840
1977	176,220	20,734
1978	187,511	21,003
1979	229,437	33,369
1980	249,671	41,922
1981	254,721	49,332
1982	275,914	53,708
1983	298,870	58,472

The performance of fertilizer packaging industry and fertilizer utilization in 1981-1983 as presented in Table 12.16 give us striking information about production and utilization of fertilizer. As indicated by this table, output realization of packaging industry is much lower than produc-

tion capacity. According to the producer, only one reason for this phenomenon, that is lack of demand. In other word, the producer keeps his output realization in conformity with demand for fertilizer from the farmer in this region. Since the packaging industry also serves Riau Province besides West Sumatra, it is difficult to understand why the farmer in West Sumatra can use much more fertilizer than the total output of packaging industry as the sole supplier. Because the data from packaging industry are more manageble and more reliable, the outhor guesses that there is an over estimate of fertilizer utilization in West Sumatra. Such a situation should be taken into consideration in analysing investment possibility in fertilizer packaging industry.

Table 12.16 Production Capasity and Output Realization of Fertilizer Packaging Industry, and Fertilizer Utilization in West Sumatra 1981-1983
(Ton)

Year	Production Capacity	Output Realization	Fertilizer Utilization
1981	150,000	54,382	49,332
1982	150,000	39,693	53,708
1983	150,000	42,485	58,472

Projection of fertilizer utilization as potential demand and production capacity of fertilizer packaging industry in West Sumatra as presented in Table 12.17, gives us information about investment possibility in this industry. As indicated by this table, up to 1990 potential demand for fertilizer is lower than production capacity. Further when supposition of over estimate case as mentioned above is taken into consideration, the gap (excess supply) of capacity becomes higher. Finally, as additional information, according to the

producer this packaging industry can be operated in two shifts if needed. Therefore, there is no possibility to invest in fertilizer packaging industry in West Sumatra, at least up to 1990.

Table 12.17 Projection of Potential Demand for Fertilizer and Production Capacity of Fertilizer Packaging Industry in West Sumatra, 1984-1990
(ton)

Year	Production Capacity a/	Potential Demand
1984	150,000	63,658
1985	150,000	69,305
1986	150,000	75,452
1987	150,000	82,145
1988	150,000	89,431
1989	150,000	97,390
1990	150,000	106,058

a/ Without plant expansion or set up the new plant.

b/ Source: West Sumatra (1984) Extrapolating up to 1990.

CONCLUSION

Based on the potential demand, production capacity and available raw material, the investment possibility in the future is only in tractor industry and chicken feed industry. For tractor industry we can start now. But for chicken feed industry the possibility will come out after 1986 and it should be remembered that the possibility is subject to the availability of enough raw material by importing (inflow) from neighbouring provinces. Further, relating to chicken feed industry there is a good chance for a special program in development of maize plantation in West Sumatra.

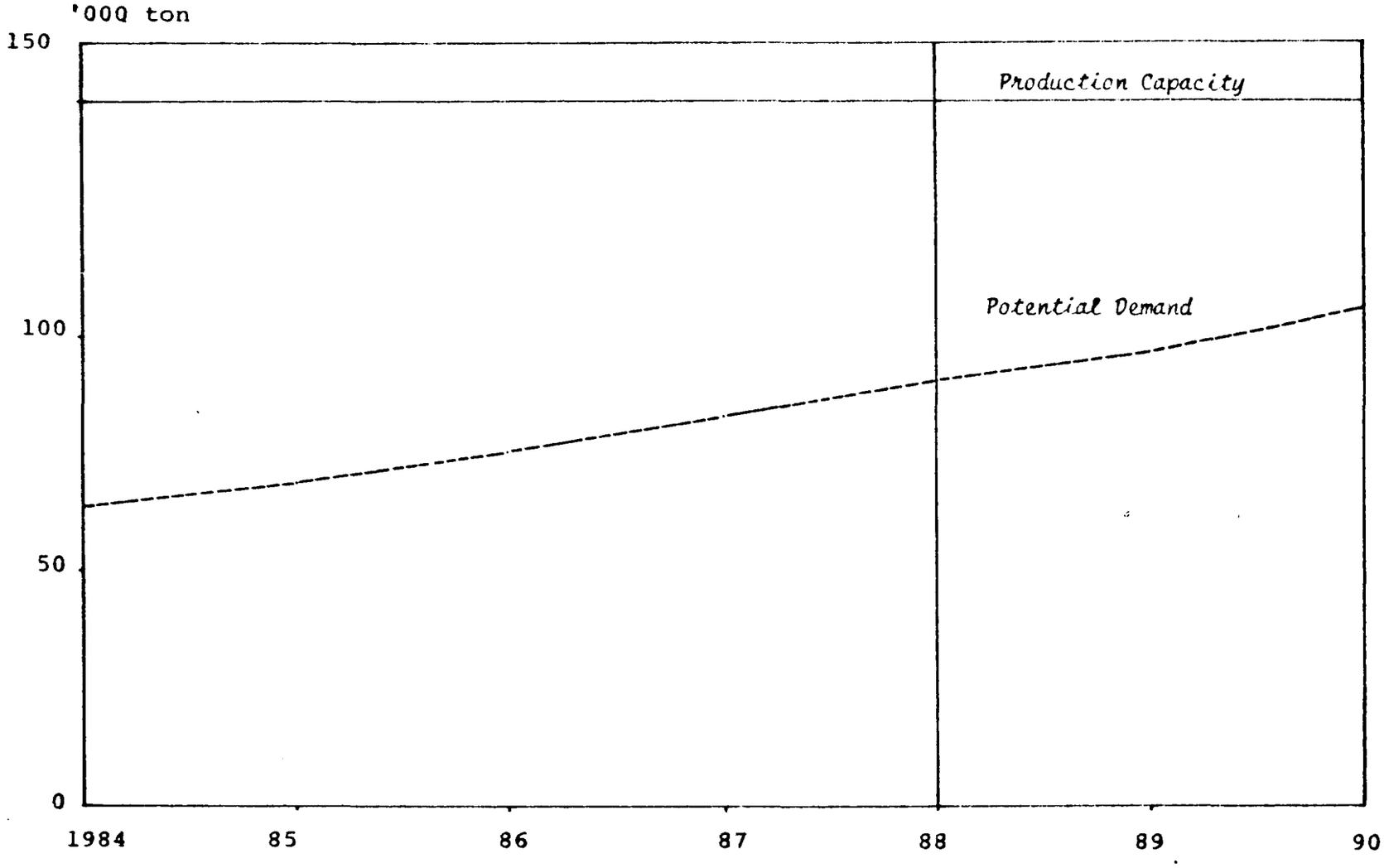

Figure 12.4. WEST SUMATEA : PROJECTION OF POTENTIAL DEMAND AND PRODUCTION CAPACITY OF FERTILIZER PACKAGING INDUSTRY

For the other industries, thresher, hoe or fertilizer packaging industry, their potential demand can be fullfilled by the existing industry, rather than by setting up a new plant of production.

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Chapter 13

AGRO-INDUSTRIAL SUPPORT FACILITIES

IN ORDER to support the agro-industrial development (agriculture, animal husbandry, fishery, etc) the existing facilities in West Sumatra that have any relation with the development of agriculture are the agricultural research, institute agricultural school, the slaughter house and fishmarketing facility. The results achieved by all of them to support the activity of agro-industry are not satisfactory enough and are of great variation in accordance with each respective institute.

AGRICULTURAL RESEARCH INSTITUTE

There are four agricultural research institutes in West Sumatra which could support the agro-industrial development, i.e., the Animal Disease Research Institute located in Bukittinggi, the Food Crops Research Institute at Sukarami, the Agro-Industrial Research Institute at Solok and Soil Science Research Institute at Bukittinggi.

The Animal Disease Research Institute studies the animal diseases which are supposed to influence the animal population and production. In addition this research institute also make a list of the animal problems in West Sumatra. It is expected that by the existence of this institute the sector of animal husbandry can be protected from any animal disease.

The Animal Disease Research Institute

The main objective of this institute is to create a condition in which the animal diseases can be well controlled and to increase the production of animal husbandry.

Investigations have been undertaken to evaluate the causes of the death of imported cattle to West Sumatra as well as various animal diseases widely found in this area.

From the result of animal disease investigation, the condition of laboratory equipment and the research workers, we can know the prevention and elimination of animal diseases.

There are 43 research workers and workers at this institute, consisting of 4 veterinary surgeons, one bachelor of veterinary science, 23 Senior High School graduates, 4 Yunior Secondary School graduates and 11 of Elementry School. The need for research workers for the next five years is seriously increasing as the working region of this institute consists of West Sumatra, Riau and Jambi provinces.

The activity of this institute has been increasingly and widely known by people due to its services such as: (1) to diagnose and cure the sick animals; (2) to give counsel and information through mass-media; (3) to observe and supervise the animal disease; (4) to map out the animal disease in three provinces; and (5) to give special training and skill to field workers.

The results of animal disease investigation that have been applied to develop the agriculture, are: (1) The evaluation of the cause of death of cows imported from Australia; (2) The investigation of various cases of animal diseases at Region II (The Provinces of West Sumatra, Riau and Jambi). The location of the Animal Disease Institute is at Kotamadya Bukittinggi and it has a branch at Baso, Kecamatan IV Angkat Candung, Kabupaten Agam. The existing infrastructures are an office building of 300 meters square, laboratory building of 340 meters square and 5 hectare of experimental land. The surrounding facilities consist of sheds for isolating animals, training rooms, workshops/garages and boarding houses. Then there are also equipment for investigation , hatching machines,

microscopes, sterilzers, compressing microscopes, some animals and other laboratory equipment and other devices.

All infrastructures and facilities are still less than what are needed, especially in the future when the service for the community should be multiplied.

Agricultural Research Institute

Balai Penelitian Tanaman Pangan (Balittan=Food Crop Research Centre) at Sukarami, Kabupaten Solok, has been in operation administratively since Oktober, 1983.From 1974 up to 1983 the administrative and technical management centred at Bandar Buat, Kotamadya Padang, with the name of Lembaga Penelitian Pengembangan Pertanian (LP3 = The Institute for Agricultural Research and Development). Structurally Balittan is under the Directorat Jendral Penelitian dan Pengembangan Departemen Pertanian (The Directorate General of Research and Development, the Departement of Agriculture) and coordinates the research of food crop in Sumatra Barat.

The aim of this institute is to investigate the adaptation of the variety of terrestial of farming rice and Gogo rice. It also carries out the experiment of new varities by considering the local ecosystem.

The objects of investigation of Balittan at present are food agronomy (planting techniques), plant breeding, food crop physiology, food crop pest/deseases, socio-economy, and applied technology in each field. The plant investigation, especially food crop, such as rice plants, soya-beans, ground-nuts, maize-corns, etc is also carried out.

In order to support the activity of investigation, the institute cooperates with regional government office, national one and foreign institute. At the regional level the cooperation is done with local Government and The Faculty of Agriculture, Andalas University, to excecute the investigation for the regional interest. At the national level, in-

vestigation is done for Sumatra. Cooperation has also been carried out with foreign institutes such as IRRI, IGRISAD, IFOC, AVROC and USAIDS/AID.

The category of the existing researchers and workers at this institute is not complete yet due to the shortage of senior and medium researchers.

Agro-Industrial Research Institute

Agro-industrial Research Institute is a sub unit of Agro-industrial Research Institute of Lampung, built in 1976 at Solok. The main aim of the establishment of this institute is to investigate plants & plant pest/diseases, especially those relating to agro-industry.

In the execution of investigation, this institute also cooperation with a foreign research institute from the United Kingdom, The aspect investigated concerns the disease, pest and technology of agro-industry.

The number of research workers at this institute, especially the senior and medium staff is still small. In developing the agro-industry to produce export commodity, the results of the research will be of great importance.

The results of the research have been used to support the agricultural development, especially cloves-trees. The aspects investigated concern the cause of clove tree-death, the breeding of improved clove plants, and the agricultural technology of clove. This research is still going on at present.

The infra-structure and facility at this institute covers an office building of 200 meters square, a laboratory building of 120 meters square, a green house of 90 meters square and an agricultural land of 75 hectares for planting experiments required is not sufficient, especially the laboratory equipments.

The Soil Science Research Institute studies soil having relation with the development of agricultural sector, such as that relating to the food plantation, animal husbanddry and others. As this Soil Science Research Institute is at the level of branch or station, the number of research workers is relatively small, namely 13 persons, consisting of one having a Master's degree, and the rest are Senior High School graduates.

THE EDUCATIONAL INSTITUTE

The Educational Institutes supporting the agro-industry in West Sumatra are Agricultural High School, Animal Science High School, Agricultural Industrial Technology High School the Faculty of Agriculture, the Faculty of Animal Science, and the Faculty of Fishery and the Institute of Agricultural Training.

Table 13.1 shows that the number of Agricultural High School in West Sumatra is five with 34 teachers and 511 students. Since 1978 up to 1982 they have graduated 794 students. The greater number of them work as Extension Workers in the villages all over West Sumatra.

There is only one Animal Science High School with 38 instructors and 250 students. Since the establishment of this school, it has graduated 64 students. In general they work as Animal Husbandry Extension Workers in the villages.

There is only one Agricultural Industrial Technology High School having 70 teachers and 642 students. Since 1978 up to 1982 it has gradvated 688 students.

The Faculty of Agriculture of Andalas University has 767 students and 91 lectures. Since 1978 up to 1982 there have been 389 alumnae, the greater number of whom have worked as officers at the Agricultural Service in and out of West Sumatra. In addition some of them work as research workers at various research institutes or lecturers at various faculties or colleges.

The Faculty of Animal Science of Andalas University has 566 students and 135 lectures. The number of alumnae has been 136 since 1978 up to 1982. Most of the alumnae of this faculty work at Offices of Animal Service in and out of West Sumatra.

The Faculty of Fishery which is two year old is still a private one. Since this faculty is quite new, no remarks will be made about it.

Table 13.1 Number of Lectures/Teachers, Students/Pupils, Alumni/Graduate and Drop Out of Faculty/Senior High School of Agricultural

Faculty/Senior High School	Number of				
	Institution	Lectures /Teacher	Student /Pupil	Alumni/ Graduate 1978-'82	Drop Out
Agriculture High School	5	34	511	794	n.a
Animal Science High School	1	38	250	64	n.a
Industrial Technical High School of Agriculture	1	70	642	688	n.a
Faculty of Agriculture	1	91	767	389	n.a
Faculty of Animal Science	1	135	556	136	n.a
Faculty of Fishery	1	n.a	n.a	n.a	n.a
Institute of Agriculture Training	1	12	285	1,429	n.a

The Agricultural Training Centre has 12 instructors and 285 trainess. The number of alumnae have been 1,429 since 1978

up to 1982. In general the trainess originated from the offices/services under the Departement of Agriculture such the Agricultural Services, Animal Husbandry Service, Plantation Service and Fishery Service and other, The aim of the training is to increase their skill in agriculture. It is expected that after finishing their training, they return to their services in which they can apply and disseminate their skill and knowledge.

A school that plays an imprtant role to support the fishery-based industry is called Sekolah Usaha Perikanan Menengah (Fishery High School). But this school has not existed yet in West Sumatra. It is expected that this school would be established, counsidering that the fishery potentials of West Sumatra is substantial. This school is also expected to bill the need for semi-skilled experts in fishery.

If we observe the development of the number of the alumnae of Faculty of Agriculture, it is estimated that since 1983 up to 1990 there will be 640 alumnae of the Faculty of Agriculture, 564 alumnae of the Faculty of Animal Science, 1,434 alumnae of the Agricultural High School and 5,135 alumnae of Industrial Agricultural Technology High School. The projection of the number of alumnae of the Faculty of Fishery and Animal Science High School cannot be provided yet.

SLAUGHTER-HOUSE

The condition of slaughter-house in West Sumatra at the time of the carrying out of this investigation is not satisfactory. The buildings are too old with unsuitable rooms (the slaughter room, the examining room and storage). The equipment is very simple. The ground for keeping animals before being slaughtered is too narrow. This is the general condition of most slaughter-houses in West Sumatra.

Although the condition of the slaughter-house is not fa-

vourable, the number of livestocks slaughtered has increased markedly. This can be seen in the development of the amount of meat produced since 1978 up to 1983. In 1978 the amounth of meat produced was 13,032.75 tons, in 1979 amounting to 13,849.55 tons, 15,427.64 tons in 1980, 16,329.82 tons in 1981, 17,116.36 tons in 1982 and 18,335.11 tons in 1983. The number of slaughtered livestocks is predicted to increase up to 1990. Therefore the construction of new slaughter-houses with new equipment is necessary.

There are six slaughter-house in West Sumatra, each at Bukittinggi, Padang, Padang Panjang, Solok, Payakumbuh and Sawahlunto respectevely. Their activities very one from the other. The slaughter-houses at Padang and Bukittinggi have more activities than the others. The number of slaughtered livestocks at the slaughter-house of Padang is detailed in the following Table 13.2.

Table 13.2 Number of Livestocks Slaughtered in Padang Slaughter-House, 1980-1982

Year	Cows	Buffalo	Horse	Goat	Pig
1980	4,266	4,294	298	44	2,495
1981	4,047	4,390	283	568	2,623
1982	115,990	177,588	6,053	1,885	35,537

Source: Kantor Statistik Kotamadya Padang, Padang Dalam Angka 1982 (

It can be seen from the above Table 13.2 that the activity of slaughter-house in Padang has increased greatly up to 1982. The big numbers of livestocks slaughtered are buffaloes and cows.

FISH MARKETING FACILITIES

Fish Landing Port (Pangkalan Pendaratan Ikan = PPI)

The role of PPI is not only the anchoring place for fishing boats but also for fish transaction and an information centre for fishermen,

As the fish port, the number of fishing boats mooring varies at each PPI area, excluding Painan at which there is no more activity. If all PPI's are viewed to tally, it appears that the amount of fish sold has decreased since 1981. The decreasing of the amount of fish sold at PPI shows that the activity of PPI also decreased except at PPI of Bungus, at which it was the production that was decreasing. There might be several factors causing the decrease. One of them was the non-cash payment. It did not matter for the fishermen possessing great capital at Bungus, because they could use their own capital for financing the fishing. But it would be a difficult problem for the fishmen possessing only relatively small capital. They had to stop fishing due to the lack of capital or they had to borrow money from others.

As the information centre for fishermen no activity has been done at PPI especially at PPI of Tiku and Painan. It was only at PPI of Bungus the information guidance concerning fish-catching, credit application of regional government regulations, and marketing given by Fishery Service. The number of fishermen who have obtained this information/guidance was between 25 and 50. This information giving activity has only been carried out only once, although the facilities for doing more are available.

The Role of cooperative In Supporting PPI Activities

Mina KUD can be viewed from several points, namely the PPI as a working unit and fisherman as member of a cooperative body. Long before the estabilishment of Mina KUD, the-

greater number of fishermen have been united in Koperasi Perikanan Laut (KPL = Sea Fishery Cooperative Body). This Cooperative body has attempted to raise the living standard of fishermen as much as possible.

The estabilishment of Mina KUD was the modification of Koperasi Perikanan Laut. In 1974 Koperasi Perikanan Laut was founded at Tiku and Painan and then changed into Mina KUD. In 1976 Mina KUD was estabilished in Padang and in 1978 in Pariaman. The number of Mina KUD members differ very much from one place to an other. Based on the latest data when this investigation was carried out, the number of Mina KUD of Tiku was 165, that of Pariaman was 90, that of Padang was 2,134, and that of Painan was 190. Remembering the population of fishermen existing in West Sumatra, it seems that only 13.9 per cent of them became the members of Mina KUD.

The structure of the leadership of Mina KUD consists of a chairman, a secretary, a treasurer, a manager, officers and managers of PPI. The steps that will be carried out are decided by the meeting of members. This meeting outhorizes the chairman, the secretary, and the treasurer to manage the organization.

THE POSSIBILITY OF INVESTMENT

From the data collected during the investigation, the possibility of investment preferred in order to support the agricultural industry in West Sumatra is as follows.

The construction of a new slaughter house to replace the old one and its equipment which is in accordance with the community development. A new slaughter house at Padang has been planned to be built at Lubuk Buaya. Slaughter houses at other towns should also be renewed.

The increase of equipment facility of research centre and the increase of the member and quality of researchers

through training and higher education should be done so that they are more able to detect, prevent, and protect the plant and animal pest in West Sumatra.

The capital to support PPI is the stipulation that the sale system should be in cash. In order to overcome the shortage of skilled workers in the sector of fishery, it seems that a Fishery High Scool should be establised in West Sumatra, the fish potential here being favourable.

CONCLUSION

In West Sumatra, there are four facilities to support the sector of agro-industry. The four supporting facilities are the Institute of Agricultural Research, the Agricultural School, the slaughter house and the fish marketing facility.

The Institute for Research consists of Animal Disease Research Institute, The Industries Plant Research Institute, and the Soil Science Research Institute. The activities of the four research institute have run well, but the research activity in the field of agro-industry is still relatively low. The lack of researchers is one of the factors that hinder this activity. But the Food Plant Research Institute has more activities than the other institutes do, as it has more researchers.

The educational institute that support the agro-inustries consists of Agricultural High School, Animal Science High School, Agricultural Technology High School, the Faculty of Agriculture, the Faculty of Animal Science, and the Institute of Agricultural Training; these schools have produced a great number of graduates.

The great number of alumnae of these High Schools and Faculties work in the sector of agriculture such as at the officies of agriculture, animal husbandry, and fishery. The future great number of alumnae are expected to be able to support the development of agro-industry in West Sumatra.

The slaughter houses have shown a lot of activities. But their facilities such as buildings, cattle yards and necessary equipment should have been renewed.

The Facility of fish marketing such as PPI has been built and its activities have run well. But the payment by instalment or not in cash is an obstacle for fish marketing process.

The possibilities of investment that can be developed in the sector of agro-industry and the supporting facilities are the increase of infrastructure and facility of slaughter houses, the increase of the number and quality of researchers, the establishment of fishery school and the effort to speed up fish marketing.

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Chapter 14

GROWTH OF MANUFACTURING INDUSTRY: PAST AND FUTURE OUT-LOOK

WEST SUMATRA'S growth of manufacturing industry is influenced largely by characteristics of the region's resource endowments. The availability of particular raw materials, has been and will remain, as major factor determining the performance of the existing industries. Moreover, geographical conditions and specific social talents are also play important role ini the region's manufacturing growth. Accordingly, apropriate analysis on the region's manufacturing achievement has to be linked closely with those regional specifications as well as availability of demand.

This chapter is intended to examine broadly the past and future out-look of West Sumatra's growth of manufacturing industries. The main variables considered are value-added, employment, source of growth and productivity level. To make the analysis comparable, however, industries are groped in accordance with the International Standard of Industrial Classification (ISIC). For an investor, such an analysis may be used as basic information for making a general identification on the area in which the investment possibility should be futher elaborated

TREND OF GROWTH

Analysis on the trend of industrial growth is necessary for an assessment of regional investment profile since it could suggest in what industry investment possibility is likely to be found. If an industry has higher growth rate, this indicates that it has particular advantage either with respect to availability of raw material or the existence of large excess demand. Oppositely, if an industry has a very slow growth, then it suggest that saveral problems are facing the industry which hamper its growth. Therefore, candidates for new investment should be an industries that have higher growth rate in the past as well in the future. Otherwise, return to investment may not suffi-

cient enough to cover the capital costs. Such an argument, of course, is not true for a new innovation which is beyond the scope of this chapter.

Using value-added as the indicator, over-all growth of manufacturing activity in West Sumatra during the period of 1974-1979 reached **8.9** percent annually. Such a growth rate is considerably high, however, its impact to the whole regional economy is not as significant as the one come from agricultural sector. This is because of the share of manufacturing activity in the regional economy is still low as compared to agricultural activity[1/].

As indicated by Table 14.1,growth rates within the manufacturing sector vary widely. Industries which have high growth rates are those belong to food and beverage, chemical, non-metal mineral and metal products. But those include in the paper, printing and publishing industries experienced a very low growth rate.

High growth rate of food, baverage and tobacco industry is basically sopported by the availability of raw material produced in the region. West Sumatra is well known as one of major source of food crop production in Indonesia. As a result, sufficient amount of raw materials can be obtained in the regions which lower prices as compared to those imported from outside. Such a situation enables the food industries to perform the production activities with lower unit cost of production. This is considered as the most important factor with support its growth performance. Major products included in this industry are rice mills, cooking oils, ice cube, biscuit, noodle, etc.

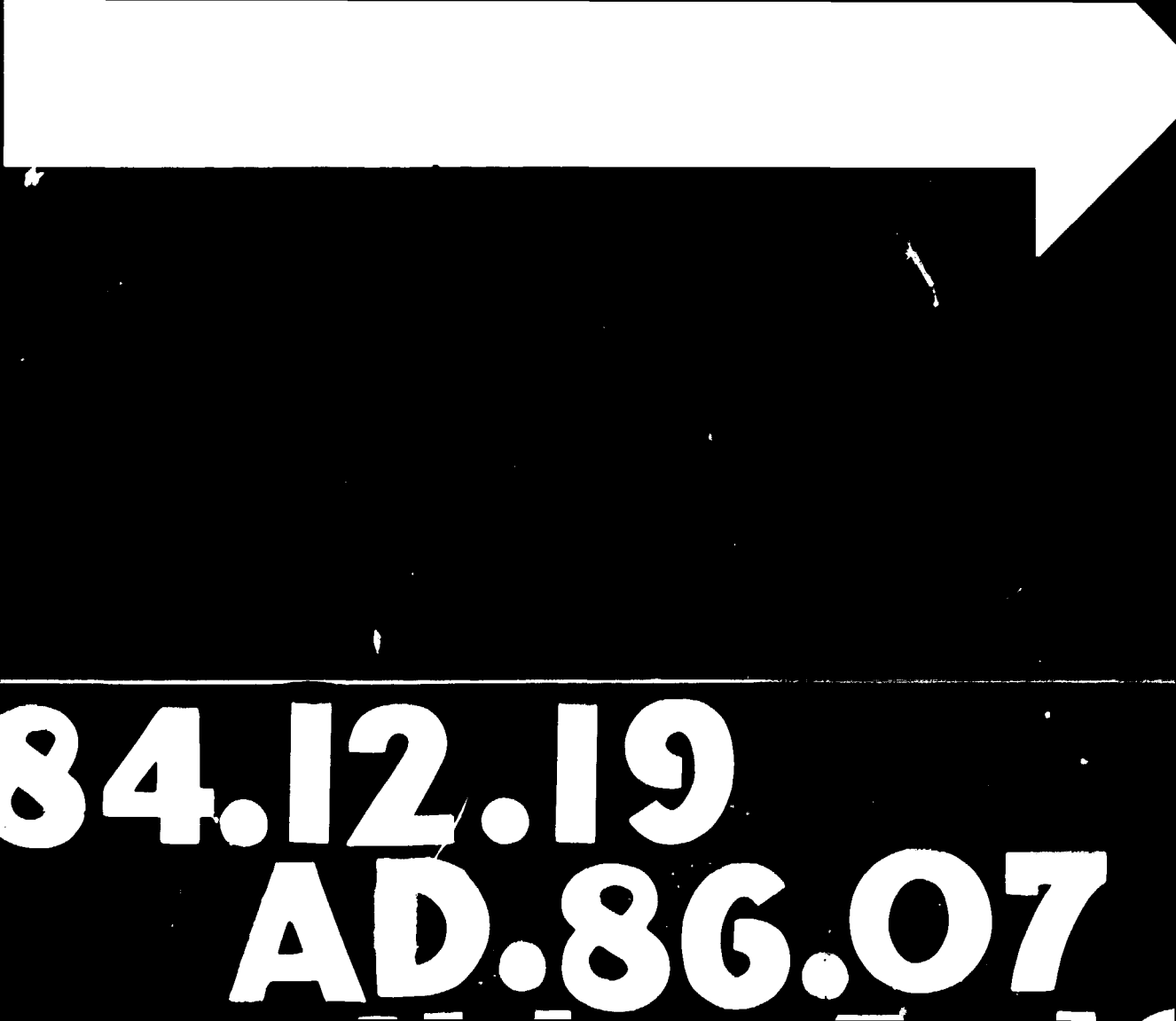
Similar to the food industry, high growth rate of chemical industry to some extend is also supported by the availability of raw materials produced in the region. Major product included is soap which use coconuts milk as basic raw material. However, availability of demand play also an important role ini the growth of this industry since the product is also marketed to outside of the region.

[1/] See Chapter 3.

Table 14.1 West Sumatra: Historical Data and Projected Figures of Value-Added at 1975 Constant Price by Type of Industry 1974-1990
(Rp Million)

ISIC Code	Industrial Classification	Historical Data				Projected Figures			
		1974	1979	Growth Rate (%)	Income Elasti-city	1984	1988	1990	Growth Rate (%)
31	Food, Drinks and Tobacco	8,990	14,483	10.0	1.2	24,736	36,084	43,595	9.9
32	Textile and Leather	340	436	5.1	0.7	575	718	802	5.7
33	Wood-based Industries	160	209	5.5	0.8	286	368	418	6.5
34	Paper, Printing and Publishing	37	45	4.0	0.6	57	69	76	4.9
35	Chemical Industries	601	1,102	12.9	1.8	2,178	3,757	4,934	14.6
36	Non-Metal Mineral Industries	5,290	7,075	6.0	0.8	9,693	12,470	14,144	6.5
38	Metal Products and Machinery	1,319	2,285	11.6	1.6	4,210	6,864	8,765	13.0
	T o t a l	16,737	25,634	8.9	1.2	41,735	60,330	72,734	9.7

Source: Data for 1974 and 1979 are taken from Central Bureau of Statistics, 1979 Industrial Statistics, Jakarta 1982, and Lembaga Penelitian Ekonomi Regional, Perhitungan Pendapatan Regional Sumatera Barat 1975-1980 (Regional Income Account of West Sumatra), Padang 1983.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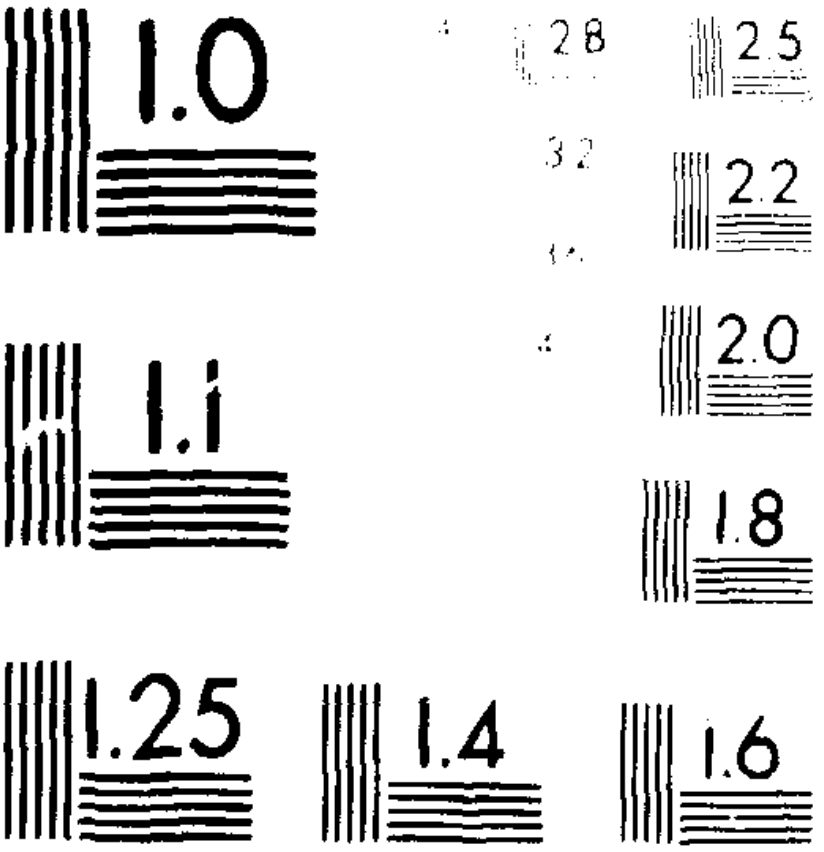

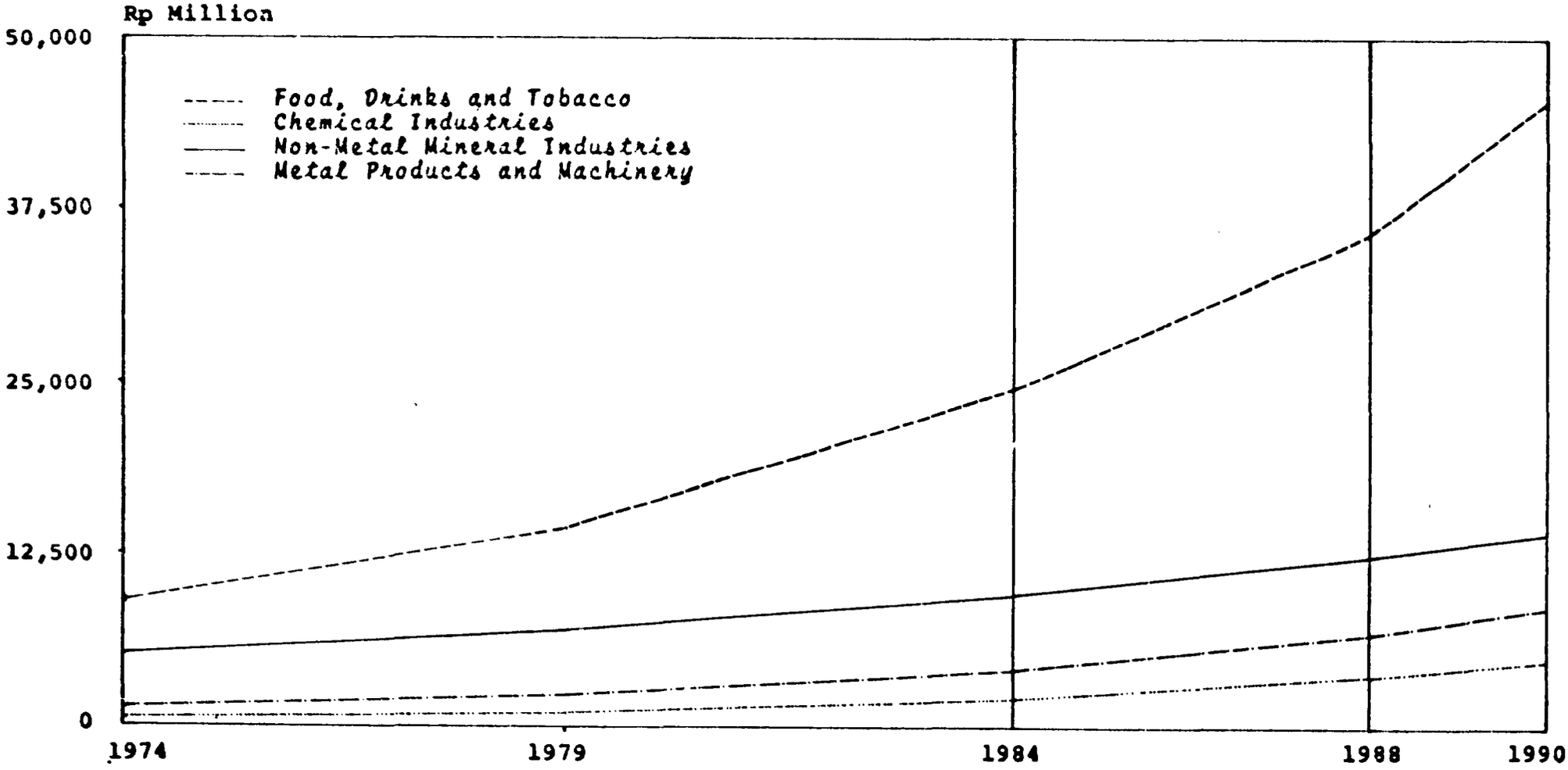

Figure 14.1 WEST SUMATRA : HISTORICAL DATA AND PROJECTED FIGURES OF VALUE-ADDED AT 1975 CONSTANT PRICE BY TYPE OF INDUSTRY, 1974-1990

Within the non-metal mineral industry, cement is considered as major product. High growth rate of this industry is largely supported by the availability of clay and lime stone in sufficient amount near the factory location (Indarung). Moreover, coal which is main source of fuel for the cement factory is also available in Sawahlunto (Ombilin Mining) which is not far away from Indarung. Such a locational advantage enables Padang Cement Corporation to perform production with lower unit costs resulted from larger saving in transportation costs for material inputs.

On the other hand, such a low unit cost of production has enabled Padang cement to dominate market out side of West Sumatra. In 1982, about 70.0 percent of the total production are sold outside of the region particularly in North Sumatra and Riau. Recently, the Padang cement market has been extended not only within Sumatra island but also cover Kalimantan and South Sulawesi.

Major factor determining the growth of metal product in the region, in fact, is quite different from those characterized the food, chemical and non-metal mineral industries. Thus far, West Sumatra does not have any source of metal inputs or iron mine. Almost all of metal inputs required by the metal product industries are obtained through import, particularly from Java. Up to the present time, availability of metal inputs has become major problem facing the West Sumatra metal product astivities.

Instead of availability of raw materials, growth of metal-working industries in the region is mainly supported by the availability of large excess demand, particularly for metal-repair activities. For the Black-Smithery activity, however, the existence of specific talent from people who live in Sungai puar has been major factor determining its growth. Important metal products produced in West Sumatra are metal-roof, metal-construction, kitchen tools, empty can, car repair, ship repair, etc. (See Table 14.2)

Projection of industrial growth over the period of 1984-1990 is carried out by considering the past growth elasticities as well as

Table 14.2 West Sumatra : Recorded and Projected Production of Selected Major Industrial Product 1979-1990

Commodity	Unit of Measurement	Recorded Data				Projection		
		1979	1980	1981	1982	1984	1988	1990
Cement	'000 ton	362	750	924	979	1,530	2,730	4,770
Crumb-Rubber	'000 ton	38	44	44	44	48	60	67
Extract Oil	ton	81	82	96	57	150	277	346
Plywood	'000 m^3	-	-	17	36	58	98	129
Saw Mill	'000 m^3	28	41	54	161	200	250	279
Zinc	'000 ton	7	8	10	10	9	15	17
Tile	'000 piece	4,654	8,400	13,857	18,840	26,002	106,852	186,179
Ice Cube	'000 ton	19	20	21	22	25	32	35
Cooking Oil	ton	1,450	1,808	1,909	2,062	2,130	2,898	3,287
Biscuit	ton	7,943	9,098	10,420	11,879	15,641	26,884	33,543
Textile	'000 Yard	779	650	578	578	578	703	775
Soap	'000 ton	3	3	3	4	30	30	32
Detergent	' ton	49	50	49	50	48	50	51
Can	'000 piece	250	365	451	569	846	2,024	2,958

Source: Pemerintah Daeran Sumatera Barat, Rencana Pembangunan Lima Tahun Keempat 1984/85-1988/89 (Provincial Government of West Sumatra, the Fourth Five Year Development Plan 1984/85-1988/89), Volume II A, Padang 1984.

targeted over-all manufacturing growth as formulated in the Fouth Five Year Development Plan of West Sumatra[2/]. Growth elasticity is considered since it can capture an industry's comperative advantage relative to other industries in the region which partly determine its future growth. Targeted industrial growth in the Regional Plan, on the other hand, must also be considered since the government regional development policies will inevitably influence also the future growth of regional manufacturing activities.

Using this approach, the projected growth of each manufacturing activity can be calculated, and the result has been presented in Table 14.1. It is shown in the Table that pattern of future industrial growth of West Sumatra, in fact, does change so much. Industries that are expected to grow rapidly are still food and beverage, chemical, non-metal mineral and metal working industries. Earlier analysis has indicated that these industries have particular growth factor (as indicated by high growth elasticities), which can support their future growth.

Over-all growth rates of manufacturing industries over the period of 1984-1990 is expected to be rather high (9.7 percent) as compared to the period of 1974-1979 (8.9 percent). Although the Regional Development Plan predicted that growth of the regional economy over the period of 1984-1990 will be only 6 percent annually, however, such a high growth of manufacturing activity can be expected by considering the existing natural resource endowment, particularly with respect to agricultural and mining productions. At the same time increase in demand from abroad due to the recovary of the world economy could also support such a high growth.

Growth rate of food industry is expected to be 9.9 percent annually which is still high. Availability of sufficient raw material combined with increase of local demand are considered as the main factors that could support such a high growth rate. Moreover, the plan to

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[2/] Pemerintah Daerah Sumatera Barat, Rencana Pembangunan Lima Tahun Keempat 1984/85-1988/89 (Provincial Government of West Sumatra the Fourth Five Year Development Plan 1984/85-1988/89), Volume I, Padang 1984.

open a new palm-oil processing plant in West Pasaman is also another reason for expecting such a high growth rate.

High growth rate for the chemical industry is expected from the expansion of crumb-rubber production. With the recovery of the United States and European economies higher demand for West Sumatra crumb-rubber products can be resulted. Although, there is an indication that the region is now become lacking of the raw materials such as latex and slabs, however, past experience showed that such an input problem can be fulfilled from the neighbouring regions. Moreover, it is expected also that soap and ditergent production may also be expanded considerably as a result of increase of demand from local as well as outside of the region.

With respect to the non-metal mineral industry projected growth rate of 6.5 percent is mainly due to rapid expension of the Padang Cement production. According to the corporate plan, another three production units will be installed up to 1990 with additional capacity of 3,000 ton annually[3/]. As a result of increase in the cement production, related activities which use cement as their input such as tile, bricks and ceramics may also be promoted.

For the metal-products, high growth rate, i.e. 13.0 percent annually is expected from the expansion of metal-repair activities such as car and ship repairs. Rapid increase in number of cars and the expansion of Teluk Bayur harbor are two major reasons for such production increases. Moreover, metal-roofing production is likely to be expanded as a result of rapid increase in housing construction in the next five year[4/]

Implication from the whole analysis on the trend of growth is that industries which are belong to the group of food and beverage, chemical

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[3/] PT. Semen Padang, Rencana Pengembangan Perusahaan (Corporate Plan) 1981-2000, Padang 1982, p 77.

[4/] See the Fourth Five Year Plan of West Sumatra, op-cit, Book II A

non-metal mineral and metal-product can be considered as promising investment area. This is because of these industries are projected to have higher growth rates which is manifestation of their strong competitive position in the market either due to availability of material inputs in the region or the existence of large potential demand. In other words, these industries are expected to have higher investment return which is major interest of private investors.

LABOR ABSORPTION

Analysis of industrial labor absorption is another important aspect that should be considered for a comprehensive regional investment profile since it may give two implications. First, it indicates type of production technology applied in each industry whether it is more labor or capital intensive. Such an information may give an investor candidate a general view on the amount of capital required if he or she decide to invest his or her money in particular sector. Second, it shows degree of labor absorption of each manufacturing industry. Such information is important from the government point of view since the national objective is to encourage investment in industries that could give higher employment opportunities for the society.

Given industrial statistics available, it is found out that the food and baverage industry has been able to employed the largest part of total workers within the manufacturing sector. In 1979, about 33.0 percent of total manufacturing employment are engaged in this industry. Other industries that could absorb significant amount of employment are metal-product (22.5 percent), textile and leather industry (14.0 percent), non-metal mineral activity (13.3 percent) and the wood-based industry (10.8 percent). Those include in the paper, printing and publishing industries, in fact, employed only a very small proportion of the whole total manufacturing worker. Table 14.3 provides detailed figure on total employment in each manufacturing industry.

With respect to the employment growth, the wood-based industry seems to have the highest rate followed by food and beverage, textile and leather,metal-product and non-metal mineral industries. Those which

Table 14.3 West Sumatra: Historical Data and Projected Figures of Employment by Type of Industry 1974-1990

ISIC Code	Industrial Calssification	Historical Data				Projected Figures			
		1974	1979	Growth Rate (%)	Employment Elasti-city	1984	1988	1990	Growth Rate (%)
31	Food, Drinks and Tobacco	7,496	9,531	4.9	0.5	12,164	13,867	14,807	3.3
32	Textile and Leather	3,471	4,382	4.8	0.9	5,619	6,423	6,875	3.4
33	Wood-based Industries	1,484	1,877	4.8	0.9	2,512	2,965	3,221	4.2
34	Paper, Printing and Publishing	277	300	1.6	0.4	331	334	336	0.3
35	Chemical Industries	2,792	3,221	2.9	0.2	3,734	3,934	4,038	1.3
36	Non-Metal Mineral Industries	3,974	4,472	2.4	0.4	5,084	5,483	5,694	1.9
38	Metal Products and Machinery	5,660	7,387	5.5	0.5	10,121	12,023	13,105	4.4
	T o t a l	25,154	31,270	4.4	0.5	39,565	45,029	48,074	3.3

Source: Central Bureau of Statistics, op-cit, and Regional Income Account of West Sumatra, op-cit

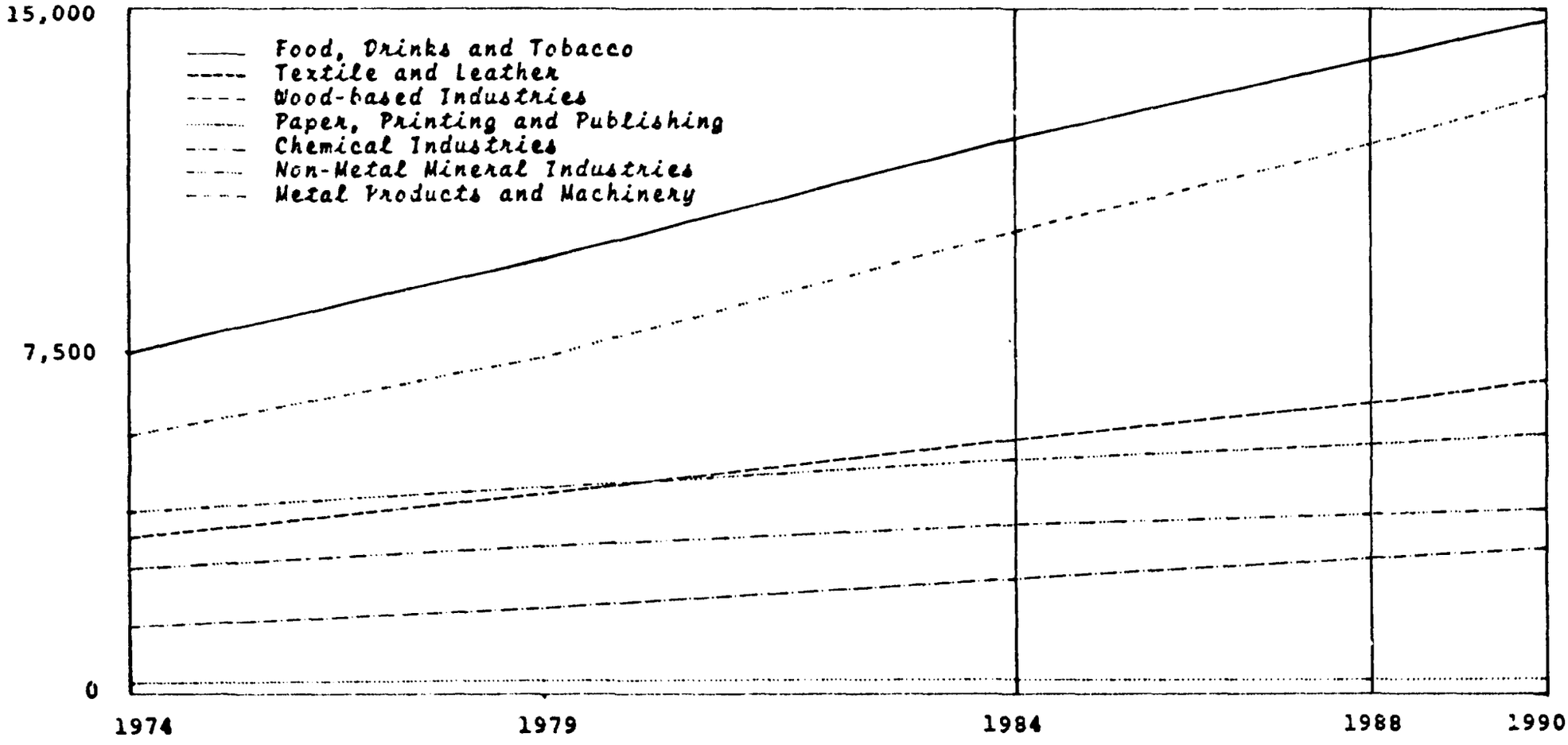

Figure 14.2 WEST SUMATRA : HISTORICAL DATA AND PROJECTED FIGURES OF EMPLOYMENT BY TYPE OF INDUSTRY 1974-1990

belong to the chemical industry and paper, printing and publishing industries, kitchen tools, have the lowest growth of employment. These informations suggest that the first four types of industries applied labor intensive technology, but the latter two industries adopt capital intensive type of production technology. Exception is only found for the cement production activity, although it belong to the non-metal mineral industry, it does apply capital intensive technology. Thus, investment in the chemical, paper and cement industries will require larger amount of capital as compared to those include in the food, wood-based, textile and leather and metal products.

Industrial employment projection up to 1990 is carried out by employing the concept of employment elasticity. By definition, this elasticity indicates percentage change of employment required as a result of one percentage increase in the value-added of related industries. Then, the projected employment growth for the period of 1984-1990 can be calculated by multiplyng the employment elasticity and the target growth of value-added as presented by Table 14.1. The results of projected employment growth are presented in Table 14.1

Given this approach, then it is expected that the food, wood-based, textile and leather and metal products will have high employment growth. This is because of these industries, in fact, adopt labor intensive technology and their projected increase in value-added is also considerably high. The chemical and paper industries, on other hand, are expected to have the lowest growth of projected employment since these two industries adopt capital intensive technology.

Implication from the above employment projection is that from regional development point of view, promoting investment for the food, wood-based, non-metal mineral and metal-working industries will be worthwhile. This is because of promoting such industries will provide larger additional employment opportunity for the region. But investment in paper and chemical industries, seems to be not so promising at the present time,since these industries require higher capital requirement and advanced technology.

From an investor point of view, the above analysis gives also some implications. For those who have relative small amount of capital, investment in the food, wood-based, and metal-working industries seem to be favourable. However, they must also realized that these industries may have low productivity which also influence degree of capital return. But for those who have larger amount of capitals, investing in the chemical, paper, cement, metal-roof, ship repair and car repair seem to be more appropriate not only because of available potential demand. But also due to high productivity level which lead to better capital return.

SOURCE OF GROWTH

Although analysis on the trend of growth either with respect to value-added or employment have been presented, however, analysis on the source of growth is also necessary. This is because of high growth does not always mean that the industry play important role ini the whole regional manufacturing sector. The source of growth will then depend on the industry's relative share in total manufacturing activities.

Analysis on source of growth is particularly important from the government point of view since it indicates contribution of particular activity to the growth of the whole industrial sector ini the region. Such information may facilitate the government in setting an appropriate investment priority for a comprhensive industrial development.

To make a more representative view, estimated source of growth is calculated both using value-added and employment. Moreover, they are also calculated in terms of relative as well as absolut figures. The estimated figures using value-added are presented in Table 14.4 and those for employment are provided by Table 14.5.

As indicated by Table 14.4 that the food and beverage industry, in fact, has the highest source of growth followed by the non-metal mineral industry and metal products. But those belong to the Textile and leather, wood-based and paper, printing and publishing industries con-

Table 14.4 West Sumatra: Source of Growth of Value-Adedd by Type of Industry 1974-1990

ISIC Code	Industrial Classification	Historical Data 1974-1979			Projected Figures 1984-1990		
		Growth Rate (%)	Source of Growth		Growth Rate (%)	Source of Growth	
			Relative	Absolute		Relative	Absolute
31	Food, Drinks and Tobacco	10.0	61.7	5.5	9.9	60.8	5.9
32	Textile and Leather	5.1	1.1	0.1	5.7	0.7	0.1
33	Wood-based Industries	5.5	0.5	..	6.5	0.4	..
34	Paper, Printing and Publishing	4.0	0.1	..	4.9	0.1	..
35	Chemical Industries	12.9	5.6	0.5	14.6	9.0	0.9
36	Non-Metal Mineral Industries	6.0	20.1	1.8	6.5	14.3	1.4
38	Metal Products and Machinery	11.6	10.9	1.0	13.0	14.7	1.4
	T o t a l	8.9	100.0	8.9	9.7	100.0	9.7

.. negligible

Source: Calculated from Central Bureau of Statistics, op-cit, and Regional Income of West Sumatra, op-cit

tribute only a very small part to the whole regional industrial growth. The same pattern on source of growth seems also true for the period of 1984-1990.

If we look to the estimated source of growth with respect to employment (Table 14.5),however, the pattern is rather different. Aside from the food, non-metal mineral and metal-products, those belong to the textile and wood-based industries are also give significant portion os source of growth. But, paper and chemical industries are still have the lowest source of growth.

Combined the facts given by Table 14.4 and those of 14.5, another finding can be derived. For the chemical, non-metal mineral and food industries contribution to increase in value-added seems to be higher than their contribution to employment creation. On the other hand, activities which include in textile, and leather, wood-based and metal-working industries, their contribution to employment creation seems to be higher than the contribution to increase in value-added.

With respect to investment possibility, two implications can be considered from this finding. First, from employment creation point of view, investing to the textile and leather, wood-based and metal-working industries will be worthwhile since they can create more jobs to the society. This is because of these industries, in fact, adopt labor intensive technology. Second, from investor point of view, investing to the food and beverage, chemical, and non-metal mineral industries, seem to be more profitable since average wage rate in West Sumatra is higher than the one in Java. Moreover, capital intensive technologi industry usually give higher productivity since labor can be provide with better working equipments and the production process can be performed more efficiently. Of course, capital requirements for these industries are higher than those required for labor intensive technology.

Table 14.5 West Sumatra: Source of Growth of Employment by Type of Industry 1974-1990

ISIC Code	Industrial Calssification	Historical Data 1974-1979			Projected Figures 1984-1990		
		Growth Rate (%)	Source of Growth		Growth Rate (%)	Source of Growth	
			Relative	Absolute		Relative	Absolute
31	Food, Drinks and Tobacco	4.9	33.8	1.5	3.3	31.0	1.0
32	Textile and Leather	4.8	15.1	0.7	3.4	14.7	0.5
33	Wood-based Industries	4.8	6.5	0.3	4.2	8.3	0.3
34	Paper, Printing and Publishing	1.6	0.4	..	0.3	0.1	..
35	Chemical Industries	2.9	7.2	0.3	1.3	5.6	0.2
36	Non-Metal Mineral Industries	2.4	8.3	0.4	1.9	7.2	0.2
38	Metal Products and Machinery	5.5	28.7	1.2	4.4	35.1	1.1
	T o t a l	4.4	100.0	4.4	3.3	100.0	3.3

.. negligible

Source: Calculated from Central Bureau of Statistics, op-cit, and Regional Income of West Sumatra, op-cit

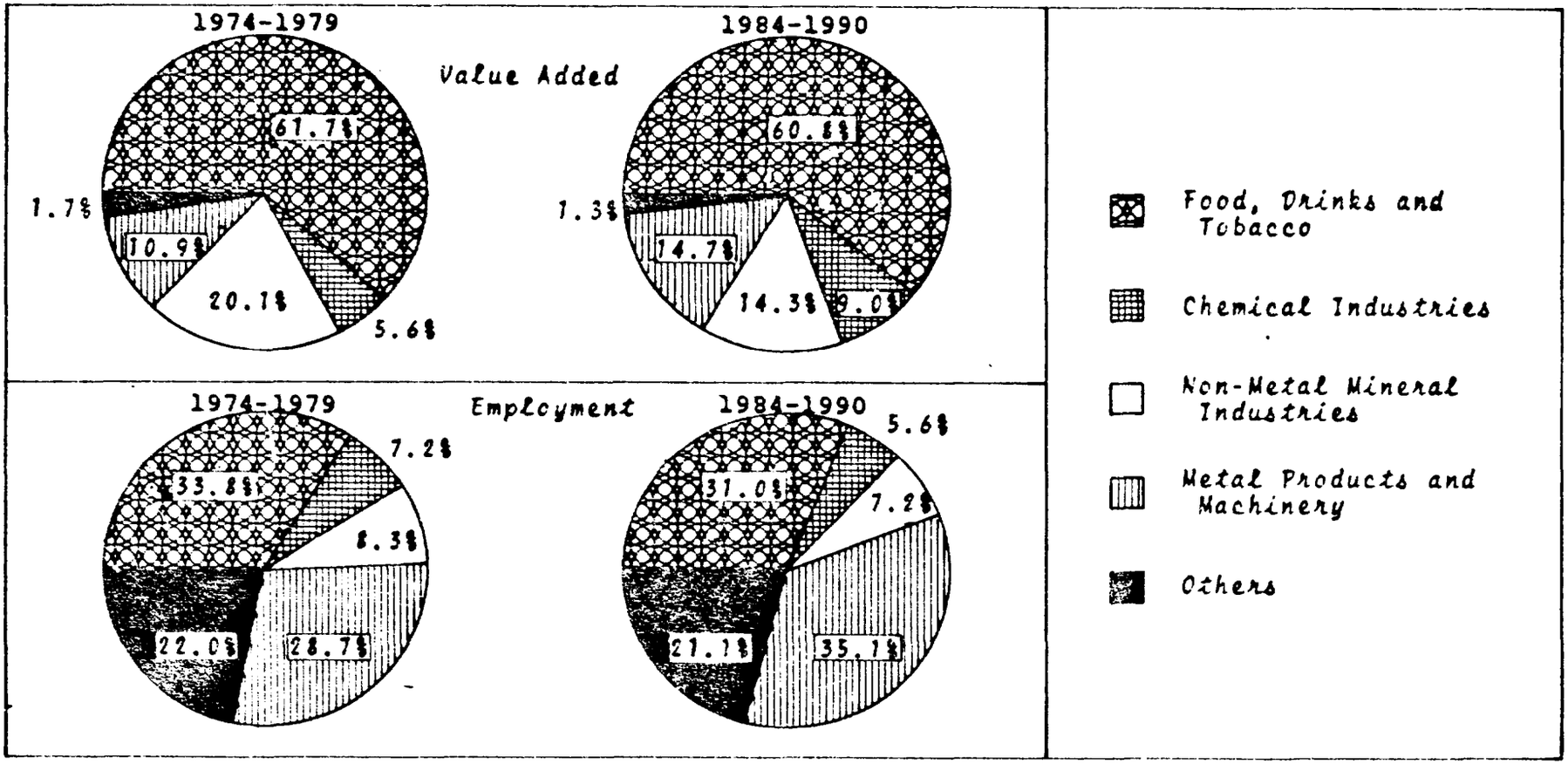

Figure 14.3 WEST SUMATRA : SOURCE OF GROWTH OF VALUE-ADDED AND EMPLOYMENT, 1974-1979 and 1984-1990.

PRODUCTIVITY

Productivity is another important factor determining growth of manufacturing activity. Industries which have higher productivity will tend to have higher growth rate and vise versa. Thus analysis on the productivity level be necessary for this chapter.

Due to difficulties in obtaining data on capital, productivity in this study can only be performed in a very crude way. In this case productivity is measured through calculated ratio of value-added to number of worker employed in respective industry. In other words, productivity in this case actually is measured in terms of the "cude productivity".

Analysis of productivity in this study is performed by comparing the values found for industries in West Sumatra with those for Indonesia. Through such a comparison, one can make a general judgement on the situation of West Sumatra with respect to labor productivity for each type of manufacturing industry. Table 14.5 provides detailed figures of labor productivity in West Sumatra as well as in Indonesia.

As indicated by Table 14.6 that industries which have higher productivity compared to the national average are food and non-metal mineral industries. This means that these two industries have relatively higher labor productivity as compared to similar industries at the national average. For the non-metal mineral industry, such a better performance is due to the existence of Padang Cement Factory which is operate in larger scale with modern production technology so that the average labor productivity can be improved significantly. For the food and beverage industry, higher labor productivity seems to be resulted also by larger scale economies particularly in the production of cooking oil,biscuit, noodle, and rice milling. Such a larger production scale can be performed due to availability of raw materials produced in the region.

The rest of the industries are all have lower labor productivity as compared to the national average. Such a lower productivity level

Table 14.6 West Sumatra : Comparison of Industrial Productivity With National Average at 1975 Constant Price, 1979. (Rp. '000)

ISIC Code	Industrial Classification	Indonesia	West Sumatra	Percentage Difference
31	Food, Drinks and Tobacco	254	1,752	+ 83.6
32	Textile and Leather	590	123	- 79.2
33	Wood-based Industries	811	71	- 91.2
34	Paper, Printing and Publishing	1,059	287	- 72.9
35	Chemical Industries	1,487	730	- 50.8
36	Non-Metal Mineral Industries	1,800	2,113	+ 17.4
38	Metal Product and Machinery	1,275	407	- 68.1

Source: Calculated from Central Bureau of Statistics, 1979 Industrial Statistics, Jakarta 1981, except figures for West Sumatra where adjustment was made by considering data from Lembaga Penelitian Ekonomi Regional, Perhitungan Pendapatan Regional Sumatera Barat 1975-1980 (Regional Income Account of West Sumatra), Padang 1983.

was mainly due to small scale production activity which make related economies can not fully absorbed. Moreover, most of the existing firms are still work under capacity either due to the lack of demand or material input available. This is particularly true for the textile and leather, paper, and metal-products where most of their raw materials are imported from other regions. For example, Sumatex Subur Company, which was the largerst textile factory in the regions had to stop its production activity since 1983 due to the lack of raw materials as well as demand.

IDENTIFICATION OF POTENTIAL INVESTMENT CANDIDATES

Given analysis on the previous section, we shall now identify industries which can be considered as future investment candidates. In this case, growth of value-added as well as employment are used as major criteria for such identification. This is because of growth of value-added indicates the profitabilitiy of an industry while growth of employment suggests the state of production technology and degree of capital requirement. Thus, if an industry experience high growth of value-added, it indicates that the industry has higher obtainable profit either due to the existence of large excess demand or the availability of factor inputs at lower costs, and vice-versa. But, higher growth of employment suggest that the industry adopts labor intensive technology and hence requires smaller capital for expanding or establishing a new firm.

Since maximum profit is major objective of an investor, then high growth of value-added should be preferable. For those who have limited capital, however, they may also interested to the high employment growth industry due to lower investment requirement. Therefore, industries wich have higher growth of value-added as well as employemnt growth should be major interest of an investor. Moreover, industries which have higher growth of value-added, but lower growth of employment should also be considered as promising investment candidates, particularly for those who have larger amount of capital.

The term of high and low growth is indeed a relative measure, and hence, determination can be made arbitrarily. Accordingly, this study determines that those which have growth rates higher or equal 9.0 percent are considered as high growth industries. But those which have lower growth rate than 9.0 percent are considered as lower growth industries. Given this measure, identification of potential investment candidates can be made, and the resilt is shown in Table 14.7.

As indicated by Table 14.7, the investment priority should be given to industries which are classified as the Food and Beverage, Non-Metal Mineral and Metal Products. This is because of these industries

Table 14.7 West Sumatra: Calssification of Industries Based on Growth of Value-Added and Employment

High Growth of Value-Added And Employment	High Growth of Value-Added But Low Growth of Employment
31 Food, Beverage and Tobacco 36 Non-Metal Mineral Industries 38 Metal Products	35 Chemical Industries
Low Growth of Value-Added And Employment	**Low Growth of Value-Added But High Growth of Employment**
34 Paper, Printing and Publishing	32 Textile and Leather 33 Wood-Based Industries

in fact, have higher growth rates either with respect to value-added as well as employment. Within the Food and Beverage industry, investment on coocking oil, canned fish, sool storage, palm oil, crackers and biscuit seem to be feasible both from the availability of raw materials and the existence of excess demand. For the Non-Metal Mineral Industries, on the other hand, investment on cement, tiles and ceramics would be quite feasible. In this case, the availability of large deposits of clay, lime stones and silica stones combined with the existence of the Indarung Cement Factory are considered as the main factors which support such an investment possibility. Fir the Metal Products, investment in ship building and repair, Balck-Smithery and car repairs seem to be worthwild not because of the availability of raw materials but mainly due to the existence of large demand. In the case of Biack-Smithery, the existence of apecific talent of the people in Sungai Puar is considered as major growth factor.

The second investment priority should be given to the Chemical Industries. Within this industrial group, investment on the soap adn detergent industry seem to be promissing. In this case availability of raw materials, i,e. coconuts is also considered as the main growth factor. The third investment priority would be on the Textile and Leather and the Wood-Based industries. Although growth of these industries are still low, hawever, tneir employment absorption are indeed high. For the Paper, Printing and Publishing, however, none of the growth factors are exist, and hence investment in this industry can not be recommended.

CONCLUSION

Considering growth of value-added, employment and productivity level, this study can provide a set of investment priorities. The first priority should be given to industries which are belong to the group of, Food and Beverage, Non-Metal Minerals and Metal products. Chemical industries, on the other hand, should be considered as the second investment priority. The third priority will be on those belong to the Wood-Based, Textile and Leather industries. But those belong to the Paper, Printing and Publishing seems to be not so promising for future investment. It is realized, however, that such a conclusion is still quite general since the analysis is performed within the macro framework. Detailed analysis on the commodity basis can be found in other cahpter.

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Chapter 15

METAL-WORKING INDUSTRIES

FOR THE PURPOSE of analysis, Metal-Working industries are divided into two major groups, i.e. metal-processing and metal-repair activities. The former is activity which use metal as the main input, but the latter provides only repair services and almost no metal inputs are required. Such an industrial classification is necessary to be able to analyze performance, problems and investment possibility in each industry.

Metal-processing activity includes production of metal-roof, metal-construction, Black-Smithery, metal-furniture, kitchen tools and empty cans. Metal repair activity, on the other hand, consists of motor cycle repair, car repair, welding shop, car body repair and ship repair. These metal products are selected based on the existing activities, and hence some other metal working industries may not be included in this analysis.

Since the objective of analysis is to assess possible investment to expand the existing metal working industries or establishing new plants, then the emphasis of analysis is given to the future demand gaps by taking into consideration the availability of related metal inputs, man power and other support facilities. Accordingly, the component of analysis will be on the trend of past production and sales, estimated excess demand, required metal inputs, employment and production technology. At the end of the analysis, a tentative estimation on investment requirement for establishing a new plant will be provided. Such an estimation will, of course, subject to the price change.

PRODUCTION TRENDS

To evaluate the past performences of metal-working industries in West Sumatra, analysis on production and sales will be usefull. Through such indicator one can get a broad information on the growth of metal-working industries which further indicate the attractiveness of this business. Moreover, such analysis provides also some initial informations on the existence of the demand gap.

Due to limited recorded data available, value of production for each industry is estimated through sampling data[1/]. The estimation can be done by multiplying the figure from samples with their total number of plant establishment. Accordingly, a certain degree of biased is involved in the estimation. To get a time series data, however, information from the 1975 census of manufacturers is also used. Based on this method of estimation, then estimated values of the metal-working production is presented in Table 15.1.

Production of metal-working industries are indeed vary widely. Consequently, analysis can be given only interm of group of products rather than detailed analysis on each type of product. Within the group of Metal Processing industries, their products may be classified into metal-roof, metal construction (particularly metal door, iron pipes and construction steels), Black-Smithery, metal furnitures, kitchen tools and car bodies. On the other hand, metal repair activities consist of motor cycle repairs,car repairs, welding shops,car body repairs. Given such a variety of products, then analysis on production sales has to be performed in terms of values rather than their physical products.

As indicated by Table 15.1 that within the Metal Processing industry, production of metal-roof and metal construction are found to have very high growth rates. Such a high production increases could be achieved mainly due to high growth of demand as indicated by high income elasticity. Thus, increase on demand, in this case, is not only

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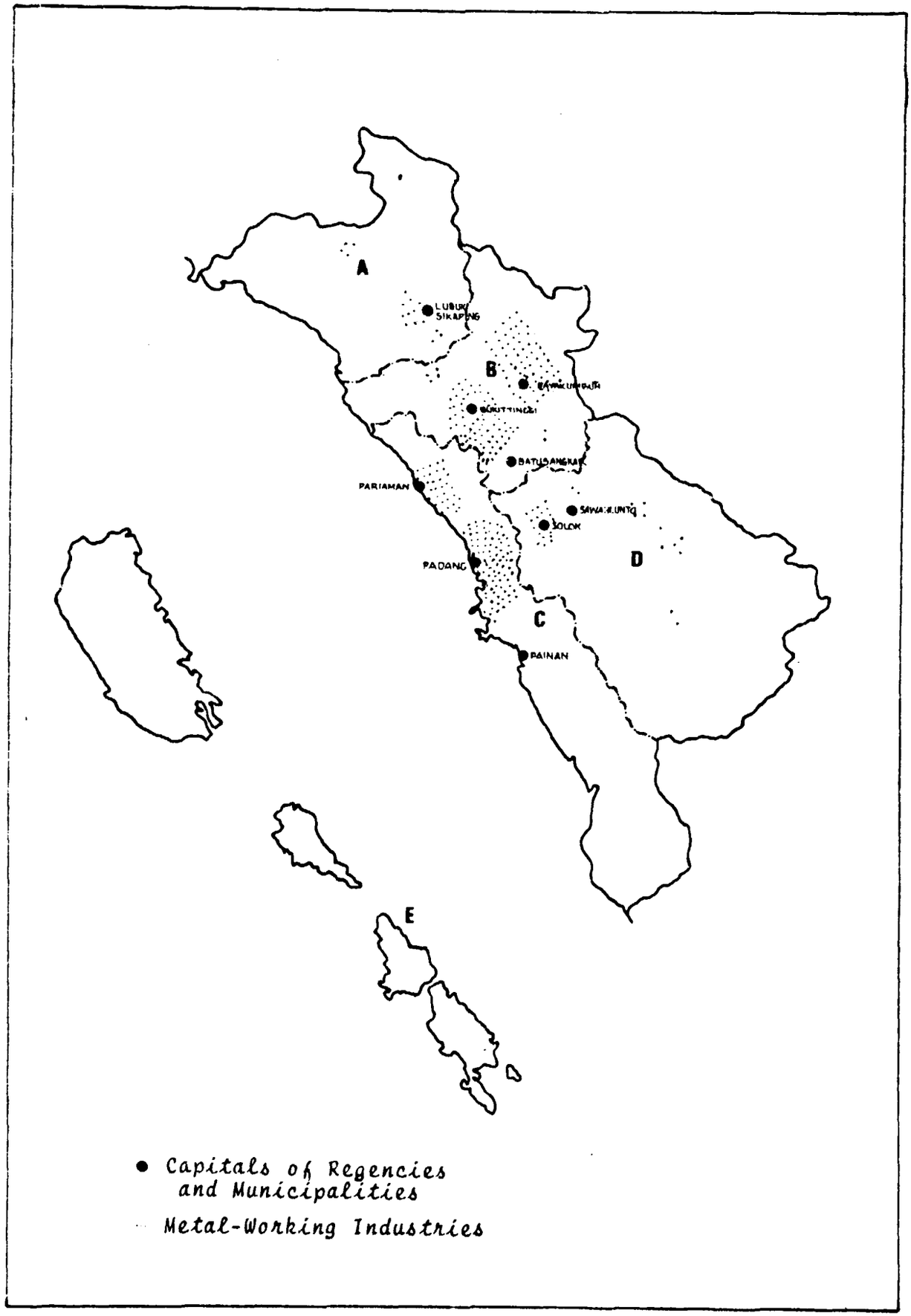
[1/] Number of samples as well as population is presented in appendix 1.1

Table 15.1 West Sumatra : Historical Data and Projected Figures of Output Value at 1983 Constant Price of Metal-Working Industry 1979-1990

Type of Industry	Historical Data					Projected Figures			
	1979	1981	1983	Growth Rate (%)	Income Elasti-city	1984	1988	1990	Growth Rate (%)
Metal Processing									
- Metal Roof	13,367	18,518	25,654	17.7	2.6	29,655	52,958	70,770	15.6
- Metal Construction	358	480	652	16.1	2.3	742	1,244	1,661	13.8
- Black-Smithery	512	623	761	10.4	1.5	830	1,172	1,393	9.0
- Metal Furniture	428	539	679	12.2	1.8	752	1,133	1,391	10.8
- Kitchen Tool	690	833	1,008	9.9	1.4	1,093	1,509	1,773	8.4
- Empty Can	142	180	227	12.4	1.8	252	380	467	10.8
Metal Repair									
- Motor Cycle Repair	1,403	1,769	2,371	12.3	1.8	2,627	3,959	4,860	10.8
- Car Repair	3,055	4,669	5,416	15.4	2.3	6,163	10,336	13,386	13.8
- Welding Shop	1,127	1,545	1,756	10.5	1.5	1,914	2,702	3,210	9.0
- Car Body Repair	927	1,213	1,644	14.4	2.1	1,851	2,976	3,774	12.6
- Ship Repair	363	526	560	11.4	1.7	617	910	1,105	10.2



Map 15.1 **WEST SUMATRA: LOCATION OF METAL-WORKING INDUSTRIES**

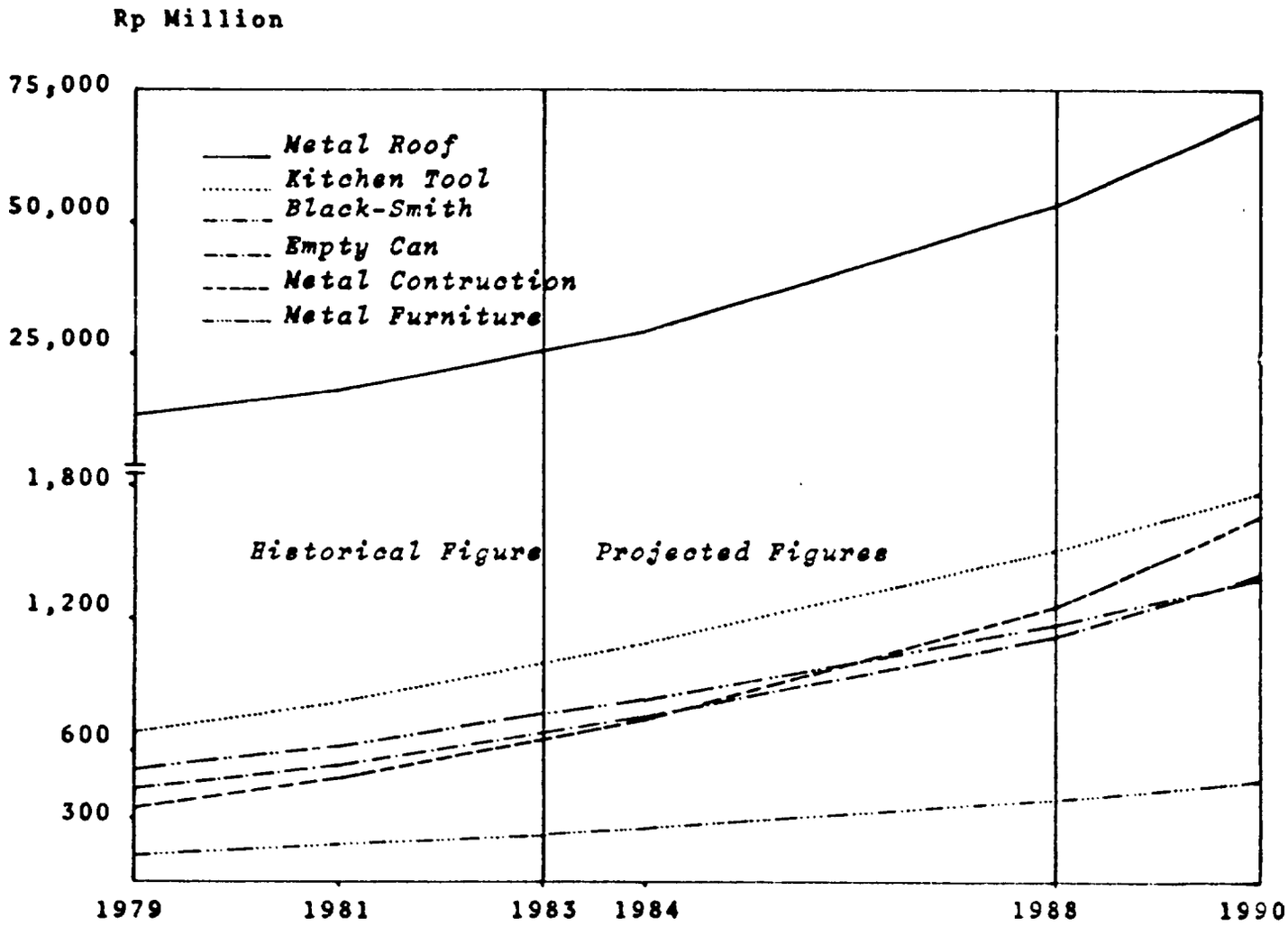


Figure 15.1 WEST SUMATRA: HISTORICAL DATA AND PROJECTED FIGURES OF OUTPUT VALUE AT 1983 CONSTANT PRICE OF METAL PROCESSING INDUSTRY 1979-1990

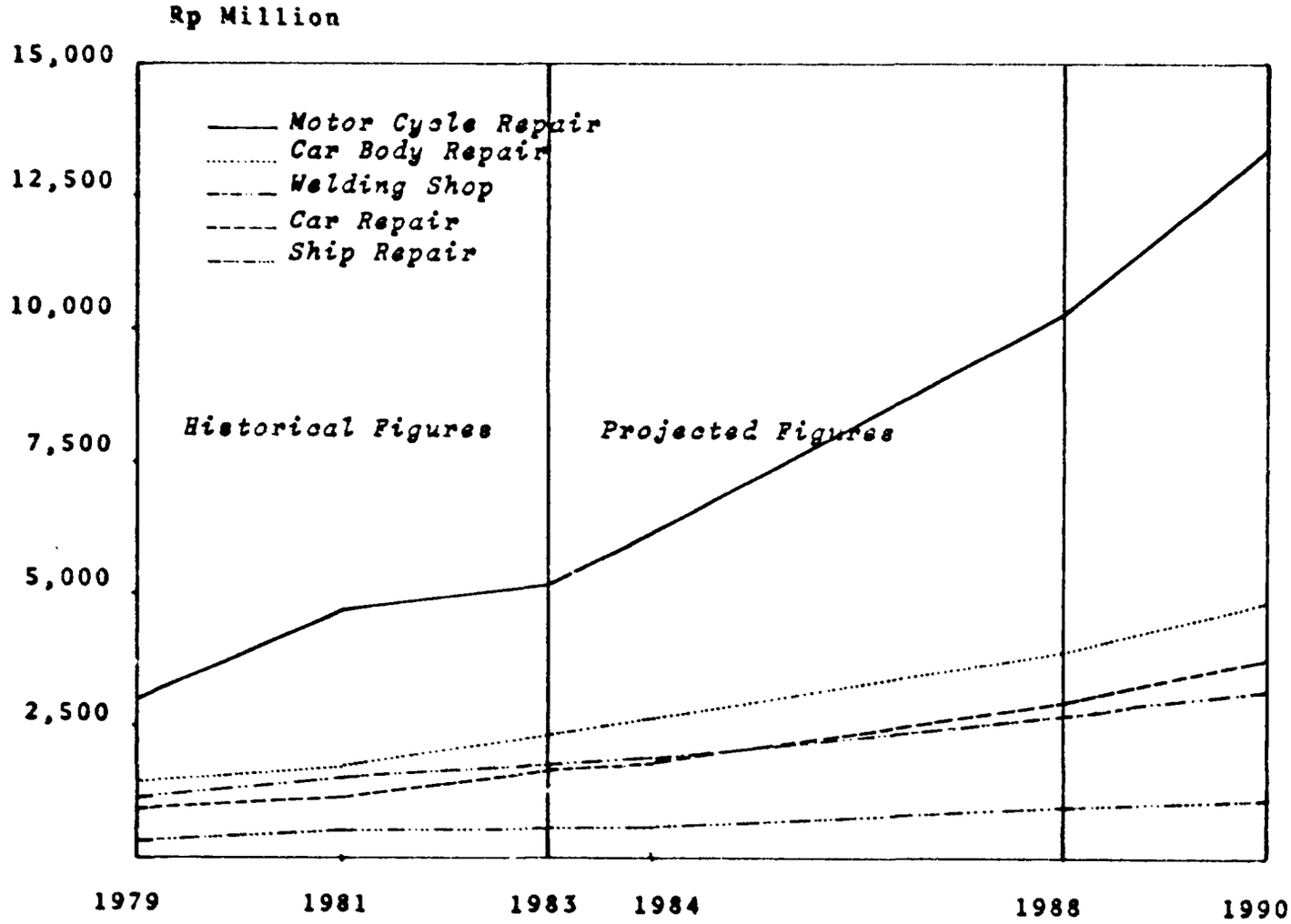


Figure 15.2 WEST SUMATRA: HISTORICAL DATA AND PROJECTED FIGURES OF OUTPUT VALUE AT 1983 CONSTANT PRICE OF METAL - REPAIR INDUSTRY 1979-1990

due to growth in housing contruction, but also resulted by raising income. This suggests that potential demand for these two products will stay higher since in the Fourth Repelita, Gross Domestic Regional Product of West Sumatra is expected to have average annual growth rate of 6 percent[2/].

Within the Metal Repair industry, on the other hand, car repair and car body repair are found to have high growth rates compared to other industries in the group. During the period of 1979-1983, growth rates of these industries reached 15.4 percent and 14.4 percent respectively. Rapid increase in the number of car in the region (11.2 percent) is considered as the main factor which create larger demand for such activities. Moreover, it is also found out that elasticity of income for these two metal repair industries are indeed very high. This suggests that potential demand for car repair and car body repair in the future will become higher, not only because of increase in the number of cars, but also as a result of increase in the society income.

Growth rates of the rest of the metal-working industries, in fact, are also considerably high, i.e. around 10.0 percent with average income elasticity of 1.5. These indicate that those activities are also considered as attractive businesses, although the prospect are not as good as those found for metal-roof, metal construction, car repair and car bodyrepair.

Projected output value by type of industry up to the year 1990 is performed by considering their growth elasticity and targeted growth rates of the regional economy. The Regional Fourth Five Year Development Plan 1984/85-1988/89 has set the growth rate of Gross Domestic Regional Product to be 6.0 percent annually. To maintain consistency of analysis with overall development activities, then this targeted growth rate is used for projecting growth of output value by type of metal-working industry by considering related growth elasticities.

[2/] Pemerintah Daerah Sumatera Barat, Rencana Pembangunan Lima Tahun Keempat 1984/85-1988/89 (Provincial Government of West Sumatra, the Fourth Five Year Development Plan 1984/85-1988/89), Volume I, Padang 1984.

To avoid the inflationary impact, however, all figures are measure in constant prices.

Given the above approach, then the projected output value of metal-working products for each type industry can be calculated for the period of 1984-1990 and the result are presented in Table 15,1. As indicated by this table that within the Metal-Processing Industry, metal roof and metal construction are expected to have higher potential demand with annual growth rate of 15.6 and 15.7 percent respectively. These figures suggest that larger investment opportunities are available in these types of industry.

Within the metal repair industry, on the other hand, car repair and car body repair are two activities which have larger potential demand in the future. It is expected that annual growth of demand for these industries reached 13.8 and 12.6 percent respectively. Such a high potentialdemand is supported also by high projected growth rate of car in the Regional Development Plan which is 8.0 percent annually. Thus, car repair and car body repair seem to be major metal-repair activities which have larger investment opportunities in the coming years.

ESTIMATED EXCESS DEMAND

Investment possibility, to some extend, will largely depend on the existence of potential demand for particular products. Since the metal-working activities in West Sumatra have already exist, then potential demand for existing production capacity or establishing new plants will depend on the existence of available demand. By definition, excess demand can be estimated through differences between the overall estimates of quantity demanded and total products of the existing firms under full capacity.

For primary consumption goods, the overall demand in the community are usually estimated by setting particular standard of consumption level. However, such an approach can not be used for metal working products since the standard does not exist. Alternatively, estimated overall total quantity demanded can be performed through elasticity

with respect to the growth of the economy as has been done in section 15.1.

Estimation of the full capacity production of metal-working industry can not also be determined easily. This is because of most firms use only certain types of tools such as hammers, screwdrivers, and other mechanical tool rather than particular type of machine which has certain production capacity. If some of the firms use machines, these are usually just to create certain power to support the works. Consequently, estimation of the full capacity production of metal-working firms has to be determined from number of working hours. Findings from the field indicated that most of the existing metal-working firms in West Sumatra works only with 70 percent capacity. Accordingly, the full capacity production will be 30 percent higher than the production level during survey period (1983). Exception is only find for the metal-roof industry where particular type of machine which has certain capacity are used.

Given the above approach, the excess demand for each type of metal-working industry up to the year of 1990 can be estimated and the result are presented in Table 15.2. Moreover, by assuming that the new plants will be established with the size twice of the existing full capacity, then expected number of possible establishment of new plants to meet the excess demand can be calculated. Again exception is made for the metal-roof and empty can firms since the existing production have been carried out in medium scale.

As indicated by Table 15.2 that within the Metal-Processing industry, large excess demand are available for the metal-roof products, metal construction,Black-Smithery and metal furniture. As a result several new firms can be established in West Sumatra to meet the excess demand in the region. If the products can be sold outside of the region, then more new plants can be established.

Similarly, within the Metal-Repair industry, large excess demand are indeed exist for car repair, car body repair, welding shop and motor cycle repair activities. As a result, a certain amount of new

Table 15.2 West Sumatra : Estimated Excess Demand by Type of Metal-Working Industry

Type of Industry	Estimated Demand up to 1990 (Rp Million)	Full Capacity of Output 1983[a] (Rp Million)	Excess Demand Up to 1990	
			Value of Output (Rp Mil.)	Additional Number of Firm[a]
Metal Processing				
- Metal Roof	70,770	36,649	34,121	1
- Metal Construction	1,661	931	730	9
- Black-Smithery	1,393	1,087	306	23
- Metal Furniture	1,391	970	421	7
- Kitchen Tools	1,773	1,440	333	2
- Empty Can	467	324	143	-
Metal Repair				
- Motor Cycle Repair	4,860	3,378	1,473	39
- Car Repair	13,368	7,737	5,631	44
- Welding Shop	3,210	2,509	701	8
- Car Body Repair	3,774	2,349	1,425	14
- Ship Repair	1,105	800	305	1

[a] Full capacity of output is estimated by assuming that the existing capacity is only used arround 70 percent

[b] Estimation of additional firms required is based on the average size twice of the existing full capacity in 1983, except for the metal roof and empty can industries which have already considered as medium scale industries.

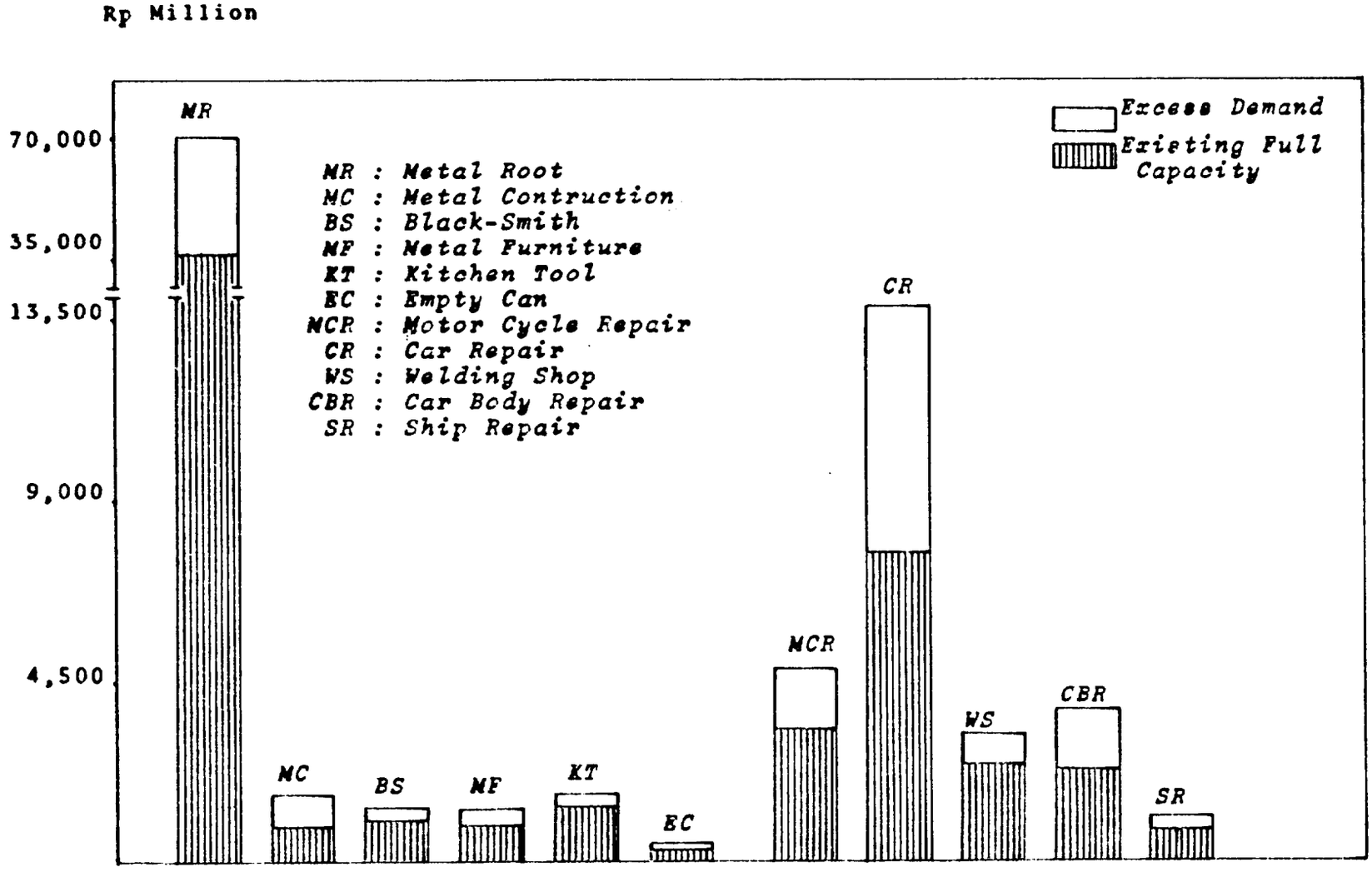


Figure 15.3 WEST SUMATRA: ESTIMATED EXCESS DEMAND BY TYPE OF METAL-WORKING INDUSTRY

firms can be established for each type of industry. Exception is found for empty can product where the excess demand seems very small. This is because of the use of cans in West Sumatra's manufacturing activities are still not that high. For car repair and car body repair, the existing excess demand may be underestimated since the calculation is made regardless number at possible cars come from other regions. The same thing happen for the estimated excess demand of the ship repair activity. Therefore, larger number of plant establishments as compared to those indicated in Table 15.2 are possible for these type of metal-repair industries.

The above analysis does indicated that investment opportunities are exist in the West Sumatra's metal-working industries. Homever, the problem is that most of the production activities are carried out in small scale, so that average cost tend to be higher. Thus, to maintain the return to capital, the new plant establishments should be performed in larger size, at least twice of the existing size.

COST STRUCTURE

Thus far analysis has been emphasized on the demand side by looking into differences between projected potential demand and the existing production capability. To be able to get a general picture of the investment possibility on metal-working industry, then, a detailed analysis on the characteristics of its supply side must also be performed. However, this section concentrates only to the cost structure of metal-working industrry which is a basis of identifying type and amount of input required to develop such an industry.

Metal-working industry is an activity which is highly rely on the availability of material input and labor perticularly who have a certain skills and experinces. From the total cost of production, around 51.2 percent is spent for material input and 37.4 percent for salaries. Thus, these two input components share around 88.6 percent of the total cost of production. Table 15.3 provides detailed figure on general cost structure of the metal-working industry.

Table 15.3 West Sumatra : Production Cost of Metal Processing Industry by Type of Input 1979 (in US $)

Type of Input	Value from Sample	Percentage
Raw Material	370,236	51.2
Labor	270,565	37.4
Electricity	8,330	1.2
Fuel and Lubricant	36,029	5.0
Packing Material	227	..
Other Materials	1,526	0.2
Repair and Maintenance	1,425	0.2
Services	26,957	3.7
Rent of Building and Machinaries	2,894	0.4
Other Expenses	5,141	0.7
Total	723,330	100.0

.. negligible

Source: Central Bureau of Statistics, Small-Scale Industrial Statistics, Jakarta, 1979, pp. 52.53

Implication from this fact is that the growth of metal-working industry in West Sumatra is largely depend on the availability of material inputs particularly various types of metal and labor who have particular type of skills. Therefore, if these two major inputs are not available in sufficient amount, then the growth of metal-working activity may be hampered and hence investing capital in this industry may not be profitable. Such a presumption, of course, valid only far the metal-processing activities since metal repair provides only services

and not manufactuirng activities.

Like in other areas, metal processing activities in West Sumatra use many types of metals from small to large with different physical characteristics. Most of material input used are pipes, metal sheets, triangle steels, screw and bolt, welding rod, steel wire, casting iron, and other materials from metal. Most of these metal inputs are come from Jakarta or Medan, and infact, some of them are imported materials. Due to limited metal available, however, most of Black-Smith activity in Sungai Puar utilized used metals. Table 15.4 provides percentage use of major metal input by type of metal-working industries.

As a matter of fact, West Sumatra does not produced metal or iron. Consequently, most of the metal input required by the industry are fulfilled through import or by making use of scrap metals. In the case of Black-Smithery activity,some of the input requirements are fulfilled by utilized unused rail tracks or cars. This suggests that metal-working industry in West Sumatra are indeed facing difficult problem in obtaining their metal input requirements. This is particularly true for the Metal-Processing industries where metal is the major inputs.

Although earlier analysis does indicate that metal-working industry in West Sumatra indeed has larger potential demand, however, the lack of metal inputs may become a very serious problem that might hampered their future growth. This is because of importing metals from other regions or from abroad is indeed required high transportation costs. Consequently, average production costs metal-working products of West Sumatra may way become higher than that of in West Java where metal inputs are available (The Krakatau Steel Company). Such a situation,,in turn, will reduce the competitive strength of West Sumatra metal-working products in the national market.

Given the above problem, then if an investor plans to invest his capital in the metal-working activity, the lack of available metal inputs in the region should be considered seriously. To maintain the return to capital, a certain way out should be formulated to guarrantee the availability of metal inputs in the long run. Moreover the in-

Table 15.4 West Sumatra : Percentage Use of Major Metal Input by Type of Metal-Working Industry 1983

Type of Metal-Working Industry	Major Metal Input									Total
	Block Steel	Zink Plate	Steel Pipe	Used Metal	Iron Steel	Steel Wire	Welding rod	Screw/ bolt	Other	
Metal Processing										
- Metal Roof	-	95.0	-	-	-	-	-	-	5.0	100.0
- Metal Construction	-	7.7	46.5	-	0.1	-	0.1	23.7	22.0	100.0
- Black-Smith	0.5	-	-	99.4	-	-	-	-	0.1	100.0
- Metal Furniture	30.6	-	59.0	-	-	-	-	-	10.4	100.0
- Kitchen Tool	0.1	1.6	2.3	-	0.1	-	0.2	0.3	95.4	100.0
- Empty Can	-	85.0	-	-	-	-	-	-	15.0	100.0
Metal Repair										
- Motor Cycle Repair	-	-	-	-	-	-	-	-	-	-
- Car Repair	-	-	9.3	-	50.0	-	-	-	40.7	100.0
- Welding Shop	-	0.4	17.2	-	1.2	-	4.9	-	76.3	100.0
- Car Body Repair	-	5.0	29.5	-	-	-	-	2.7	62.8	100.0
- Ship Repair	-	15.1	-	-	-	-	4.7	1.6	78.6	100.0

vestor should be able to produce high quality of products, so that the weak competitive position can be cempensated.

Except for the ship repair, most of metal-working firms established in West Sumatra are in the form of small-scale activity. Accordingly, although this industry is basically use labor intensive technology, however, number of labor employed by each firm, in fact, is relatively small. Most of the existing firm utilizes labor below ten persons. Only few of them use labor more than 20 persons. Consequently, production activity is carried out for small amount of products, in accordance with the customer's request. This suggests that unit cost of production of metal-working activities in West Sumatra could be higher than that of in Java because the economies of scale can not be absorbed. Table 15.5 gives figures on the use of labor by type of metal-working group.

INVESTMENT REQUIREMENT

In this study, the investment requirement is calculated from total fixed capital needed to establish a new metal-working firm. Such a fixed capital include expenses on land, building, equipments and other tools that are necessary to perform the production activities. In other words, investment requirement in this case is excluded working capitals.

It is clear that total investment requirement for each metal-working firm vary widely, depending upon size of firm (production scale) and type of production technology applied. Accordingly, investment requirement for ship repair and metal-roof industries will become higher as compared to those needed for Black-Smithery and motor cycle repairs.

Estimated total investment requirement for each type of metal-working industry is calculated based on the average size of capital of the existing firms. However, the new plant establishment is assumed to be twice of the average size of existing firms (see section 15.3), except for the metal-roofing, empty can and ship repair industries. Accordingly, capital requirement for the establishment of a new metal-working firm should also follow this assumption. Based on this approach, then estimated investment requirement for establishing each type of new

Table 15.5 West Sumatra : Percentage Use of Labor by Type of Metal-Working Industry 1983

Type of Metal-Working Industry	Number of Labor Employed				Total
	0 - 10	11 - 20	21 - 30	>30	
.Metal Processing					
- Metal Roof	-	-	-	100.0	100.0
- Metal Construction	37.5	37.5	25.0	-	100.0
- Black-Smithery	71.4	14.3	14.3	-	100.0
- Metal Furniture	57.1	-	28.6	14.3	100.0
- Kitchen Tools	75.0	25.0	-	-	100.0
- Empty Can	-	-	-	100.0	100.0
Metal Repair					
- Motor Cycle Repair	90.0	10.0	-	-	100.0
- Car Repair	51.7	14.3	28.6	-	100.0
- Welding Shop	87.5	12.5	-	-	100.0
- Car Body Repair	66.7	16.7	16.6	-	100.0
- Ship Repair	33.3	33.4	-	33.3	100.0
Average	76.7	11.7	8.3	3.3	100.0

metal-working firm can be calculated and the result are presented in Table 15.6

As indicated by Table 15.6 that high investment requirement are needed in establishing new metal-roofing, ship repair and empty can industries. For the ship repair activity, the investment requirement reach around half million U.S. dollars value in 1983 market price. Those for the metal-roofing and empty can industries, the investment requirement are estimated around quater million U.S. dollar. These industries basically adopt capital intensive technology and their production activities are performed in medium scale. Although the investment requirements are rather high, however, their return to capital seem to be also high as a result of better productivity as compared to other metal-working activities in West Sumatra. In other words those three industries can be considered as promising candidates for new investment in the near future.

With respect to other metal-working industries, considerably high investment requirements are found for car repair and car body repair with average fixed capital around sixty thousand U.S. dollar for each firm. These activities are more labor intensive than taht of ship repair and they operate in smaller scale. Although the investment requirements for these activities are smaller than that of ship repair, however, earlier analysis did indicated that excess demand for these activities are indeed large. Therefore, car repair and car body repair can also be considered as other promising candidates for investment in West Sumatra that could give higher rate of return to capital.

Other industries such as metal construction, Black-Smithery, metal furniture, kitchen tools, motor cycle repair and welding shop required rather small capitals. Although earlier analysis indicated that these industries also have large excess demand, however, since the firms are mostly operated in small scale then investments in these activities may not be worthwhile from investor point of view.

Tabel 15.6 West Sumatra : Estimated of Fixed Capital Requirement (Investment) For a New Metal-Working Firm (Rp'000)[a]

Type of Industry	Fixed Capital Component				Total
	Land	Building	Equipment	Others	
Metal Processing					
- Metal Roof	91,000	81,000	109,405	31,278	312,683
- Metal Construction	3,000	10,398	1,700	1,500	16,598
- Black-Smithery	1,780	2,702	306	500	5,288
- Metal Furniture	3,500	9,830	1,450	1,600	16,380
- Kitchen Tools	2,500	2,428	3,600	520	5,808
- Empty Can	70,000	65,000	85,049	14,001	234,050
Metal Repair					
- Motor Cycle Repair	6,380	11,450	3,024	2,084	22,938
- Car Repair	31,012	23,342	5,502	3,186	63,042
- Welding Shop	24,250	7,576	3,324	3,516	38,666
- Car Body Repair	28,926	18,166	4,990	5,730	57,812
- Ship Repair	301,280	122,546	40,000	46,382	510,208

[a] Valued in 1983 market prices.

PLANT LOCATIONAL CHOICE

Aside from the existence of excess demand, availability of raw materials, and other related business considerations, locational will also determine the profitablity of a firm. This is because of an appropriate locational decision can reduce the firm transportation costs for the inputs as well as the outputs. Such a situation is especially true for a metal-working firm : both of its inputs and outputs are heavy products which certainly require higher transportation costs. Moreover, carefull locational selection can also absorb several related agglomeration economies that may lead to reduction in the firm's unit cost of production.

Generally, metal-working activities may be classified as the weightloosing industries since the production process makes the weight of outputs will be less than the weight of inputs. This is because of during the production process some of the inputs may become slack or unsed materials. Accordingly, appropriate location for the metal-working firms in general should be in the source of metal inputs. By locating in the source of metal inputs, then high transportation costs to bring the inputs to the plant location can be avoided.

As mentioned earlier, however, West Sumatra does not have source of metal inputs, and most of the input requirement are fulfilled through import either from Java or from abroad. Most of these metals are transported by sea passing through Teluk Bayur harbor (Padang). Thus, in order to reduce the transportation costs, Padang should be an appropriate location for metal-working activities. Except for the Black-Smithery activities which tight to particular type of skills. In this case Sungai Puar (Agam regency) will remain as the appropriate location for such an activity.

Choice of Padang as the right location, in fact, is also supported by the existence of better infrastructure conditions, availability of enough electricity, and other urban services. The availability of such industrial services could guarrantee the continuation of production process and to some extend could reduce the average production

costs since the firms do not have to provide those expensive facilities by themselves.

With respect to possible absorption of agglomeration economies, choice of location in Padang seems also justifiable since almost all of the related metal-working activities are located in this city (see Table 15.6). As a result a very close input-output relationship among the metal-working activities in the city has been formed. Hence, if a new metal-working firm is established in Padang, then it may take advantage of some agglomeration economies created by such input-output relationship. One of major advantage from the concentration of relaled manufacturing activities in particular place is in the form of reduction of transportation costs since inputs as well as outputs are now available in that place.

The above argument, of course, is not valid for Metal-Repair industries which do not require metal inputs. For this type of metal-working industries, concentration of demand will be more relevant factor for their locational choice. Since most of cars and motorcycles are concentrated in several major cities such as Padang, Bukittinggi and Solok, then these three cities can be considered as appropriate location for metal-repair activities. For the ship repair activity, Teluk Bayur which the largest harbor in the West coast of Indonesia seems to be the best location, particularly if the activity is concentrated to repairing medium and big size of ships.

SUMMARY AND RECOMMENDATION

Analysis has shown that metal-working activities in West Sumatra can be considered as promising candidates for private investments Such a prediction is derived from past performances of the existing metal-working firms (through trend in production), and estimated excess demand up to year of 1990. The only problem which might be faced by the investors is the lack of metal inputs since the region does not have any steel mining or steel processing plant. Thus far, all metal requirements are fulfilled through import, either form Java or from abroad, which is clearly requires higher transportation costs.

Tabel 15.7 West Sumatra : Number of Plant Establishment at Metal-Working Industry by District

Type of Industry	Pasaman	Agam	50 Kota/Payakumbuh	Tanah Datar	Solok	Padang Pariaman	Sawahlunto/ Sijunjung	Pesisir Selatan	Padang	Bukittinggi	Padang Panjang	Solok	Total
Metal Processing	13	95	65	7	7	12	3	10	52	46	15	12	337
- Metal Roof	-	-	-	-	-	-	-	-	1	-	-	-	1
- Metal Construction	1	-	-	-	2	3	-	-	13	2	-	2	23
- Black-Smithery	12	81	62	7	5	9	3	10	15	35	15	8	262
- Metal Furniture	-	2	3	-	-	-	-	-	21	5	-	-	31
- Kitchen Tools	-	12	-	-	-	-	-	-	-	4	-	2	18
- Empty Can	-	-	-	-	-	-	-	-	2	-	-	-	2
Metal Repair	36	18	30	17	23	20	19	22	166	31	12	13	407
- Motor Cycle Repair	19	6	17	4	16	12	5	12	71	5	7	5	179
- Car Repair	7	7	8	6	5	5	5	7	52	12	2	4	120
- Welding Shop	5	4	3	5	1	2	9	1	14	9	1	2	56
- Car Body Repair	3	1	2	2	1	1	-	-	26	5	2	2	45
- Ship Repair	2	-	-	-	-	-	-	2	3	-	-	-	7
Total	49	113	95	24	32	32	22	32	218	77	27	23	744

Source: Calculated from Kantor Wilayah Perindustrian Sumatra Barat, Laporan Tahunan (West Sumatra Office of Industrial Service, Annual Report), various issues.

Considering the rate of return to capital, worthwhile investments seem to be found in ship building/repair and metal-working industry which can be performed in larger scale and hence have higher productivitylevel. Investment requirement for the ship building and repair reached half million U.S. dollars and the one for metal-roofing industry is around three hundreds dollars. Another considerable good investment opportunity is also found in car repair and car body repair which have very large excess demand. However, the production have to be performed in larger scale than the existing plants which average investment requirement around sixty thousands U.S dollars. All of the investment requirements are valued in 198› constant prices, and hence the values may become higher in the coming years.

Excess demand for small metal-processing activities such as metal-construction, metal furniture and kitchen tools are also considerable. This indicates that investment opportunity in these industries are also possible. To strengthen their comptitive position in the future, however, production should be performed in larger scale than those existing plants. Otherwise, the productivity will be low and so its return to investment.

Particularly for the Black-Smithery activity, specific investment program is required. Since Black-Smithery in West Sumatra are tight to traditional skills, then one possible investment program is to estatablished large processing plant which further refine the products of the Black Smiths. In other words, the investment program should be concentrated to establish a propulsive industry within the Sungai Puar small scale industrial zone. Such a program could benefits the investor as well the small Black-Smithery. For the investor, return to capital can be maintained since the investment can be performed in larger scale. At the same time, the establishment of the new processing plant could guarrantee demand as well as transfer of technology for the small Black-Smithery activity in the region.

Appendix 15.1 West Sumatra : Number of Population and Sample Selected for Metal-Working Survey

Type of Industry	Population	Sample	Percentage
Metal Processing			
- Metal Roof	1	1	100.0
- Metal Construction	23	6	26.1
- Black-Smithery	262	15	8.7
- Metal Furniture	31	6	19.4
- Kitchen Tools	18	6	33.3
- Empty Can	2	7	50.0
Metal Repair			
- Motor Cycle Repair	179	10	5.6
- Car Repair	120	8	6.7
- Welding Shop	56	8	14.3
- Car Body Repair*/	45	6	14.3
- Ship Repair**/	7	2	42.9
Total	741	67	9.0

*/ Include car body manufacture

**/ Include ship building

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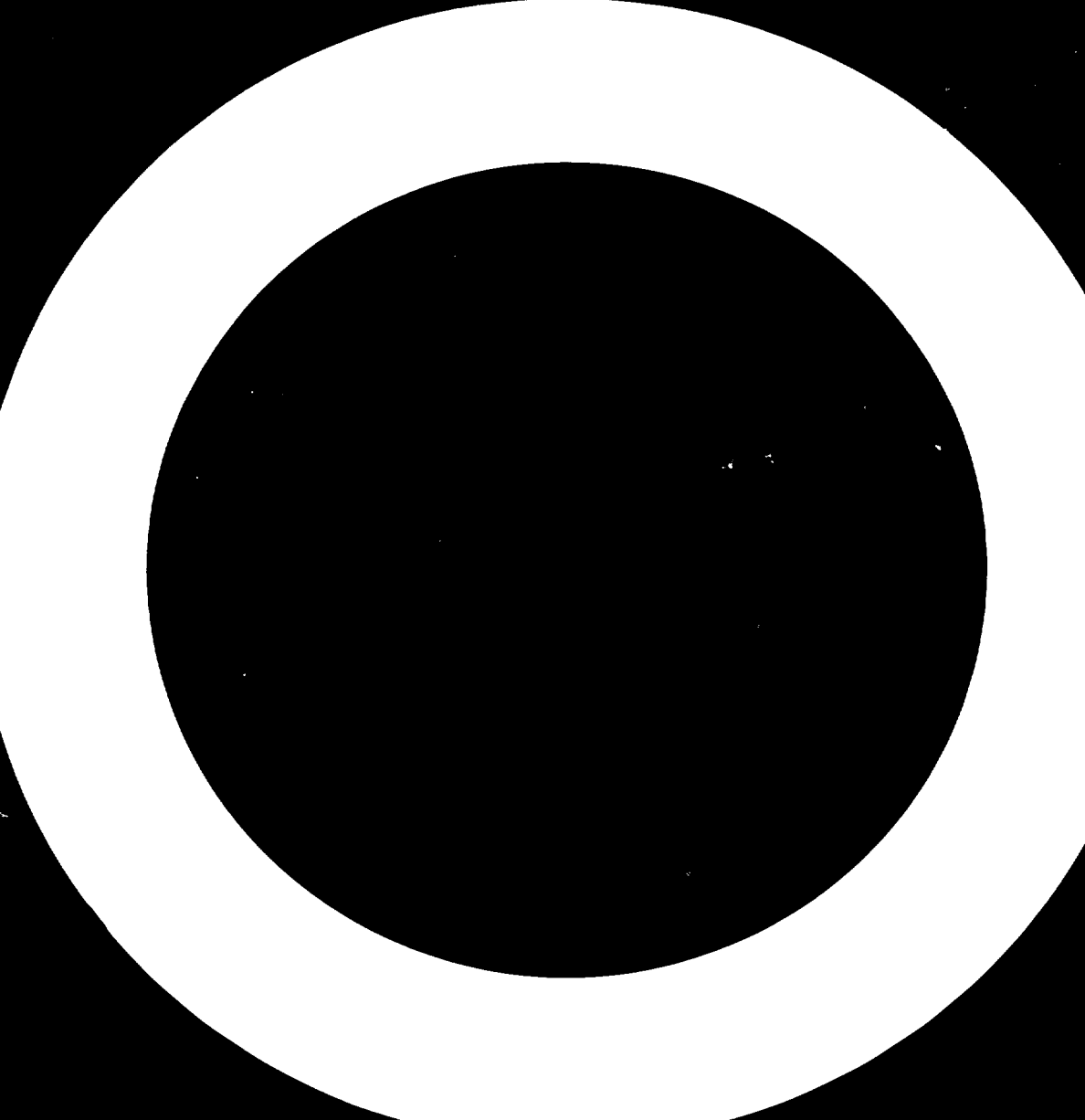
Part IV

BASIC NEEDS



Chapter 16

FOOD SUPPLY AND DEMAND

FOOD supply and demand in a certain region have significant influence on the level of living conditions of the people . As a component of basic needs, the availability of food in sufficient quantity and quality is important for creating a favourable economic condition. Accordingly this study deals with on evaluation of food situation, especially regarding its sufficiency. As a regional study, such an evaluation of food situation is directed to the ability of the region to produce food that fulfils demand. Therefore in supply side analysis wholy imported commodities are excluded.

This chapter will asses the balance of food using two different approaches physical consumption approach and calory and protein approach. But first of all, food pattern will be discussed.

FOOD CONSUMPTION PATTERN

Comparing with other food pattern, the spesific pattern of food in West Sumatra is immediately apparent. As shown in Table 16.1 rice consumption per capita in this region is much higher than in Java or Indonesia as a whole. West Sumatra people consume rice 27 per cent more than Javaness people and 22 per cent more than the Indonisian people. It seems that cassava and sweet potatoes have been used to substitute short of rice consumption in Java and Indonesia as a whole.

Almost all of animal protein resources food are consumed in West Sumatra at higher level than either Java or Indonesia. Only for fish and fresh milk that West Sumatra consumption level is slightly lower than the Indonesian level.

Another spesific pattern of food consumption in West Sumatra is that frest coconut consumption in this region is much

hihger than in Java and Indonesia as a whole. Consumption of fresh coconut in West Sumatra is 104 per cent more than the level of consumption in Indonesia and 162 per cent more than the level of consumption in Java.

Table 16.1 Consumption Level Per Capita Per Year of Selected Foodstuffs in West Sumatra, Java and Indonesia, 1976

Foodstuffs	Unit	West Sumatra	Java	Indonesia
Rice	kg	145.288	106.149	113.620
Cassava	kg	10.088	31.165	33.124
Sweet Potato	kg	6.396	9.741	12.376
Palm Sugar	ons	12.896	27.196	24.804
Sugar	ons	44.980	41.635	57.772
Fresh Coconut	kernel	42.796	16.311	20.956
Cooking oil	liter	5.356	3.865	4.524
Fresh Marine fish	kg	4.212	1.612	4.888
Dried and Salted fish	kg	3.276	4.143	4.576
Fresh Inland fish	kg	2.600	1.595	2.964
Cattle Meat	kg	1.300	0.537	0.780
Buffalo Meat	kg	0.468	0.156	0.208
Chicken Meat	Head	1.352	0.849	1.196
Chicken Egg	egg	17.264	10.123	13.208
Other Egg	egg	12.792	3.068	4.420
Fresh Milk	leter	0.312	0.347	0.364

Source: Central Bureau of Statistics, Survey Sosial Ekonomi Nasional 1976 (National Socio Economics Survey) (Jakarta, 1980)

FOOD BALANCE: PHYSICAL CONSUMPTION APPROACH

In this section we want to estimate food balance in the future in terms of physical meaning rather than in nutritional

meaning, that is this approach does not concern with calory and protein but with food as a commdity. Therefore in this section, food balance will be analised as a commodity. Demand for a certain food is calculated on the basis on physical consumption and population. Income elasticity to consume is also taken in to consideration.

According to food consumption pattern, there are 19 varieties[1/] of foodstuffs included in this study. Except for fruit and vegetables[2/] level of consumption in the base year is quoted from National Socio-Economic Survey (Survey Sosial Ekonomi Nasional) 1976 (SUSENAS). Income elasticitties are calculated on the basis of level of consumption by expenditure group using the same source of data (SUSENAS 1976). Projection of income and population are quoted from the Fourth Five-Year Development Plan of West Sumatra.

Supply of foodstuffs is projected using the projection of production quoted from West Sumatra (1984), conversion factor from production to available quantity to consume is calculated on the basis on Food Balance Sheet[3/].

The results of calculation are summarized in Table 16.2, and Table 16.3, Rice as staple food, as before will be surplus in the future at least up to 1990. The increasing of surplus means that contribution of this region to the neighbouring provinces becomes higher.

The projection of food balance for cassava tells us that in the future surplus of cassava will be decreaseing. Since

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1/ Consist of rice, cassava, sweet potato, palm sugar, ground nut, fresh coconut, cooking oil, cattle meat, buffalo meat, pork meat, chicken meat, Egg, milk, marine fish, inland fish, banana, chili, potato, and cabbage.

2/ Neraca Bahan Makanan Sumatra Barat, 1979, 1980, and 1981 (Food Balance Sheet of West Sumatra) are used to make projection of supply and demand for fruit and vegetable.

3/ Neraca Bahan Makanan, 1979, 1980, and 1981 op cit

Table 16.2 Income Elasticities to Consume and Projection of Food Balance in Physical Consumption Approach, by Foodstuffs in West Sumatra 1984-1990
(Percentage surplus or minus)

Foodstuffs	Income Elasticity	1984	1985	1986	1987	1988	1989	1990
Rice	0.997	+ 16.3	+ 18.1	+ 19.9	+ 21.7	+ 23.4	+ 25.1	+ 26.8
Cassava	0.271	+ 42.2	+ 41.2	+ 440.3	+ 39.3	+ 38.3	+ 37.3	+ 36.3
Sweet Potato	0.271	- 55.3	- 55.7	- 56.0	- 56.3	- 56.6	- 56.8	- 57.0
Palm Sugar	1.074	+ 56.1	+ 55.1	+ 54.1	+ 53.0	+ 51.9	+ 50.8	+ 49.0
Peanut	0.806	- 28.2	- 28.9	- 28.8	- 30.5	- 31.3	- 32.1	- 32.9
Fresh Coconut	0.806	+ 31.0	+ 31.1	+ 31.1	+ 31.2	+ 31.2	+ 31.3	+ 31.4
Cooking Oil	0.806	- 21.5	- 24.0	- 26.4	- 28.9	- 31.4	- 33.9	- 36.6
Banana	0.806	+ 9.0	+ 12.5	+ 15.9	+ 19.2	+ 23.3	+ 25.2	- 28.1
Chili	0.806	+ 16.4	+ 17.5	+ 18.6	+ 19.6	+ 20.7	+ 21.7	+ 22.7
Potato	0.271	+ 32.6	+ 34.6	+ 36.6	+ 38.5	+ 40.4	+ 42.2	+ 43.9
Cabbage	0.814	- 22.3	- 19.2	- 15.4	- 11.0	- 5.9	- 2.3	+ 11.1
Cattle Meat	1.696	- 61.6	- 59.9	- 59.2	- 59.2	- 59.5	- 59.2	- 58.8
Buffalo Meat	1.696	- 29.4	- 36.3	- 43.4	- 50.8	- 58.6	- 67.1	- 76.1
Pig Meat	1.696	- 139.4	- 138.9	- 138.9	- 138.7	- 138.4	- 142.4	- 136.5
Chicken Meat	1.696	- 8.0	- 7.1	- 6.2	- 5.0	- 3.8	- 2.9	- 2.0
Egg	1.334	+ 37.2	+ 41.8	+ 45.8	+ 49.6	+ 53.2	+ 56.3	+ 59.1
Milk	2.989	- 6.5	- 4.7	- 1.9	+ 1.6	+ 5.8	+ 8.8	+ 11.
Marine Fish	0.814	- 86.0	- 80.8	- 76.8	- 72.9	- 69.3	- 65.5	- 61.7
Inland Fish	0.814	- 71.5	- 74.9	- 75.3	- 75.7	- 75.3	- 76.2	- 77.1

Table 16.3 Projection of Food Balance in Physical Consumption Approach By Foodstuffs in West Sumatra, 1984-1990
(Ton surplus or minus)

Foodstuffs	1984	1985	1986	1987	1988	1989	1990
Rice	+ 134.978	+ 156.700	+ 178.817	+ 204.479	+ 230.626	+ 258.499	+ 288.117
Cassava	+ 29.931	+ 29.616	+ 29.338	+ 29.044	+ 29.328	+ 28.394	+ 28.037
Sweet Potato	- 9.233	- 9.569	- 9.912	- 10.261	- 10.619	- 10.983	- 11.355
Palm Sugar	+ 8.622	+ 8.805	+ 8.986	+ 9.165	+ 9.340	+ 9.503	+ 9.662
Peanut	- 2.452	- 2.641	- 2.839	- 3.049	- 3.271	- 3.513	- 3.768
Fresh Coconut*	+ 74.081	+ 78.199	+ 82.550	+ 87.336	+ 92.313	+ 97.398	+ 102.816
Cooking Oil	- 2.739	- 3.151	- 3.583	- 4.047	- 4.536	- 5.075	- 5.644
Banana	+ 2.698	+ 4.096	+ 5.693	+ 7.513	+ 9.575	+ 11.872	+ 14.467
Chili	+ 2.814	+ 3.200	+ 3.630	+ 4.097	+ 4.616	+ 5.166	+ 5.768
Potato	+ 4.373	+ 4.937	+ 5.547	+ 6.209	+ 6.925	+ 7.702	+ 8.539
Cabbage	- 3.602	- 3.349	- 2.931	- 2.290	- 1.346	- .584	+ .297
Cattle Meat	- 3.138	- 3.360	- 3.627	- 3.949	- 4.313	- 4.683	- 5.080
Buffalo Meat	- .639	- .814	- 1.000	- 1.220	- 1.455	- 1.723	- 2.021
Pig Meat	- 506	- 549	- 599	- 652	- 707	- 796	- 834
Chicken Meat	- 636	- 621	- 590	- 529	- 436	- 367	- 280
Egg **	+ 103.286	+ 134.533	+ 170.213	+ 213,047	+ 264,374	+ 321,476	+ 388,504
Milk***	- 177	- 148	- 73	+ 71	+ 301	+ 504	+ 848
Inland Fish	- 5.222	- 5.653	- 5.974	- 6.312	- 6.624	- 7.032	- 7.457
Marine Fish	- 22.888	- 23.321	- 23.882	- 24.413	- 24.954	- 25.422	- 25.829

Note: * in '000 kernel, ** in '000 eggs and *** in '000 litres

demand for cassava became higher, at least from the new comer tapioca industry which is not yet included in this analysis, effort to increase cassava production should be encouraged. The lowness of rate of growht of cassava maybe related to limited share of cassava in food basket of West Sumatra's people.

The shortage of sweet potatoes and peanut has been a chaoure problem for a long time. Eventhough these crops do not require special condition of land and climate, they are only produced in certain and limited areas. Therefore there is a possibility for the farmer to increase their income by cultivating these crops on some idle (un cultivated) land .

There is a surplus of coconut about 31 per cent of supply . As in the case of coconut oil industry as mentioned in chapter 8 where the producer reported that they have to work in under capacity because of the lack of raw material; but according to recorded data the coconut production is more than sufficient. Now we are facing the same inconsistency once again. Where as the coconut production is surplus about 31 per cent, the coconut oil (cooking oil) is minus about 21-37 per cent. As before this study guesses that there is an over estimate in production of coconut.

Supply of animal food stuff as the resources of animal protein in the future are very critical. Except for egg supply, all of animal foostuffs are in deficiency situation. The total supply of those foods will not be able to meet the demand. Therefore a special program should be prepared in the next short period, to increase animal foodstuffs production in the future. Relating to investment possiblility for private sector, there is a good change for investment in animal-based industries in West Sumatra.

The surplus of vegetables that have existed since a long time ago seems will continue in the future. Hence the position

of West Sumatra as suplier of vegetable, particularly for Riau and Jambi provinces, will continue in the future.

SUPPLY AND DEMAND OF CALORY AND PROTEIN

Different from physical consumption approach in this section, we want to estimate the supply and demand of food in terms of nutritional needs. There are two objectives of this analysis:

First; to estimate the projection of supply and demand for food in terms of calory and protein in the future.

Second; to estimate the projection of population below the minimum calory and protein requirements.

Estimating the supply of calory and protein have been made on the basis of supply of foodstuff by calory and protein contents. For example, the supply of rice in 1984 = 829,094 ton ; content of calory per gram of rice = 3.615[4/]; projection of population in 1984 = 3,711,855 , number of day per year = 365; share of calories of rice in cereal group = 0.94877[5/]. Based on these variables and coefficients, supply of calory per capita per day (SC) from cereal group in 1984 can be calculated as,

$$SC = \frac{829{,}094 \times 3.615 \times 10^6}{3{,}711{,}855 \times 365 \times 0.94877} = 2{,}331.67$$

4/ Direktorat Gizi Departemen Kesehatan Republik Indonesia, Daftar Komposisi Bahan Makanan, (Jakarta: Bhratara, 1972), 3.615 is average contain of calories of milled rice and semi milled rice.

5/ Kantor Wilayah Departemen Pertanian, 1979, 1980 and 1981, Neraca Bahan Makanan di Sumatera Barat (Food Balance Sheet of West Sumatra), Padang.

By the same manner bath for calory and protein, supply of calory and protein per group of foodstuff can be found as presented in Appendix 16.1 and 16.2. Total supply of calory is shown in column 2 of Table 16.4, total supply of protein is shown in column 2 of Table 16.5, and especially supply of animal protein are shown in column 2 of Table 16.7.

Demand for calory and protein is calculated on the basis of food consumption level by expenditure group. Firstly, take conversion from level of consumption per foodstuff into calory and protein per group of foodstuff. It should be remembered that as in demand case, consuption level of a main foodstuff in certain foodstuff group is used to estimate number of calory or protein of foodstuff group group (exp. rice for cereal foodstuff group). Further using income elasticities, growth rate of income 1976-1990 (including projection of income rate of growth 1984-1990), and population rate of growth in the same period, projection of demand for calory and protein per group of foodstuff per capita per day in 1984-1990 can be calculated. For example, here is an estimation of demand for calory from cereal foodstuff group. Average consumption level of rice in 1976 = 2.794 kg/capita/week (SUSENAS 1976); calory content per gram of rice = 3.615; total rate of growth of income per capita 1976-1984 = 37.39 per cent ; income elasticity to consume of rice = 0.997; share of rice in cereal foodstuff group = 0.942[6/], projection of demand for calory from cereal foodstuff group is

$$\frac{\frac{2.794}{7} \times 1000) \times 3.615 \times 1 + (0.3739 \times 0.997)}{0.942} = 2{,}102.74$$

6/ Based on SUSENAS 1976, slightly different with Food Balance Sheet of West Sumatra.

By the same manner both for calory and protein, demand for calory and protein per group of foodstuff can be found as presented in Appendix 16.3 and 16.4. Total demand for calory is shown in column 3 of Table 16.4, total demand for protein is shown in column 3 of Table 16.5 , and total demand for animal protein is shown in column 3 of Table 16.6.

Table 16.4 Projection of Supply and Demand of Calory in West Sumatra, 1984-1990
(unit of calory per capita per day)

Year	Supply	Demand	Balance
1984	2,940.38	2,739.69	+ 200.70
1985	3,042.26	2,842.47	+ 199.79
1986	3,119.66	2,876.68	+ 242.98
1987	3,199.36	2,899.31	+ 300.05
1988	3,279.15	2,922.74	+ 356.41
1989	3,364.75	2,947.37	+ 417.38
1990	3,454.15	2,972.96	+ 481.19

Table 16.5 Projection of Supply and Demand of Protein in West Sumatra, 1984-1990
(gram protein per capita per day)

Year	Supply	Demand	Balance
1984	70.87	57.34	+ 13.53
1985	72.61	59.54	+ 13.07
1986	74.58	60.46	+ 14.12
1987	76.62	61.11	+ 15.51
1988	78.71	61.75	+ 16.96
1989	80.93	62.46	+ 18.47
1990	83.27	63.20	+ 20.07

As indicated by Table 16.4 and 16.5 and Figure 16.1 - 16.3 there is a surplus either of calory or protein. This result is consistent with physical food consumption approach, where rice as most important sources either of calori or protein is surplus. Further, this surplus becomes higher by years up to 1990. This phenomenon also appears in the result of calory and protein approach. Nevertheless, especially for animal protein, as the result of the physical consumption approach, there is critical deficiency of animal protein. Even though there is a tendency that such deficiency will become smaller to the year 1990.

Table 16.6 Projection of Supply and Demand of Animal Protein in West Sumatra, 1984-1990
(gram protein per capita per day)

Year	Supply	Demand	Balance
1984	6.20	10.41	- 4.21
1985	6.71	10.84	- 4.13
1986	7.21	11.32	- 4.11
1987	7.79	11.82	- 4.03
1988	8.41	12.32	- 3.91
1989	9.11	12.86	- 3.75
1990	9.88	13.44	- 3.56

To estimate the projection of population below the minimum requirement, of calory and protein intake, we use the food condition in 1976, as shown in Table 16.7, as the starting point.

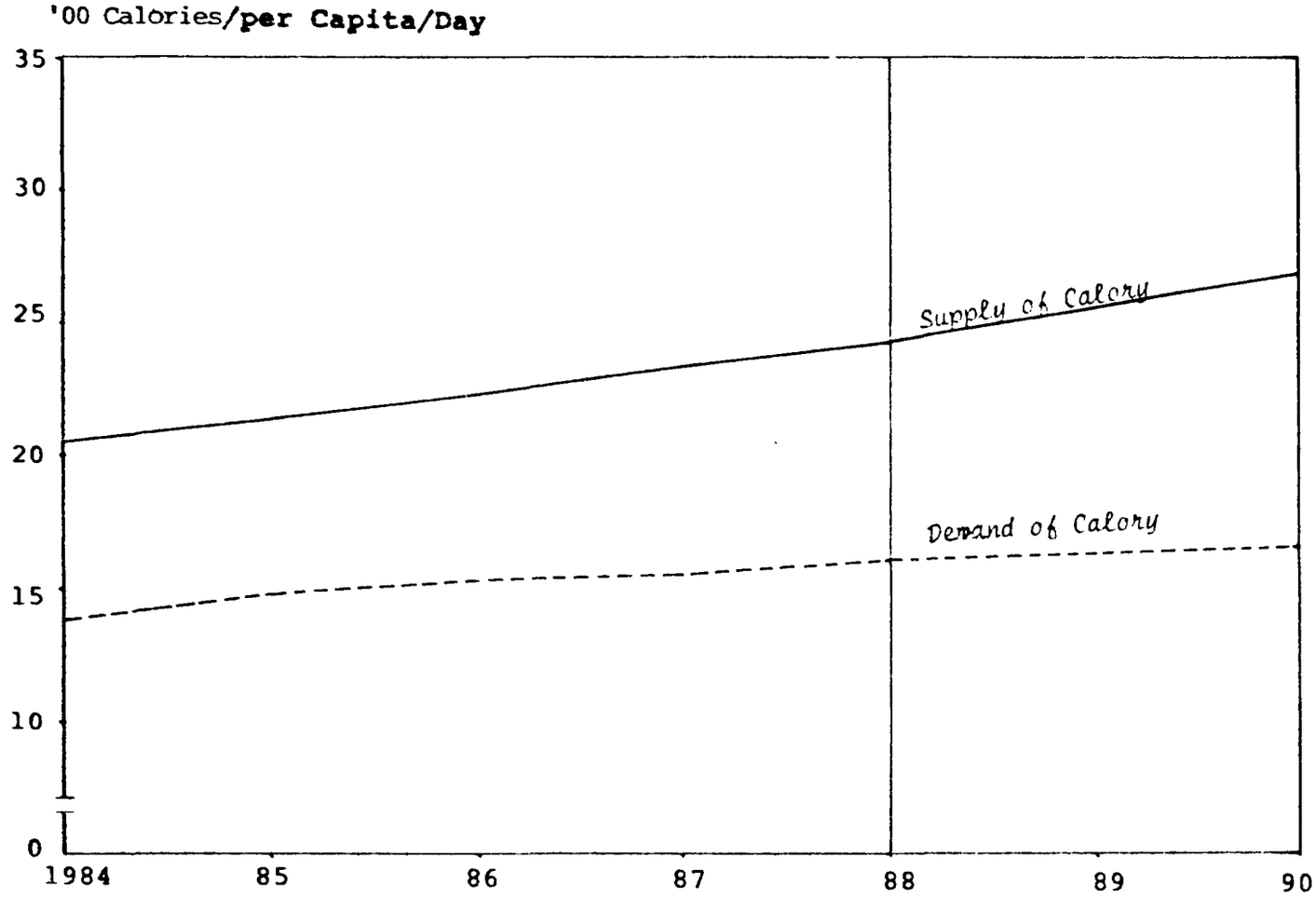

Figure 16.1. WEST SUMATRA : PROJECTION OF SUPPLY AND DEMAND OF CALORIES PER CAPITA PER DAY, 1984-1990

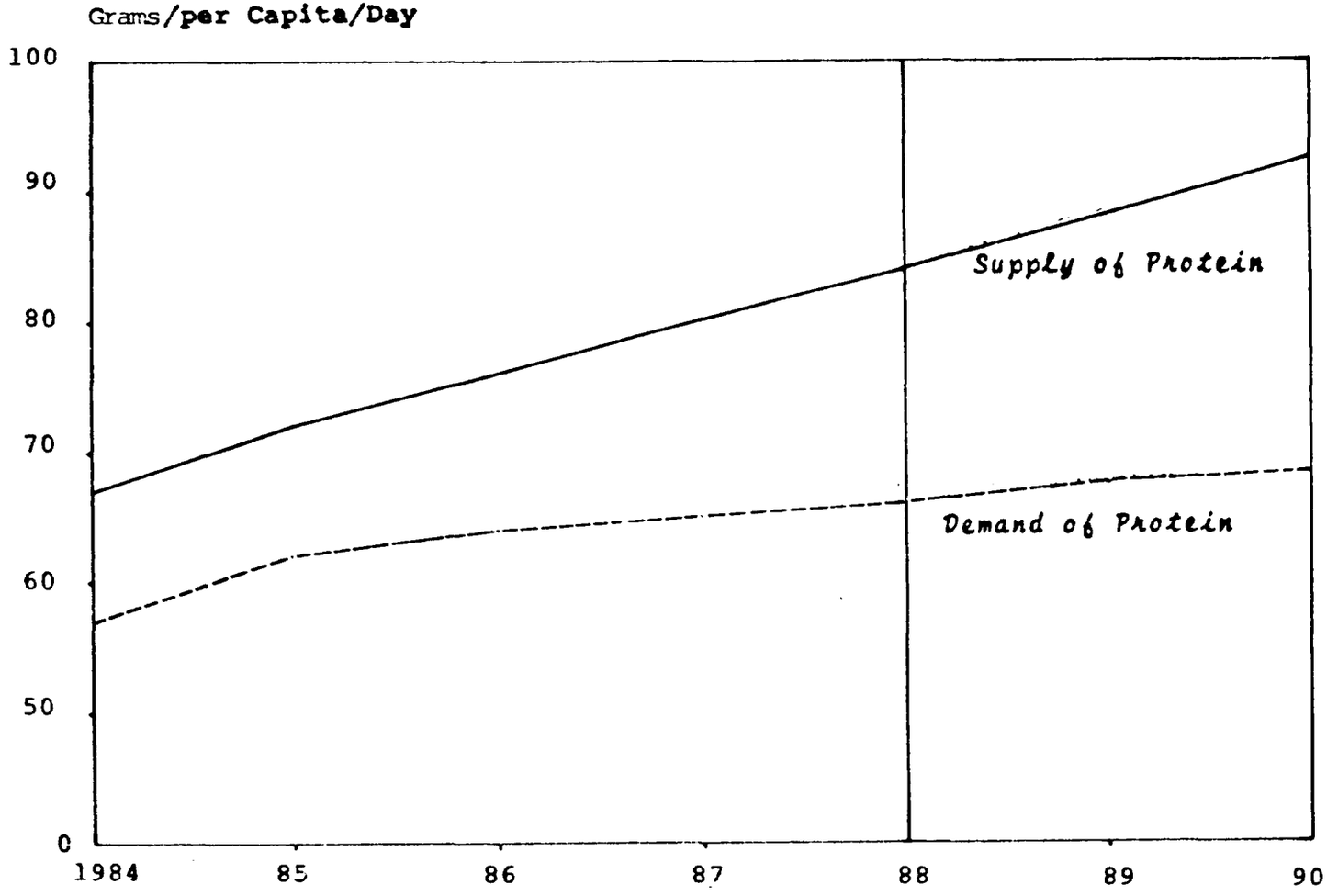

Figure 16.2. WEST SUMATRA : PROJECTION OF SUPPLY AND DEMAND OF PROTEIN PER CAPITA PER DAY, 1984-1988

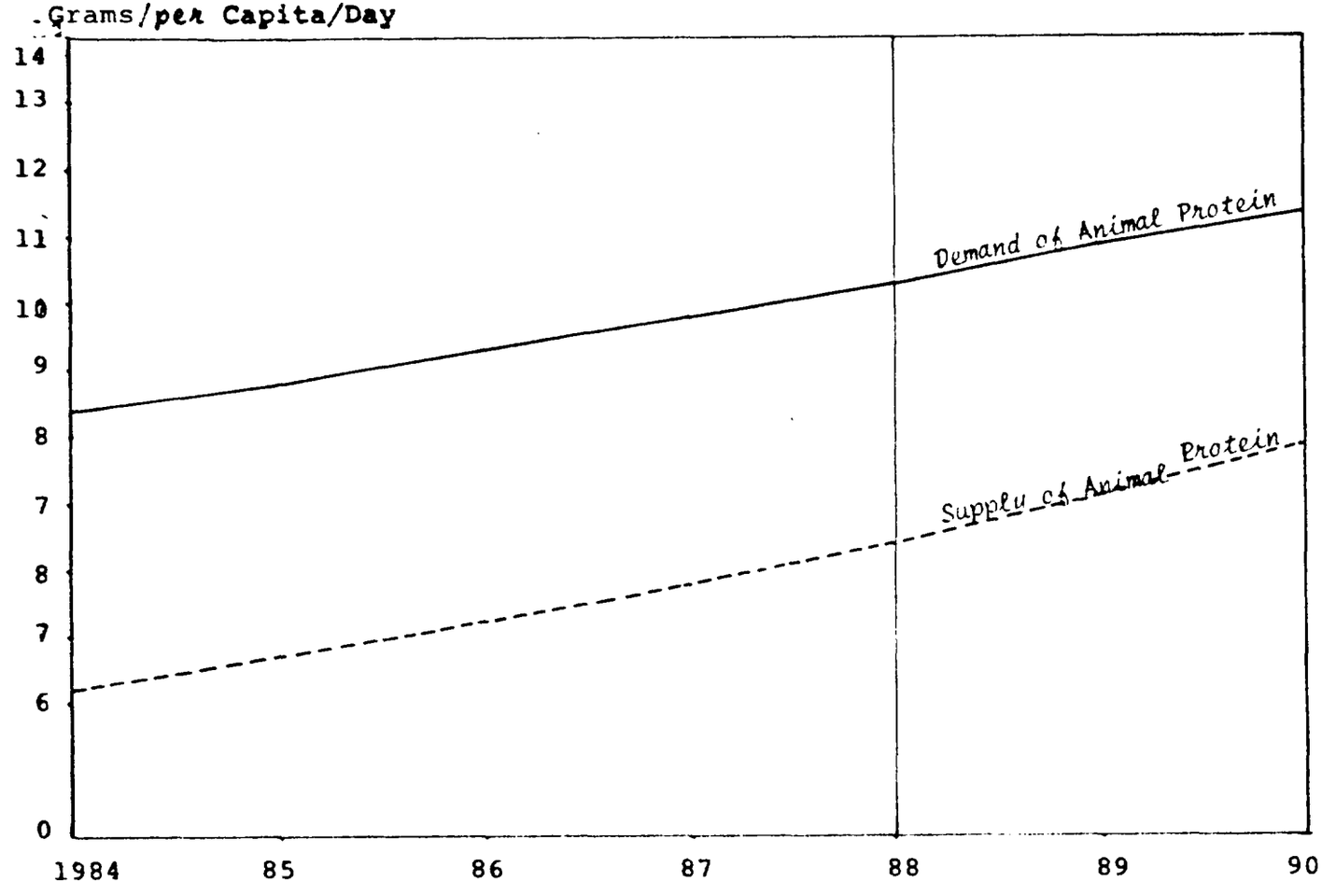

Figure 16.3. WEST SUMATRA : PROJECTION OF SUPPLY AND DEMAND OF ANIMAL PROTEIN PER CAPITA PER DAY, 1984-1990

Table 16.7 Number of Population, Calory, Protein and Animal Protein Intake per Capita per Day by Monthly per Capita Expenditure in West Sumatra, 1976.

Monthly per Capita Expenditure	Number of Population	Calory	Protein	Animal Protein
1,000	-	-	-	-
1,000- 1,999	126,914	1,179.90	23.39	1.96
2,000- 2,999	448,554	1,547.95	31.35	4.07
3,000- 3,999	781,296	1,805.35	37.08	5.71
4,000- 4,999	510,944	2,098.43	42.56	6.41
5,000- 5,999	428,781	2,305.40	47.78	8.74
6,000- 7,999	424,950	2,272.07	49.78	11.02
8,000- 9,999	173,562	2,904.34	63.10	14.29
10,000-14,999	87,562	2,595.40	58.28	16.82
15,000-19,999	9,394	2,667.06	59.48	17.80
20,000-29,999	854	3,346.36	71.39	35.48
30,000	1,704	4,786,06	91.60	26.36
Average	2,994,446	2,018.76	42.00	7.47

The untritional minimum requirements are 1900 calory per capita intake per day, and 40 gram protein per capita per day[7/] (out of which 30 per cent should consist of the animal protein (12 gram). According to Table 16.7, the minimum require at 1900 calory intake stay betwen 1,080.35 - 2,098.43 or calory on in take, whose per capita expenditure per mouth between Rp 3,000 - Rp 3,999 Assuming that calorie is dependent on income (in term of expenditure, i.e., expenditure group), the minimum income requirement

7/ Sajogyo,

which can take 1,900 (Y_{bc} or boundary) can be calculated by inter polating method, that is Rp 3,823.

To estimate the number of population while have calorie intake less then minimum requirement in the next period, the new grouping of population should be made as shown in Table 16.8

Table 16,8 Population and Calorie Intake per Capita per Day by New Group of Expenditure, 1976

Mounthly per Capita Expenditure	Number of Population	Calorie
< 1,000	-	
1,000 - 1,999	125.914	1,179.90
2,000 - 2,999	448.554	1,547.95
3,000 - 3,822	643.007	< 1,900[a/]
3,823 - 4,999	649.233	⩾ 1,900[b/]
5,000 - 5,999	428.781	2,305.40
6,000 - 7,999	424.950	2,272.07
8,000 - 8,999	173.562	2,904.34
10,000 -14,999	87.562	2,595.40
15,000 -19,999	9.394	2,667.06
20,000 -29,999	854	3,346.36
>30,000	1.704	4,786.06

a/ The maximum calorie intake per capita per day of the member of this group is less than 1,900

b/ The minimum calorie intake per capita per day of the member of this group is bigger than 1,900.

Relating to the previous assumtion, when the income of a person increase in such a manner that he moves from the income group 3,000 - 3,822 to 3,823 - 4,999, outomaticly he will have calorie intake more than the minimum requirement. Accordingly to estimate the number of population with minus calorie next year, we have to estimate how many persons will cross to 3,823 - 4,999 income group (cross the boundary) inconformity with growth rate of income.

When rigional income increases by r_y and population increases by r_p and the minimum annual per capita income requirements to attain the minimum per capita calory requirements per day is Y_b, the level of income which able to achieve Y_b is Y_c, then

$$Y_c + r\,Y_c = Y_b \qquad (1)$$

$$Y_c = \frac{Y_b}{1+r} \qquad (2)$$

then

$$r = r_y - r_p$$

The number of population which can achieve the minimum calory requirements for the next period, is,

$$N_c = \frac{Y_b - Y_c}{C_i} \times P_{oc}\,(1 + r_p) \qquad (3)$$

where,

C_i = Monthly per Capita Expenditure class interval at the nearest before Y_b

P_{oc}= Number of population at the nearest before Y_b

The percentage of population below the minimum calory requirements in 1977 (P_m), can be calculated as

$$P_m = \frac{P_{om}\,(1 + r_p) - N_c}{P_o(1 + r)} \times 100$$

where P_{om} is the number of population which have the calorie intake, less than the minimum requirements at the base year.
For example, from 1976 to 1977 we have;

Y_b = Rp 3,823
r_y = 0.0721
r_p = 0.022
P_{oc}= 643,007
C_i = 822
P_{om}= 1,218,475
P_o = 2,994,515

Using equation (2) we find

$$Y_c = \frac{3,823}{1 + (0.0721 - 0.022)}$$

$$= 3,641$$

Substitution $Y_c = 3,641$ into equation (3) we have

$$N_c = \frac{3,823 - 3,641}{822} \times 643,007 \ (1 + 0,022)$$

$$= 145,501$$

Using $N_c = 145,501$ in equation (4) we find

$$P_m = \frac{1,218,475 \ (1 + 0.022) - 145,501}{2.994,515 \ (1 + 0.022)} \times 100$$

$$= 35.94$$

Hence, in 1977 the number of population below the minimum calory requirements decreased from 45.3 per cent to 35.94 per cent. By the same method, either for calory, protein or animal protein , the number of population below the minimum requirements to the year 1990 can be found. But it should be remembered that a certain number of population will enter the nearest group before boundary which comes from first group behind. The results of this calculation are shown in Table 16.9.

CONCLUSION

West Sumatra's people consume rice much more than other regions in Indonesia. Nevertheless this region coul be self-sufficient in this foostuff. In fact it is an important source of rice for the neighbouring provinces. In the future it seems that this performance will increase.

Either physical or calory and protein approach in food balance analysis gives us the significant indication that this region is in surplus condition. But considering the distribution aspect we find the significant indication that a large part of the population is in deficient condition, where their calory and protein intake is less than the minimum requirement. According to the projection analysis, this condition will continue up to 1990, especlly in animal protein which about 50 per cent of the population will have animal protein intake less than the minimum requirement. Therefore special endeavour should be undertaken.

--ooOoo--

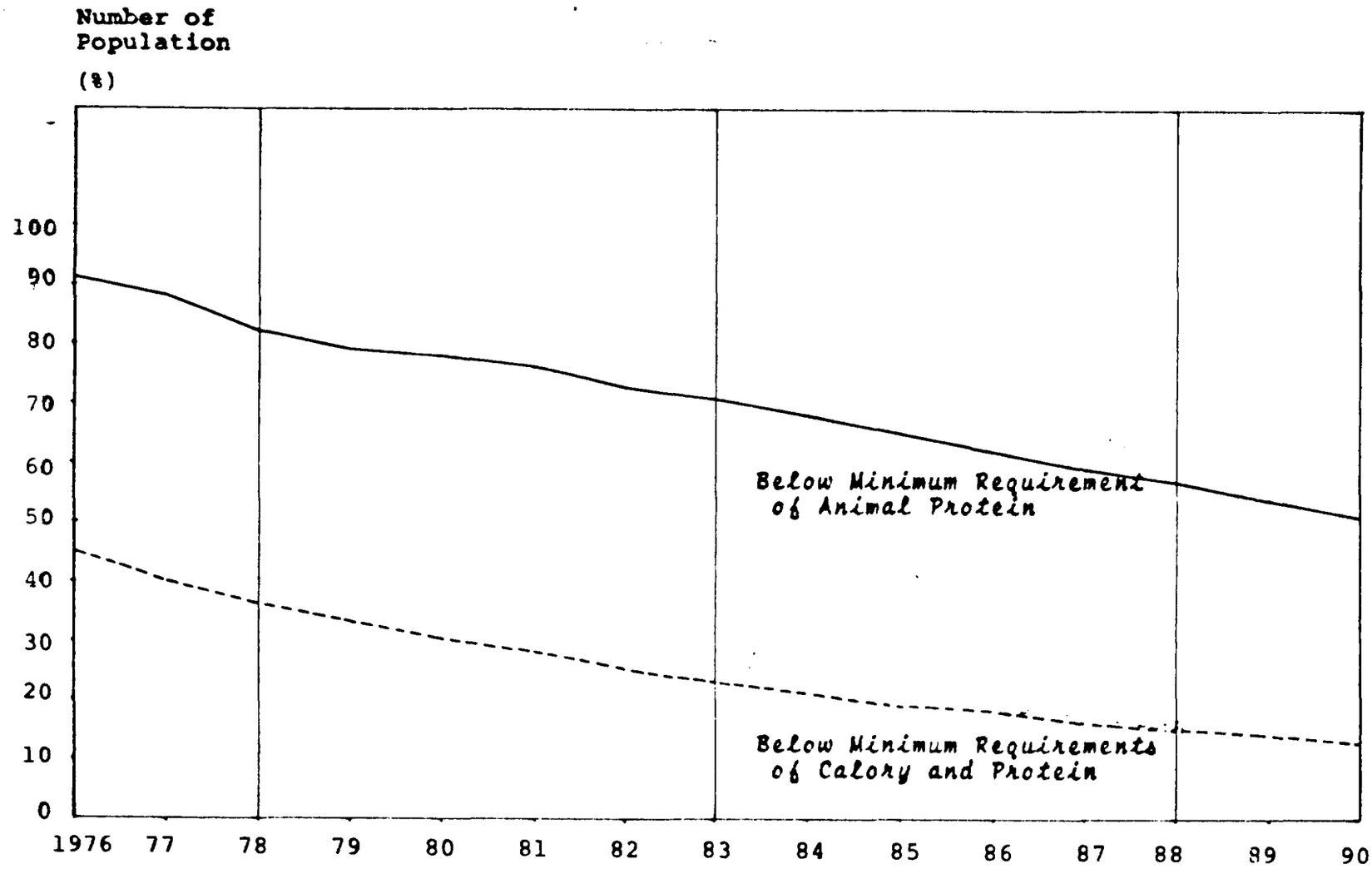

Figure 16.4 WEST SUMATRA: TRENDS AND PROJECTIONS OF POPULATION BELOW THE MINIMUM REQUIREMENTS OF CALORY, PROTEIN AND ANIMAL PROTEIN, 1976-1990

Table 16.9 Trend and Projection of Population Below the Minimum Requirements of Calories, Protein, and Animal Protein West Sumatra, 1976-1990

Year	Number of Population (person)	Number of Population Below Minimum Requirements of Calories and Protein					
		Absolute (Persons)			Relative (%)		
		Calories	Protein	Animal Protein	Calories	Protein	Animal Protein
1976	2,994,515	1,218,475	1,374,136	2,636,371	40.69	45.86	88.04
1977	3,060,324	1,099,780	1,250,224	2,615,353	35.94	41.67	85.46
1978	3,126,386	1,993,363	1,139,382	2,477,661	31.77	36.44	79.25
1979	3,225,539	1,938,570	1,080,233	2,481,407	29.10	33.49	76.93
1980	3,327,837	1,887,147	1,026,970	2,498,873	26.66	30.86	75.09
1981	3,437,478	841,986	976,931	2,517,265	24.49	28.42	73.23
1982	3,524,198	777,513	908,539	2,508,524	22.06	25,78	71.18
1983	3,637,618	735,770	860,297	2,484,857	20.23	23.65	68.31
1984	3,711,855	681,896	805,844	2,434,606	18.37	21.71	65.59
1985	3,790,770	634,597	752,847	2,387,427	16.74	19.86	62.98
1986	3,870,809	590,774	701,391	2,332,937	15.26	18.12	60.27
1987	3,951,691	550,159	655,586	2,274,198	13.92	16.59	57.55
1988	4,033,856	512,508	611,533	2,208,133	12.71	15.16	54.74
1989	4,116,550	475,848	568,907	2,137,724	11.56	13.82	51.93
1990	4,200,116	442,008	529,635	2,063,097	10.52	12.61	49.12

Appendix 16.1 Projection of Supply of Calory per Capita per Day in West Sumatra, 1984-1990

	1984	1985	1986	1987	1988	1989	1990
Cereal	2,331,67	2,413,26	2,467,34	2,523,26	2,580,62	2,640,04	2,701,37
Starch	62.87	62.65	62.45	62.25	62.06	61.91	61.76
Sugar	44.11	44.92	45.75	46.61	47.49	48.39	49.33
Oily Seed	390.88	401.42	414.23	426.55	436.37	448.47	461.01
Fruit	18.23	19.56	20.98	22.50	24.16	25.92	27.82
Vegetables	22.08	23.04	24.04	25.10	26.20	27.37	28.60
Fish	16.93	17.96	18.95	20.00	21.08	22.27	23.52
Meat	21.80	23.34	25.08	26.84	28.71	30.80	33.07
Egg	30.60	34.74	39.26	44.43	50.34	57.13	64.85
Milk	1.21	1.37	1.58	1.82	2.12	2.45	2.82
Total	2,940,38	3,042.26	3,119.66	3,199.36	3,279.15	3,364.75	3,454.15

Appendix 16.2 Projection of Supply of Protein per Capita per Day in West Sumatra, 1984-1990

Foodstuff Group	1984	1985	1986	1987	1988	1989	1990
Cereal	46.20	47.22	48.28	49.37	50.50	51.65	52.86
Starch	11.12	11.21	11.30	11.40	11.48	11.59	11.69
Sugar	1.25	1.27	1.29	1.32	1.34	1.37	1.40
Oily Seed	4.86	4.92	5.14	5.31	5.47	5.64	5.80
Fruit	0.23	0.24	0.27	0.28	0.31	0.32	0.35
Vegetables	1.01	1.04	1.09	1.15	1.20	1.25	1.29
Fish	2.81	2.99	3.14	3.33	3.49	3.70	3.91
Meat	1.74	1.85	1.96	2.07	2.20	2.33	2.47
Egg	1.58	1.79	2.02	2.29	2.60	2.95	3.34
Milk	0.07	0.08	0.09	0.10	0.12	0.13	0.16
Total	70.87	72.61	74.58	76.62	78.71	80.93	83.27
Animal Protein	6.20	6.71	7.21	7.79	8.41	9.11	9.88

Appendix 16.3 Projection of Demand of Calory per Capita per Day in West Sumatra, 1984-1990

Foodstuff Group	1984	1985	1986	1987	1988	1989	1990
Cereal	2,102.74	2,184.49	2,196.89	2,196.89	2,196.89	2,196.89	2,196.89
Starch	54.58	55.16	55.74	56.33	56.92	57.54	58.16
Sugar	81.32	84.73	88.28	91.97	95.82	99.94	104.23
Oily Seeds	376.82	388.66	400.88	413.48	426.48	439.88	453.71
Fruit	18.23	18.80	19.39	20.00	20.63	21.30	21.98
Vegetables	23.04	23.61	24.19	24.78	25.39	26.03	26.69
Fish	37.73	38.93	40.16	41.44	42.75	44.14	45.58
Meat	26.93	28.71	30.61	32.64	34.79	37.15	39.67
Egg	16.29	17.14	18.03	18.98	19.95	21.01	22.14
Milk	2.01	2.24	2.51	2.80	3.12	3.49	3.91
Total	2,739.69	2,842.47	2,876.68	2,899.31	2,922.74	2,947.37	2,972.96

Appendix 16.4 Projection of Demand of Protein per Capita per Day in West Sumatra, 1984-1990

Foodstuff Group	1984	1985	1986	1987	1988	1989	1990
Cereal	41.90	43.53	43.84	43.84	43.84	43.84	43.84
Starch	0.58	0.59	0.59	0.60	0.60	0.61	0.62
Sugar	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Oily Seed	2.99	3.08	3.18	3.28	3.38	3.49	3.60
Fruits	0.23	0.24	0.24	0.25	0.26	0.27	0.28
Vegetables	1.22	1.25	1.28	1.31	1.34	1.38	1.41
Fish	6.77	6.98	7.21	7.44	7.67	7.91	8.17
Meat	2.34	2.49	2.66	2.84	3.02	3.22	3.44
Egg	1.20	1.26	1.33	1.40	1.47	1.55	1.63
Milk	0.10	0.11	0.12	0.14	0.16	0.18	0.20
Total	57.34	59.54	60.46	61.11	61.75	62.46	63.20
Animal Protein	10.41	10.84	11.32	11.82	12.32	12.86	13.44

Chapter 17

HOUSING FACILITIES AND NEEDS

HOUSING is a very important component of the "necessity of life" along with food, clothing, health and education. The most recent view on the appropriate role of housing derives from emergent trends in development thinking. Increasing disillusionment with the record of growth maximizing development has led, in further decade, to call for the adoption of the basic needs attainment as an additional objective of development and the ultimate objectives is to determine the level of welfare society.

In the development literature, there is a considerable controversy about the appropriate role of housing in economic development. This results from a combination of several factors. One important factor is the lack of adequate data basis with which to assess in any definitive way, the contribution of the housing sector to development. Second, widely different theoretical positions on this issue were evident till a decade ago in dialogue between housing specialist, who traditionally ascribed to the housing sector as an important role in development, and the economist who gave housing a low priority on the development agenda.

In developing countries, housing has not been accorded a high priority for investment, a major determinant was assigning of a social, rather than economic priority to housing.

According to Jan Tinbergen (1967) housing was uneconomical since it was in direct competition with industry and agriculture for scarse resources. Housing has a high capital output ratio. Although, some investment for housing could be justified on ground for health and safety "but generally increase in housing standards should follow growth in per capita income resulting from productivity increases.

There is only fragmentary and inadequate information on the role of housing activity in the national economy like in developing countries. Often, information of housing development is only collected for construction sector as a whole and no breakdown is provided for the various forms of construction, dwelling, office building, hotels storage and others. This can be caused partly by extreme difficulty in collecting information on the housing sector. Consequently, estimates of housing investment and employment are likely to have such a large margin of error that it would undermine their usefullness.

Despite these shortcomings that are common in the statistics of collecting data of housing and its facilities, some published data of Central Bureau of Statistics are still of considerable utility to assess housing requirement of West Sumatra. This paper is an empirical study focusing on the basic needs particularly on housing needs. The study utilizes the available data for 1970-1980 period on which the estimation of housing requirement will be based up to 1990.

The Objective of the Study

The main objective of the study is to find appropriate way and means of developing the private sector in housing development. The basic needs study encompassed the assessment the condition of the housing needs of the people in the province. The basic needs component tries to evaluate the situation of the social services which affect the living conditions of the population. Without a fully supported basic needs programme it will be difficult for the private sector to invest in the province.

A study will be made on the number of the houses or shelter available and the number of houses needed to fill the needs of the population. In this case, the minimum housing standard will be used as a basis for calculating the housing needs. Therefore, the income per capita will be used as a basis for

Table 17.1. Number of Building Construction and Households By West Sumatra Province

Development Regions	Building Construction				Households		Ratio of Dwelling/ Households
	Dwelling ('000)	Hotel & Restaurent ('000)	Others ('000)	Total ('000)	Total ('000)	Size a/	
A	73.03	0.23	1.99	75.16	77.16	4.66	1.056
B	234.27	0.88	11.38	246.53	256.21	4.52	1.102
C + E	221.64	0.56	11.38	232.42	236.78	5.28	1.048
D	123.97	0.28	2.39	126.64	131.15	4.76	1.0215
Total	652.91	1.66	25.99	692.03	703.305	4.84	1.077

a/ Household size computed from number of population divided by number of households and accounted in one people.

Source : Central Bureau of Statistics of West Sumatra, 1980 Population Census (Padang: 1981), Table 3,p13.

estimating the demand for housing. It also can be used for as a standard of the ability to core the housing needs of the people.

The broad objectives of this study are :

(1) To review recent development of the housing sector in West Sumatra.

(2) To assess the investment opportunities for the private sector particularly in housing development.

(3) To draw up a policy recommendation for promoting the private investment in the West Sumatra's housing sector.

AN OVERVIEW OF HOUSING SITUATION IN WEST SUMATRA

The highlight of the housing situation of West Sumatra is provided to obtain a basis for analysing housing condition. Information is required on the quality of dwelling units, density, occupancy characteristics, tenure, expenditure and availability of housing amenities. Unfortunately, reliable data on housing stock and facilities are difficult to obtain. Consequently, the overview on housing condition has to be based on data published by the Central Bureau of Statistics of Indonesia and the Annual Report of local government of West Sumatra Province.

The most recent information on housing can be gained from the population census of 1971 and 1980. It is too difficult to classify houses by structure. For instance, the 1971 census provided data based on broad categories such as, temporary, sem permanent and permanent. While the 1980 census used categories in terms of dwelling unit and non dwelling unit of housing constructions.

The 1980 census of population shows the number of 652,912 for dwelling units and 3,406 million from the population. This means that, on average every housing unit is occupied by 5.22 persons. Therefore, at the same time, the number of household is 704 306 which implies that for one dwelling unit there is 1.08 household which consists of 4.84 people.

During the Second Five-Year Development period the number of dwelling units has increased by 3.9 per cent per annum from 488,912 in 1974 tO 570,539 in 1978. While in the Third Five-Year Development Period (1978-1980), it has arisen by 7 per cent per annum. The relatively high rate of growth of dwelling units implies the rising demand for housing as a basic necescity of life due to the rise in income per capita during the development periods. There are generally government programmes which aim to alter the support for housing development such as low-cost housing programme and Kampong Improvement Programme (KIP).

In general, the housing condition in West Sumatra is relatively unsatisfactory. In rural areas, housing is still mainly in traditional mud. Most of dwellings are non-durable and lacking of basic water and sanitary facilities, especially in poor kecamatan areas.

Since the first-five year development period the over whelming majority which approximately accounted for 75-80 per cent of cent of the population in rural areas live under such condition of housing. In recent years, however, the provision of adequate rural housing is considered as an integral part of the housing development in line with the government's kampong improvement programme (KIP).

In urban areas as well as in rural areas, the situation is equally bad. The population aspect and the shining city development has caused of rural-urban migration seeking whereby people are employment opportunities in the urban areas.

This is due the government's inability to keep housing requirement meet the rapid urban growth. The sub-standard residential areas have arisen. In fact, in Padang municipality more than 30 per cent of the residential areas live are in traditional type of dwelling units without water and sanitary facilities. In recent years, throughout the low-cost housing programme for government employee and self-help housing schemes by private sector are aimed at eradicating the squater setlements.

Most of the housing stocks comprised of smaller dwellings. Table 17.2 indicated that the number of households who live in terms of floor areas, over 60 per cent have less than 50 m2 of floor areas, and only 5 per cent of the number households having floor areas over 100 m2.

Another information this condition of housing for selected cities in West Sumatra shows that more than two thirds of housing consist of 2-3 rooms and only 5 per cent of the units having over 6 rooms. However, there are considerable variations between cities in Indonesia. For Jakarta (1976) 81 per cent dwelling consists of 1-3 rooms. This can be compared with Padang, where 58 per cent of the units consists of 1-3 rooms and over 17 per cent of stock having 6-7 rooms.

Table 17.2. Number of Households by Province and Floor Areas, 1978 and 1980

URBAN + RURAL

Floor Areas (m2)	West Sumatra		Indonesia	
	Total	%	Total	%
Less than 30	211,492	30.04	7,154,055	23.639
30 - 49	227,610	32.33	9,931,836	32.818
50 - 99	234,525	31.89	10,255,327	33.887
100 - 199	33,414	4.75	2,880,089	9.52
200 and more	5,118	0.73	810,501	2.68
Total	704,010	100.00	30,267,273	100.00

Source : Result of the 1980 Population Census, Population of West Sumatra, May, 1983.

However, it is difficult to apprise for housing quality throughout information on floor areas, materials, use for construction, etc. For instance, such materials used, for roofing and each for walls does not necessarily imply inferior housing, where such materials have been traditional construction materials and traditional housing designs are adapted to climate and cultural norms. Rather, the quality of maintenance and frequency of replacement are better indicators of housing quality.

In the approach of this study, it is deterioration and the need for repairs rather than use of specific materials for construction of wall, roof and floor areas to be used as an important indicators for specifying substandardness and criteria for policy determination.

Housing Expenditures

This section highlights some of the associated housing consumption in West Sumatra since 1970. It depends on two sources of data-census and the National Socio-Economic survey. This section is intended to provide only a brief discussion housing consumption characteristics. The pattern of household consumption of major classes of goods in 1976 is presented in Table 17.3. In general, the expenditure levels are higher in urban areas than in rural areas. The disparity is marked in expenditures for housing, fuel, light,and water. Expenditure in urban areas for these items are more than 4 times those of rural areas. Some of these disparities can be explained by higher standard of housing consumption in urban areas (at least among the upper income groups) and expenditure for locational environment.

Table 17.3. Average Montly per Capita Expenditure on Housing by Expenditure Classes, 1976 (in Rp)

Monthly Expenditure	Rural		Urban	
	Housing Expenditure	%	Housing Expenditure	%
Less than 3,000	205.52	6.08	643.66	3.94
3,000 - 4,999	373.07	14.52	1,145.37	7.02
5,000 - 9,999	1,017.20	39.59	4,534.95	27,77
10,000 - 19,000	973.34	37.88	8,326.36	51.00
20,000 and more	-	-	1,675.00	10.26
Total	2,569.13	100.00	16,325.34	100.00

Source : The National Socio-Economic Survey, Subround II, 1976.

(a) Future growth of population

(b) Future increase in income

(c) Structure of households (multiple and single number households).

(d) Social and personal expectations that change with income and development, about shelter space and amenities

In addition, estimation of structure needs implies the adoption of standards such as (1) replacement of existing house which improves the quality of the housing stook, (2) vacancy rate, rate allowed of vacant houses for second homes, and for facilitating movement of households.

Demand for housing is thus an economic concept and does not take into account social norms. Demand estimate is based on the relationship between housing consumption and income, price of housing and price of competing goods. Demand for housing is referred to people who are willing and able to pay. In the case of West Sumatra, a large majority of the population live under such conditions mentioned above. Consequently, needs for housing become problem due to the low income of the people. Then a quantity assessment needs is required. From this condition such an assessment precise of governmental housing programme is needed.

In projecting housing requirements, economic variables should be taken into account with the traditional demographic variables, for example, level of income affects the propensity for housing formation, and affects the future number of households. Replacement needs are often on the basis of based on technical criteria, such as age of housing, type of materials used in construction, and so forth. The rate at which dwelling become absolute is also a function of income, and people's ability to pay for better accomodation.

However, the pattern of housing consumption is different. The average housing expenditure in urban area is 6 times as large at that in rural areas. It is compared with Indonesia at same time, it is as follows. Housing expenditure in urban areas is large as in rural. Expenditure class in rural areas spend more on housing than its counterpart in urban areas. It is positively correlated with income. In the lowest income group, urban housing expenditure is twice as big as that of rural. But in per centage, it is the other way round. In the midle income group, housing expenditure in urban and rural area are about equal.

The analysis of the trend in consumption patterns by type of goods over time in Indonesia: On percentage basis the proportion of expenditures devoted to food declined all over in Indonesia in urban areas between 1970 and 1980. This is consistent with Engel's Law which states that the proportion of income spent declines on food as real income increases.

The following analysis shows the trends of consumption patterns and distribution of income over times in Indonesia 1978 and 1980. The skewness of the expenditure distribution in 1980 is lower than in 1978. The expenditure of the lowest 40 per cent of the population increased from 18.13 per cent in 1978 to 19 per cent in 1980. While, the expenditure of the highest 20 per cent decreased from 45.34 per cent in 1978 to 42.26 per cent in 1980.

THEORITICAL MODEL OF HOUSING NEEDS

The model to be presented here is a simple model which has been used by L. Chatterjee to estimate the need for housing in Indosia. The model is provided for indirect method of housing needs. The procedures used in the estimation of housing needs are flawed by the variety of implicit assumptions. Any target setting inevitably requires a number of assumptions about :

HOUSING NEEDS ESTIMATION

There are two major criteria for housing needed. First the quantity of housing in term of dwelling units, which are provided to fill of need for additional new households, replacement and vacancy rate. Secondly, needed for improvement housing quality,which people need for improving housing conditions, for example the quality of dwelling units, and availability of water, fuel, light, transport and social facilities.

The main pitfall in looking at housing needs in termsof dwelling units is that it provides the estimation to think in terms of finished houses that can be counted. The fact, however, is what constitutes the cultural and historical definition of dwelling. Nevertheless, in this paper the estimation of housing needs is economic concept rather than social norms.

Statistical estimation of the housing needs can be quite sophisticated (which has been done of World Housing Survey by United Nation). The following examples are the most common variables.

(1) Housing needs existing at the beginning planning period comprise :
   (a) number of households without shelter
   (b) number of household involuntarily doubling with other households.
   (c) households occupying living quarters of an "unacceptable"
   (d) house needing separate shelter to reduce density level in existing structures to an acceptable standard and
   (e) living quater and acceptable type but in needed for repair or replacement.

(2) Actual housing needs during the plan period, such as :
   (a) Dwelling unit needed by new housholds and
   (b) Dwelling unit needed to repair or replace living quarter lost during the period due to destruction, absolecace and eradication.

(c) Vacancy rate, the rate at which people who needed the second homes or movement households.

Despite limitation of data. A formula for estimating housing needs in West Sumatra can be used framework of projection variables in section two above. By our basic argument were; First, to additional housing for new households refer to population estimates in terms of Development regions, and therefore, the household size will be considered decreasing since the regional income per capita increasing overtime. Secondly, for replacement rate it is important to estimate for dwelling whose needs for repair or replacement (temporary to semi permanent, etc) and or because oldhouses should be replaced. Third, the vacancy rate will be considered, as well as the high level of internal out migration (merantau) of Minangkabau society which had considerable influence of vacancy rate because the people who succeed is destination areas, are willing to invest in their native lands (at least to built a house for their relatives); that is one consideration for the vacancy rate in West Sumatra.

EMPIRICAL FINDING

By using the estimation of housing needs which has been used for Indonesia by L. Chatterjee (1979): Given the uncertainties associated with projecting future needs it is preferable to provide alternative estimates. As noted earlier, several assumptions about future population, household size, growth of income, replacement rate are incorporated into the model. So the alternative scenarios consider the consequences of adopting different assumption.

The scenario evaluate the consequences of two different real GDRP annual growth rate and four different replacement and vacancy rates, as can be seen from Table 17.4 below :

Table 17.4. Scenario Parametres

Scenarios	Population Projection	Real GDRP Annual Growth Rate	Annual Replacement Rate	Anuual Vacancy Rate
I	Demographic Institute	7.0	1.14	1.00
II	idem	7.0	2.00	0.57
III	idem	5.0	1.50	1.00
IV	idem	5.0	1.29	0.57

The purpose of the scenario is to explore the consequences of housing needs under different assumptions of demographic and economic aspects.

Since household size is a function of income and gross domestic regional income (GDRP) which increases in overtime, it is expected that household size from 4.84 in 1980 will decline 4.80 of 1990 and it wil vary among development regions.

The empirical finding of additional dwelling units required to meet the housing needs, under alternative assumption growth, standard of accomodation (housing units per household) and policy choices (replacement and vacancy rate) are shown in appendix 17.8 the additional unit required in each two year period are shown in Table 17.5.

Yet agregate estimates are used for policy maker interested in resource requirement for the housing sector. This is because different regions are growing at varying rates, and having various migration pattern. For example, slow development region require a lower rate of construction and housing requirement, if the region is potential to be explored in the future. On the other hand, housing activities should be concentrated in rapid growing in the future.

Table 17.5. Commulative Housing Needs by Alternative Parameters

Year	Alternative Parameters			
	I	II	III	IV
1978	26,062	28,652	28,206	24,291
1980	29,830	33,367	32,181	29,021
1982	31,058	35,482	33,454	31,868
1984	32,064	36,720	34,656	32,368
1986	33,472	38,382	36,193	35,625
1988	34,776	39,951	37,633	37,104
1990	36,578	42,033	39,574	39,105

Notice : The alternative parameters computed from Table 17.4.

The housing requirement in region development D is rather low, because the largest part of this region is rural areas even-though household size is rather low but a lower income per capita and housing quality are unsatisfactory. But it does not appear in the empirical finding. Region C + E is one of the largest housing requirements in the province, where in this region included Padang municipality with rapidly growing regions and economic concentration such as, trade, transportation, education and good social services will pull inmigration from other regions. And consequently, the housing activities should be concentrated in rapidly growing economy in these regions if we want to avoid inflationary pressures and deteriorating environment quality.

THE OPPORTUNITIES FOR INVESTMENT ON HOUSING BY PRIVATE SECTOR

An alternative to formulate housing plans based upon empirical result of housing needs is to attain in light of what target they are supposed to pursue as indicated previously housing

might be the responsibility of government, private sector and people themselves. Supposed that a basic housing policy is not only under the responsibility of government but also private sector that proposed to participate more to fill housing needs of the region. It is also confined to the housing needs in the lowest income group at urban areas, midle and high income group at urban areas, midle and high income groups as well as households living in rural areas.

To follow our earlier discussion where the housing needs are as the ability to pay as well as income brakets of the household assumed is available. In the case of West Sumatra the majority of people is in the lower income groups, mostly for household living in rural areas and low levels of civil servant and also the people who live in slums and the squarter in cities. Consequently, the condition of housing unsatisfactory. The problem is how to improve the people who live under those conditions as well.

By using the estimation of the ability to spend for housing expenditure: As income per capita increases then the growth rate of housing development goes up to 2.7 per cent annually. The additional housing stock estimates shown in the Table 17.6 below :

Table 17.6. Number of Additional Housing Needs and Estimation of Additional Housing Stock, 1980-1990

Year	Housing Needs 1/	Housing Stock 2/	Gap Between Needs and Stock
1980	29,021	17,629	11,392
1982	31,868	18,529	13,157
1984	32,368	19,448	12,919
1986	35,625	20,410	15,214
1988	37,104	21,425	15,678
1990	39,105	22,468	16,636

Sources : 1/ Number of housing needs compiled from Table

2/ Housing stock estimated from 1980 to 1983 included the low-cost housing and Kampong investment programme.

Looking to the table above, the gap between housing needs and housing stock which is computed with ability to pay from household income in terms of quantity of housing units. That is become investment opportunities to private sector which regard from the objectives of our study.

CONCLUSION

In conclusion, it may be that problems of housing needs must be solved together with problems of education, food shortages urban congestion and even population growth. These are interrelated phenomena, which cannot be solved by development theories as experience
rity on development agenda.

As basic minimum of housing requirement which has as a standard calculated on our study for each household having 46 m2 and more and floor areas by three rooms.

Instead giving opportunities to private investment on housing sector to produce more construction materials, to improve slum and settlement conditions must be made available to the lower income groups. If this is done efficiently the problems of basic needs may also be simulataneously solved, for it is the lower income groups whose income is growing slowly which need more hands to augment their low incomes.

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Appendix 17.1. Model Framework of Housing Needs Estimation

Total housing requirements consist of three components :

$$D_{nt} = D_{1nt} + D_{2nt} \quad D_{3nt} \tag{1}$$

Where : D_{1nt} is the demographic component of housing requirement.

D_{2nt} is the replacement component

D_{3nt} is the vacancy component.

The demographic component represents the additional dwelling units required for additonal household as population increases and household size change.

$$H_{nt} = \frac{P_{nt} - P_{nt-1}}{F_{nt}} + \frac{P_{nt-1}}{F_{nt}} - \frac{P_{nt-1}}{F_{nt-1}} \tag{2}$$

This equation estimates the number of additional household requiring dwelling units. The rate of population growth is provided to estimate the additional households, so the formula for population is :

$$P_{nt} = (1 + g) P_{nt-1} \tag{3}$$

Where g is the rate of growth. The size of households is estimated as a function of income. As GNP increase, household sizes decrease.

$$F_{nt} = f(Y_{nt}) \tag{4}$$

The number of household is determined by average household size and total population.

$$H_{nt} = \frac{P_{nt}}{H_{nt}} \tag{5}$$

Since the current housing stock is less than the number of households the housing units/household ratio represents :

$$D_{1nt} = h \cdot H_{nt} \tag{6}$$

The replacement component depend on the quality of the housing atock, degree of housing shortage and growth of income.

$$D_{2nt} = r \cdot S_{nt} \tag{7}$$

The vacancy component is proportional to the total stock.

$$D_{3nt} = v \cdot S_{nt} \tag{8}$$

Appendix 17.2. Housing Requirement for West Sumatra

	1976	1978	1980	1982	1984	1986	1988	1990
Population ('000)	3,071	3,193	3,406	3,557	3,712	3,871	4,034	4,204
Number of Households	241,188	660,263	703,306	736,779	770,178	804,294	839,922	872,445
Housing Stock (Units)	219,928	615,685	652,912	686,281	720,324	755,944	793,548	832,154
Housing units per Household		0.932	0.928	0.931	0.935	0.940	0.944	0.954
Average Household Size		4.851	4.84	4.83	4.82	4.812	4.802	4.800
Incremental Housing Needs for Ending Period								
D.1. (Demographic)		12,815	15,858	16,388	16,649	17,295	17,795	18,771
D.2. (Replacement)		7,953	8,712	9,113	10,609	12,361	13,023	13,715
D.3. (Vacancies)		3,523	4,451	5,368	5,665	5,969	6,286	6,619
Total Housing Needs (Units)		24,291	29,021	31,868	32,368	35,625	37,104	39,105

Chapter 18

CLOTHING NEEDS

CLOTHING is one of the basic needs component along food, shelter, education and health, although it can be argued that clothing is more a cultural phenomenon rather than a basic necessity, there can be no disp te about the fact that cotton clothing and batik materials are a basic component of a minimum and basic standard of living.

Study on clothing needs has no specific indicator to measure its minimum. Consequently it is not used in building up the composite index of the standard of living. Howeverm some comparisons of clothing expenditure and per capita quantity of clothing have been made by using data from Socio Economic National Survey (Susenas).

The objectives of this study will be focused on the actual habits and patterns of consumption, estimates will be made on the local production and import of textiles, in order to evaluate the situation of the social services which affects the living condition of the population. The basic needs programme will be important to assess in conection with a project by private sector.

An overview of the local production seems come from small scale industry. In recent years, two of the large scale textile manufacturing have dropped out. Some influencing factors are competition from imported textiles. All materials are also imported from out of the province. Consequently, textiles production in West Sumatra became high cost economy.

Nevertheless, small scale industries mainly consist of garment production in IV Angkat, Agam regency which has more than 900 members of cooperative, and the traditional weaving production in Silungkang, Solok regency.

The production of garment in IV Angkat increased from 85,000 pc equivalent to 210,375 meters textile in 1979 to 175,450 pc equivalent to 434,238 meters in 1982. While in Silungkang, by using traditional weaving technology, the production of cotton textiles increased from 47,000 to 64,200 meters in the same period. These figures show that small scale textiles industries are still at one favouravle in West Sumatra of than large scale industry.

Because of unavailable data of the total production of textile in West Sumatra, the institute of Regional Economic Research used the number of labor textile industries as an indicator of textile production of West Sumatra as presented in Table 18.1

Tables 18.1 West Sumatra: The Trend and Projection of Total Production and Consumption of Textiles (000 meters)

Year	Production	Consumption
1970	2,188	9,646
1971	3,367	11,718
1972	3,919	15,277
1973	4,140	18,215
1974	4,278	19,330
1975	4,554	21,536
1976	4,876	24,044
1977	5,290	26,497
1978	5,570	29,100
1979	6,179	31,905
1980	6,855	34,982

Source: Lembaga Penelitian Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Pola Perdagangan Regional di Indonesia (The Pattern of Regional Trade of Indonesia), Padang, 1974.

In analysing the pattern of consumption in order to measure clothing expenditure, data collected by Socio Economic Survey (Susenas II) are provided to obtain the level of clothing expenditure which related to average monthly income per capita.

Table 18.2 Percentage Items of Consumption by Monthly Per Capita Expenditure Classes

Income Classes	Food	Non-food	Housing	Clothing	Miscelineous
less then < 2,000	88.62	11.77	4.97	2.70	2,28
2,000- 2,999	89.22	14.30	6.20	3.01	4.17
3,000- 3,999	88.09	14.58	5.76	3.42	4.36
4,000- 4,999	81.01	18.98	6.10	4.56	5.60
5,000- 5,999	79.91	20.08	6.25	6.42	5.87
6,000- 7,999	73.03	26.97	9.46	5.62	7.62
8,000- 9,999	70.01	29.98	7.12	6.58	8.99
10,000-14.999	62.43	37.56	10.42	7.90	11.65
15,000-19,999	53.76	46.23	15.15	9.15	13.71
20.000-29.999	60.25	39.74	25.69	4.32	11.83
> 30,000	67.64	30.36	5.47	3.26	11.02

Source: Central Bureau of Statistics, The National Socio Economic Survey, 1976.

The 1976 SUSENAS II show that the income elasticity of clothing expenditure is 1,301. It means that the demand for clothing is more elastic since income increases and the average expenditure on clothing expressed as a percentage is 4.96 of total consumer expenditure.

Figures listed in Table 18.3 show that on the average per capita expenditure in rural areas tends to spend a higher

proportion of their income on clothing consumption rather than lower income groups in urban areas.

Table 18.3 West Sumatra: Percentage Clothing per Capita Expenditure to Total per Capita 1976, 1978 and 1980

Areas	1976	1978	1980
Urban	4.63	4.66	5.19
Rural	5.09	4.85	4.97
Urban & Rural	4.98	4.80	5.01

Source: Computed from the National Socio Economic Survey, Pengeluaran untuk Konsumsi Penduduk, 1980.

Both these facts taken together suggest to the possibility of an importance of clothing needs analysis. During the period of 1976, 1980 it showed the decline of income elasticity viz 1,301 in 1976 and 1,083 in 1980.

It is difficult to assess the textile consumption, because the choice of what type of clother ro by needs to be considered also.

ASSESSMENT OF CLOTHING NEEDS

Total clothing needs, for the purposes of our study, are a product of three principal factors,

(1) Clothing stemming from population increases estimates based on future population and clothing habits.

(2) Clothing needs resulting from qualitative improvement of the social-culture condition.

(3) Clothing needs arising from existing quality of life, it can be measured through the increases in income which pushed up the clothing expenditure.

It will be helpful to trace the culture actual step in the needs estimation procedure, and the way these three com-

ponents of needs are related, before plunging into characteristics data. By using the estimation of population trends, projection for 1984, 1988 and 1990 are available from the cencus bureau, from research institutes such as the Lembaga Demografi, Universitas Andalas are provided to estimate the clothing consumption.

Based on clothing expenditure related to rising per capita income as indicated that the existing of quality of life needs more clothing expenditure as a figure. Income elasticity of clothing expenditure is more elastic. Even at the low level of consumption the demand for clothing tends to show a certain degree of elasticity.

The percentage expenditure on clothing estimation shows a little bit of variations, the picture in the rural areas and urban areas come out from the Table 18.4

Table 18.4 Range of Percentage Expenditure on Clothing

	1984	1988	1990
Rural			
Maximum	9.73	12.13	13.47
Minimum	4.66	4.97	5.27
West Sumatra	5.28	5.53	6.23
Urban			
Maximum	7.57	10.32	15.37
Minimum	4.97	5.25	7.28
West Sumatra	5.26	6.29	8.23

The existing variation of the percentage on clothing expenditure estimation are based upon cultural phenomenon and rising income per capita.

In the lighft of clothing requirement estimation, as an objective of this study with compliance on the local needs

and the role of trade in the province. In fact, textile industries in West Sumatra look like under unfavourable conditionsbecause almost all materials should be imported and also the lack of skilled labor and therefore the local industries become high cost economy.

The estimation of the clothing as we mentioned in earlier discussion is rather difficult to explain because clothing habits are cultural phenomenon. On this study we refer to textile consumption which consists of cotton textile and batik materials as a basic minimum for clothing needs. Based on the trend and projection of textile consumption related in increasing of Gross Domestic Regional Product, it can be estimated on per capita textile consumption and total consumption estimate on textile for West Sumatra up to 1990.

Table 18.5 Total and Per Capita Textile Consumption

Year	Per Capita Consumption (metre)	Total Consumption (000 metres)
1978	8.43	29,109.57
1984	9.91	36,781.32
1988	10.53	42,488.21
1990	10.93	46,498.57

Source: Lembaga Penelitan Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Pola Perdagangan Regional di Indonesia (The Pattern of Regional Trade of Indonesia) Padang, 1974.

CONCLUSION AND ITS RECOMENDATION

By comparing the prospect of textile production with that of consumption it is obvious that there will be short of

supply in the future. The question is how to fulfil the shortage of production, whether it will be supplied by expanding of existing industries or by importing from other areas outside West Sumatra. If the alternative is by expanding the existing industries, the local factor endowments to support those industries will have to be considered early as will as the potential market in the region. The only local factor available is labor which is mostly unskilled, raw material equipment, skilled labour should be imported from outside. At the same time, the local market is very limited.

Therefore, the establishment of new industries should be large enough in sales in order to produce efficiently for competition in the local as well as in the export markets

The consequences are the necessity to invite foreign inverstors into West Sumatra to participate in those industries.

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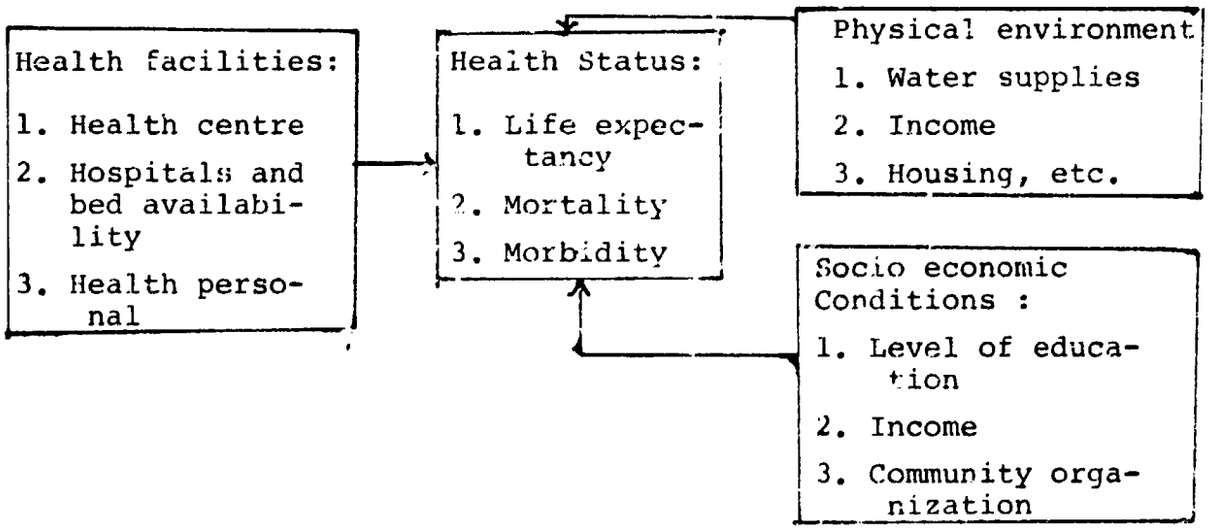
Chapter 19

POTABLE WATER AND HEALTH CARE

HEALTH is one of the basic needs for human life; therefore, in any community health development has to be considereded an important component. On the other hand, community health itself also has an important role to play as a basic resource for community development. Community health, especially in developing countries, is influenced by several factors like biological and physical environment, and also social or economic conditions of the community. Most deaths in developing countries result from infections and parastific diseases. These are closely related to prevailing social and economic conditions.

The relationship between community health and some aspect of environment and socio-economic conditions can be summarized as follows :



This diagram explains that community health can be measured by some health indicators.

WATER SUPLIES

Sources of Water Supplies

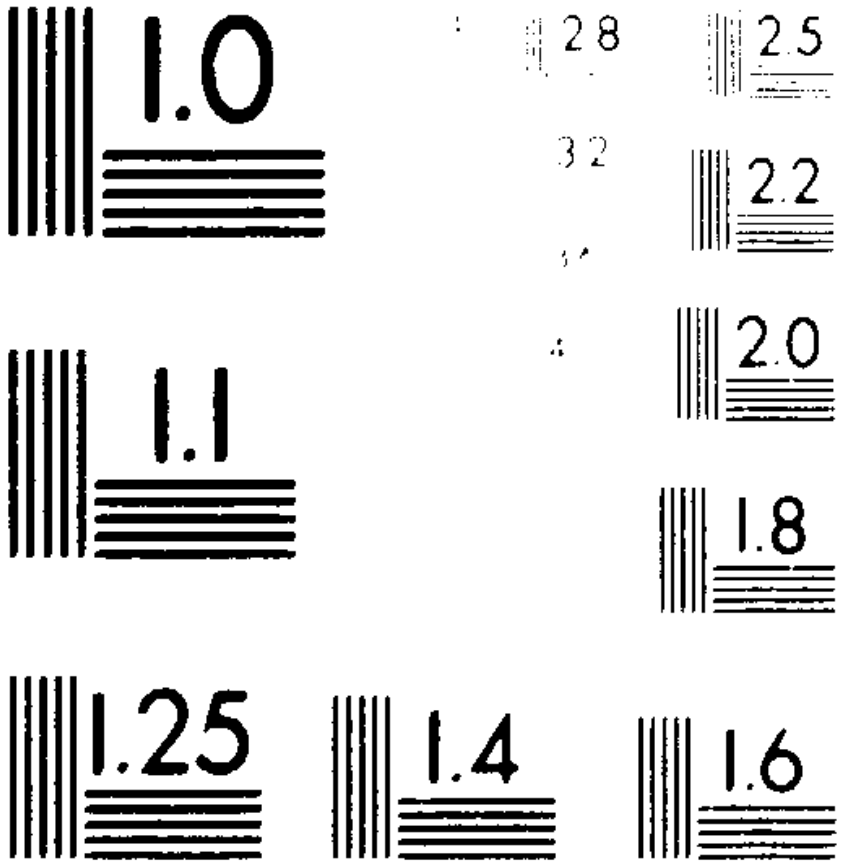
WHO considers the provision of a safe and convenient water supply as the single most important way to improve the community health especially in rural areas (World Bank 1976). Numerous studies have identified contaminated water as the source of waterborne or water-related diseases such as:

- Cholera
- Typhus abdominalis
- Dysenteria
- Heparitis
- Worm infestations

Quality standards for safe water supply are concerned with physical condition such as clear, colourless, tasteless, and odourless. The water also does not contain any matter, either chemical or biological, which could effect its safety or acceptability. Acceptability can be an important factor : for example, groundwater with a high iron or manganese content will have a distinctive taste and will discolor laundry and food such as rice. Bacteriological factor is also important; safe water must not contain Escheria coli and saprophyt less than 100 per millilitre water.

The quality consumed depends on several factors, of which the most important is conveience. If there is a supply in the house or courtyard, consumption may be five or more times greater than if water has to be fetched from a public water point. If water has to be carried a considerable distance-say more than one mile-consumption may fall to as low as 5 litres per capita per day, which approaches the minimum necessary to sustain life.

The climate and cultural patterns of bathing, laundering and foot preparation area also important factors. The provision of public bathing and laundry facilities may increase de-



mand considerably. The WHO gives a standard for water consumption 100 litres/capita/day in urban area, and 86.4 litres/capita/day in rural area.

Water pipe and pumps are considered as the safest and most convenient water resources. Community demand for safe water source is estimated by looking at the difference between total community need and combined water pipe and pump.

In West Sumatra, water pipe is supplied from Water Supply Service of Municipality. Pump water is from private and government project.

Well, pipe and pump are the major sources of water for drinking in urban area. In rural areas, the major sources of drinking water are well, spring and river. The 1980 census, conducted by "Biro Pusat Statistik" (Central Bureau of Statistics) has given number of household and sources of drinking water (Table 19.1), comparing urban and rural areas in West Sumatra.

In urban areas the major sources of water for bathing/washing are well and pipe. However, in rural areas river, well and spring are the major sources of water for bathing/washing. (Table 19.2). The 1980 census, conducted by Central Bureau of Statistics, has given number of household and sources of water for bathing/washing.

In comparison to the 1971 Census the 1980 conducted by Central Bureau of Statistics is only slightly increased in using pipe or well/pump for drinking and bathing or washing in West Sumatra.

Supporting Factors for Water Sources

The Water Supply Project from the Government

Since 1974/75, the Government have built water supply projects in 6 municipalities and 8 regencies.

Table 19.1. Number of Household and Source of Drinking Water in West Sumatra Province, 1980

	Source of Drinking Water								
	Pipe	Pump	Well	Spring	River	Rain	Others	Not Stated	Total
Urban	17,427	6,070	48,122	6,001	135	371	416	434	78,976
Rural	12,290	10,810	257,121	215,910	92,554	21,101	14,774	504	625,034

Source : Calculated from Central Bureau of Statistics, Population of Sumatera Barat -- Results of the 1980 Population Census (Jakarta : 1983).

Table 19.2. Number of Household and Sources of Water Bathing/Washing, 1980

	Sources for Water for Bathing/Washing								
	Pipe	Pump	Well	Spring	River	Rain	Others	Not Stated	Total
Urban	12,264	5,252	48,801	5,698	5,965	211	431	454	78,976
Rural	6,121	3,835	173,652	134,200	260,029	10,578	35,869	750	625,034

Source : Calculated from Central Bureau of Statistics, Population of Sumatera Barat -- Results of the 1980 Population Census (Jakarta : 1983).

Table 19.3. Household and Source of Water for Drinking and Bathing/Washing Compared Between 1971 and 1980
(In percentage)

	Source of Water for Drinking			Source of Water for Bathing/Washing		
	Pipe	Well/ Pump	Others	Pipe	Well/ Pump	Others
Urban: 1971	31.2	59.6	9.2	14.6	68.8	16.6
1980	26.5	64.9	8.4	13.3	73.2	13.3
Rural: 1971	1.7	59.4	38.9	1.1	47.4	51.5
1980	2.2	61.1	36.6	1.6	50.5	47.7
Urban + Rural						
1971	6.4	59.4	34.2	3.2	50.7	46.1
1980	7.2	61.8	31.0	3.9	55.1	41.0

Sources : Calculated from Central Bureau of Statistics, 1971 Population Census : Population of Sumatera Barat (Jakarta : 1974); Population of Sumatera Barat -- Results of the 1980 Population Census (Jakarta : 1983).

The project includes :

(1) Making use of spring with pipe, 1 unit for 75-500 household.

(2) Artesian well.

(3) Catching rain water, 1 unit for 1-70 household.

(4) Protecting spring, 1 unit for 20-500 household.

(5) Shallow handpump, 1 unit for 1-100 household.

(6) Deep handpump, 1 unit for 1-100 household.

(7) Dug well, 1 unit for 1-5 household.

The main project is shallow handpump in Regency area. Since 1974-1983, shallow hand pump is build about : 925 units in municipal area and about : 7,314 units in regencies. In 1980, the whole project in West Sumatra only supplied (1,652 to 30,615) households, while the total households in West Sumatra are 709,611, so the project only supplied (0.23 per cent to 11 per cent) from total households.

In Table 19.4, we can see the whole project and how much the household can be supplied by this project.

Table 19.4. West Sumatra : The Government Water Supply Project, 1974/75-1982/83

Year	Water Supply Project (Unit)						
	A*	B	C	D	E	F	G
1974/75	3			2	230		
1975/76	6			2	485		
1976/77	6			1	460	1	
1977/78	7			1	560	25	
1978/79	5			2	485	15	
1979/80	8		35	3	769	20	
1980/81	7		50	3	775	63	
1981/82	8		105	23	2250	195	10
1982/83	8		160	22	2225	365	10

A*Making use spring with pipe (1 unit for 75-500 households.

B Artesian well.

C Catching rain water (1 unit for 1-70 households).

D Protecting spring (1 unit for 20-500 households).

E Shallow handpump (1 unit for 1-100 households).

F Deep handpump (1 unit for 1-100 households).

G Dugwell (1 unit for 5 households).

Source : Information Collected from Regency Health Services and District Health Service in Municipal Area using a questionaire, 1984.

Water Supply Service

The main source of pipe is from Water Supply Service of Municipality.

During Pelita II, the activity for safe water supply has included urban and rural area. In Padang, Bukittinggi and Padang Panjang, they have rehabilitated the old pipe and increased the production per day. To build new project of Water Supply Service in Payakumbuh 1974/75, Solok 1976/77 and Sawahlunto 1977/78, however they were used in 1980/81. In urban area the main safe water supply is the Water Supply Project Inpres.

During the Pelita III, the safe water supply, continued from Pelita II, Padang, Bukittingi and Padang Panjang increased the consumption/capita/day, but Payakumbuh, Solok and Sawahlunto continued the distribution to the house. On the other side, in Lubuk Sikaping, Batusangkar, Pariaman and Painan, a research is carried out and is built new Water Supply Service Project. In urban area the Water Supply Project is specially built in area where a communicable disease is often found. So, during the Pelita III, we conclude that the program is divided into two categories :

(1) Continuing Projects in Padang, Bukittingi, Padang Panjang, Solok and Sawahlunto.

(2) New Water Supply Service is built in Batusangkar, Pariaman, Lubuk Sikaping, Painan dan Muaro Sijunjung.

As a result all municipality and the capital of regency have the safe water supply. (Table 19.5).

Table 19.5. Water Suply Service Production during Pelita III (Litre/second)

City	Production
1. Padang	250
2. Bukittinggi	80
3. Padang Panjang	35
4. Payakumbuh	80
5. Solok	51
6. Sawahlunto	30
7. Batusangkar	30
8. Lubuk Sikaping	20
9. Pariaman	30
10. Painan	20
11. Muaro Sijunjung	10

Source : Pemerintah Daerah Sumatera Barat, Rencana Pembangunan Lima Tahun Keempat 1984/85-1988/89 (Provincial Government of West Sumatra, the Fourth Five-Year Development Plan 1984/85-1988/89), Padang, 1984.

The Repelita IV includes :

(1) Continuing effort water supplies both for the cities and rural areas.

(2) Increasing production of clean water in litre per second for the cities covering population up to 1990, with minimal consumption of 100 litre per person per day.

(3) Perfecting distribution and use of clean water and increasing production in small cities up to 86.4 litre per person per day, until 1990.

(4) Building water supply resource for the subdistrict capital and other small cities with the population of 2,500 in 1985.

Map 19.1. WEST SUMATRA : PIPED DRINKING WATER LOCATIONS

(5) Establishing institutions to maintain and use clean water from cities, district towns, subdistrict capitals, and other smaller cities, to the village.

(6) Taking step to maintain clean water supplies, namely springs, rivers, etc., in the form of coordination or reinforcing responsibilities of the assigned institutions. For area with no surface water sources, we need to conduct research on how to get underground water sources.

Projection of Water Supply, 1980-1990

Figure 19.1 and 19.2, show trends and projections of number of household by sources of drinking water and bathing/washing. In 1990, the major sources of water for drinking are wells and pumps, while pipe is only used by 8.2 per cent of household in West Sumatra. Sources of water for bathing/washing are well/pump, but pipe is used by 4.2 per cent of household. Using well for safe water supply should have special condition such as the distance from latrine and their construction. However, figure 19.3 shows the gap between potable water supply from pipe and water consumption. Based on, WHO standard for water consumption 100 litres/capita/day (for drinking 5 litres/capita/day), we can calculate that in 1971 with the population 2.793.196.

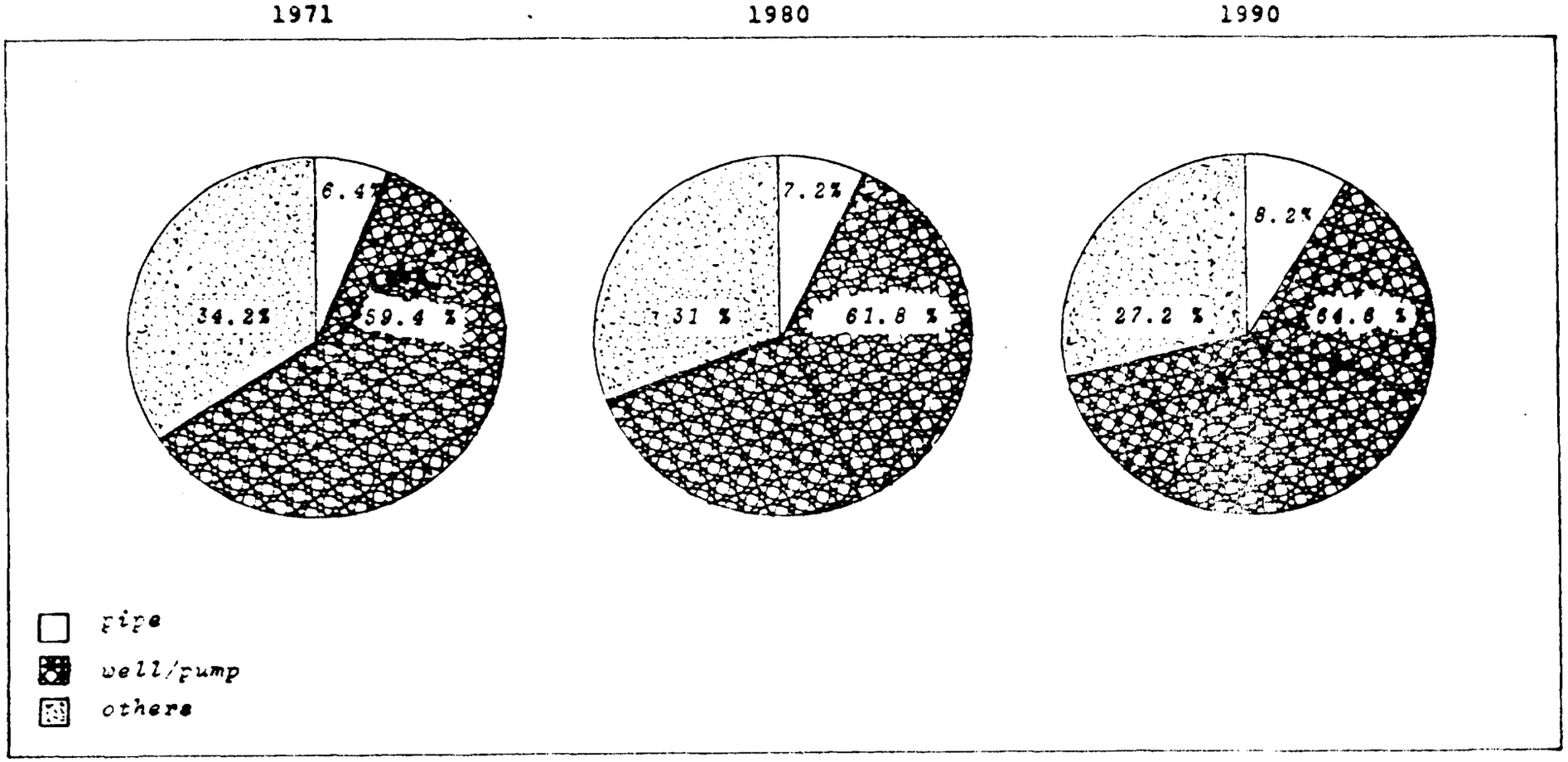


Fig 19.1 WEST SUMATRA: TRENDS AND PROJECTIONS OF NUMBER OF HOUSEHOLD BY SOURCES OF DRINKING WATER

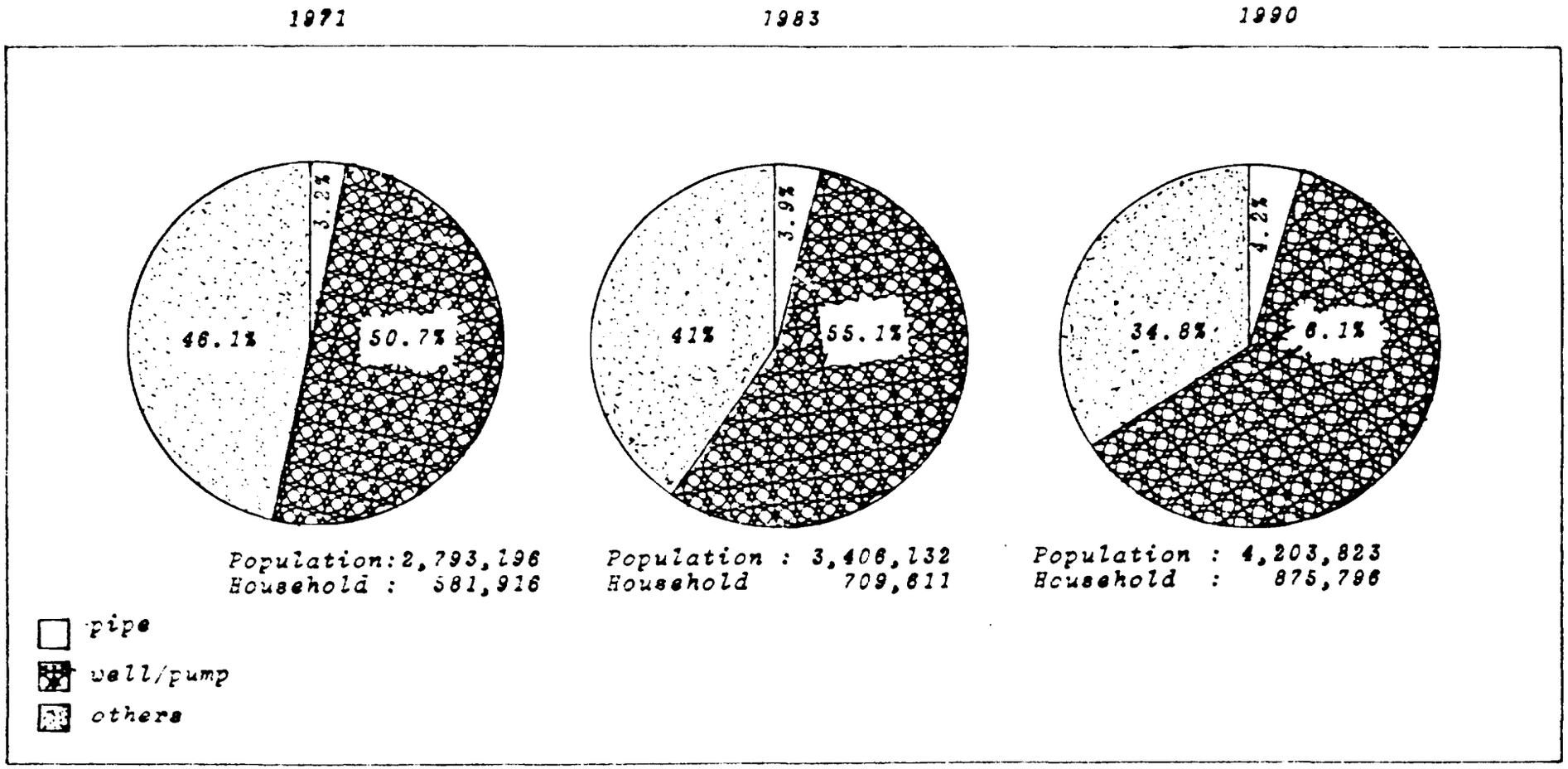


Fig 19.2 WEST SUMATRA: TRENDS AND PROJECTIONS OF NUMBER OF HOUSEHOLD BY SOURCES OF WATER FOR BOTLING AND WASHING

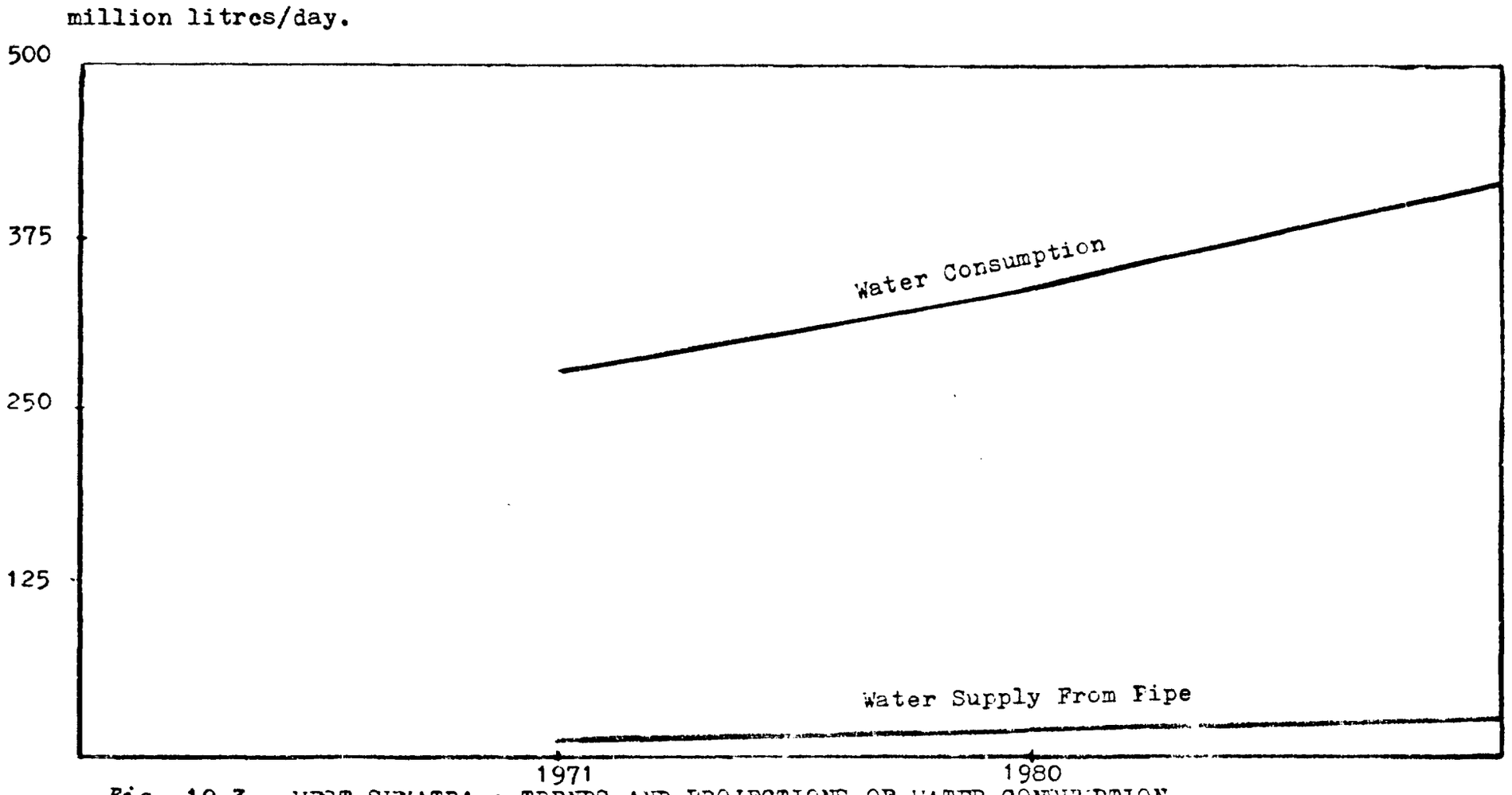


Fig 19.3. WEST SUMATRA : TRENDS AND PROJECTIONS OF WATER CONSUMPTION AND WATER SUPPLY FROM PIPE.

Table 19.6. West Sumatra : Trends and Projections of Required Water Consumption and Pipe-Water Supply, 1971-1990

Year	Population	Per Capita Water Consumption per Day (litres)			Number of Population Using Pipe-Water (%)		Number of Population Using Pipe-Water ('000)		Pipe-Water Consumption per Day ('000 litres)			Required Water Consumption per Day ('000 litres)	Ratio of Pipe-Water Consumption to Total Water Consumption
		Total	Drinking Water	Bathing/ Washing	Drinking Water	Bathing/ Washing	Drinking Water	Bathing/ Washing	Drinking Water	Bathing/ Washing	Total		
1971	2,793,196	100	5	95	6.4	3.2	178,764	89,382	893.8	8,491.3	9,385.1	279,319.6	3.4
1980	3,406,132	100	5	95	7.2	3.9	245,241	133,839	1,226.2	12,619.7	13,845.9	340,613.2	4.1
1990	4,203,823	100	5	95	8.2	4.2	344,713	176,561	1,723.5	16,773.3	18,496.8	420,382.3	4.4

Investment

Assistance provided by multilateral and bilateral agencies to government for rural water supplies over the past two decades has been widespread and has taken many forms, ranging from short term technical advice to projects which have provided supplies, to equipment, and technical assistance extending over several years.

Investment Needed

The assumed per capita costs for extending water service average by WHO region vary widely : US$ 12 to US$ 53 for urban supplies through house connections, US$ 9 to US$ 28 for urban public hydrant supplies, and US$ 6 to US$ 24 for rural supplies. Even wider variations occur between countries, ranging from US$ 1 to US$ 300 per capita (in 1976).

Technical Aspects and Cost

Factors affecting the type of water supply system to be constructed in a village include the level of service, water quantity and the nature and location of water sources. Certain general principles may be applied to most village water programmes.

There are :

- Ground water from springs, wells and boreholes, which requires little or no treatment to make it safe is preferable to surface water ; particularly in the poorest

countries shallow wells with handpumps should be used whereever possible.

- Systems must be designed for simple, troublefree operation and be capable of being operated and maintained by local techniques.
- Equipment must be able to withstand hand usage, and replacement parts must be readily available.

In many cases consumption is likely to be from 20 litres to 100 litres per capita per day, and per capita construction costs between US$ 1 & US$ 3 for shallow wells.

System costs vary widely, estimated costs for rural services shown in the WHO survey vary from US$ 1 per capita to US$ 150 per capita for individual countries. Averages for the WHO regions were from US$ 6 percapita to US$ 24 per capita (at 1970 prices). Because of this variations cost estimates have to be progressed separately for each project. Generalization of "typical" figures can lead to substantial errors.

The following general conclusions may be drawn concerning the effects of scale, levels of service, and water source or costs :

- In areas where groundwater is readily available, shallow wells with handpumps are by far the cheapest means of providing a good water supply.
- Use of surface water which requires full treatment may be several times more expensive than using groundwater.
- Providing a high level of house connections may more than double the per capita cost of the system, because of tha additional system capacity required.
- Distribution costs have a high proportion of total system costs; to reduce costs, it may be desirable to provide only a few central water prints.
- Very considerable economies of scale exist in village water systems.

HEALTH CARE FACILITIES

In 1971, in West Sumatra estimate of Infant Mortality Rate (IMR) for male and female were 0.1538 and 0.1303. The IMR decreased to 0.1324 for male and 0.1121 for female in 1980 (The data conducted by Central Bureau of Statistic). However, the IMR is still relatively high. Estimate of Expectation of Life at birth by West Sumatra Province was 44.76 for male in 1971, and 47.75 for female. In 1980 the life expectancy increased, 48.30 for male and 51.20 for female.

The demand for health care in a community is formed not only by health status and health attitudes, but also by the accessibility of medical care services. The health care demand is usually shaped by the number of health centre, bed availability in hospital, number of doctors, nurses/and midwives compared to population.

Based on ratio between hospital bed and health personnels, other non medical personnels or facilities, the hospital is divided into type A, B, C and D.

Type A/B :

(1) Hospital bed : medical personnel = (4 to 7) : 1
(2) Hospital bed : para medical with care = 2 : (3 - 4)
(3) Hospital bed : para medical without care = 3 : 1
(4) Hospital bed : non medic personnel = 1 : 1

Type C :

Hospital bed : medical personnel = 9 : 1
Hospital bed : pra medic with care = 1 : 1
Hospital bed : para medic without care = 4 : 3

Type D :

Hospital bed : medical doctor & dentist = 15 : 1
Hospital bed : para medic with care = 2 : 1
Hospital bed : para medic without care = 6 : 1
Hospital bed : non medic personnel = 3 : 2

Medical personnels include specialists, general practioners, dentists, etc.

In 1980, West Sumatra possessed :

Type B : Central Hospital Padang

Type C : Provincial Hospital Bukittinggi
Provincial General Hospital Solok
Provincial General Hospital Pariaman

Type D : General Hospital Bukittinggi
Regency General Hospital Batusangkar
Regency General Hospital Lubuk Sikaping
Regency General Hospital Sawahlunto
Regency General Hospital Padang Panjang
Regency General Hospital Payakumbuh

The hospitals, based on management, are divided into :

(1) Managed by Health Department, such as Central Hospital Padang, Central Hospital Bukittinggi.

(2) Managed by Provincial Government; such as Provincial Hospital Bukittinggi. Provincial General Hospital Pariaman, and Provincial General Hospital Solok.

(3) Managed by Regency Government:

- Regency General Hospital Painan
- Regency General Hospital Batusangkar
- Regency General Hospital Sawahlunto
- Regency General Hospital Lubuk Sikaping
- Regency General Hospital Payakumbuh
- Regency General Hospital Padang Panjang

District Health Centre is defined as :

(1) Areal concept, District Health Centre is a unity health organization, which directly gives comprehensive and integrated services to the people in a certain area. Its activities from Basic Health Services.The maximum area is still effective in area with in the radius of about 5 kms. The optimal area is in area with in the radius of 3 kms.

(2) Activities concept. Minimally his activities are :

- Out patience services
- Mother and Child Welfare and Family Planning
- Hygiene & Environmental Sanitation
- Prevention & Eradication of Communication Diseases
- Health Education to the people
- Health Care
- School Health Programs
- Nutrition
- Notation & report for planning & evaluation

and suggestion to the minimal activities are :

- Dental health Care
- Mental health Care
- Simple laboratory

(3) Personnel concept. Based on health personnels, such as Medical Doctor, Dentist, Nurse midwives, dental nurse, sanitarians.

(4) Referal concept. In health services net work system, there is delegation of responsibility on existing problem either vertical or horizontal to higher & more capable centre.

Total hospital includes Central Hospital, Provincial General Hospital, Regency General Hospital, Mental Hospital and Private Hospital (Figure 19.4 and 19.5), increased since 1976. But in 1979, decrease because the change of the condition of the hospital.

District Public Health Centre with Inpres only increased steeply. Since 1981, out Patients Clinic and Mother and Child Health Clinic is abolished gradually. Their activities are under Distric Public Health Centre. So they decrease very stepply.

Bed Availability and Capacity

We can see a gap between capacity and availability. (Figure 19.6). However, the patience increases year by year.

Health personnel includes :

(1) Specialist
(2) General participationers
(3) Dentist
(4) Public Health Advisors
(5) General midwives
(6) Sanitarians
(7) Nutrition assistenace
(8) Nurse midwives
(9) Midwives

The personnel increases year by year (Table 19.7) but in 1982, the personnel is slightly relative decreased to continue their education to the higher level.

Table 19.7. Number of Health Personnels, 1970-1982

Year	Number
1970	172
1971	187
1972	210
1973	220
1974	280
1975	306
1976	427
1977	591
1978	794
1979	870
1980	896
1981	718
1982	883

Source : Information collected from Regency Health Services and District Health Services in Municipal using a questionaire, 1984.

In 1981 the personnel highly relatively decreased, because they continued their education to the higher level. The Repelita IV includes :

- to reduce Infant Mortality Rate into 60 per 1,000 life birth.
- to increase Life Expectancy into 43.3 years for male and 57.5 years for female.

In addition to what we have had in West Sumatra, during Repelita IV, 4 hospital will develop in 4 regency areas.

PROGRAM IN REPELITA IV

(1) Improving the status of Mother and Child Health Welfare and Out Patien Clinic to become Subdistrict Health Centre (100 units). Besides Mobile District Health Centre of 36 units will be added so that each district will have one unit. As a result at the end of Repelita IV it is expected that there will be 138 units of District Health Centre, 193 units of Subdistrict Health Centre, and 83 units Mobile District Health Centres.

(2) Each District Health Centre will have health personel of :

- Medical doctor	1
- Midwives	2
- Nurses	6
- Hospital assistants	2
- Dental nurses	2
- Laboratory worker	1

and at Subdistruct Health Centre will have, 1 Medical Doctor, 1 midwives, 1 hospital assistant, 1 dental nurse, 1 laboratory worker and 2 nurses.

(3) Completing facilities available at Regency Hospital, especially number of hospital bed and addition of a few specialists.

(4) Improvement of District Health Centres activities :

(a) All District Health Centre carry out 12 basic health activities

(b) Admission of patients at certain District Health centre.

(c) Dental health care at 80 per cent of District Health Centre.

(d) Mental health care at 20 per cent of District Health centre.

(e) Reinforcing quality and member of District Health Centre personnel according to 12 Health Basic activities.

(f) Addition of District Health Centres especially of high density population area, transmigration area, isolated area and District Health Centre with wide covering working area, so each District Health Centre will be supported by Subdistrict Health Centre.

(g) Carrying out stratification of District Health Centre by completing equipments.

(5) Improvement of referal system activities. This step will be followed at the same time by completing facilities in several hospitals according to their function and level namely:

(a) Type C hospital, are open for Pediatice, Internal Medicine, Obstetric, Obstertic Gynecology, and Surgery.

(b) Type B are receiving referal from District Health Centre.

(c) General hospital dr. M. Jamil Padang only receives specialistic and subspecialistic referal.

(d) General hospital dr. A. Mukhtar Bukittinggi only receives specialistic and a few subspecialistic.

(e) Improving the health care capacity at Ulu Gadut Mental Hospital.

(6) Developing health personnel :

(a) Improving the quality and quantity of available health education graduates.

(b) Improving the quality and quantity of teacning staff according to existing paterns.

(c) Managing health personnel, training in functional, technical, administration and management especially for heads of health institutions.

CONCLUSION

The safest and most convenient water sources are water pipe and pump. Water resources for drinking, bathing, and washing have conditions of quality and quantity. The WHO gives a standard for water consumption 100 litres per capita per day in urban area, and 86.4 litres per capita per day in rural area. Quality standards are concerned with physical, chemical, biological and bacterological factors. Since 1974, the government have built the water Supply Project with the aim to improve physical environment. The government wants to build this project in all regencies. Anyhow in 1980 the project can only supply 0.23 per cent - 11 per cent of total households. In 1990 people will use well or pump for drinking 64.6 per cent of total household and 61 per cent for bathing and washing from from well or pump. However, they have been using mostly well rather than pump, but not all of wells are safe water supply. Wells for safe water supply should have special condition such as the distance from lattrine and their construction. The main source of pipe is from Water Supply Service, but projection of 1990 shows the bigger gap between water consumption and safe water supply.

While, on the one hand, is safe water supply an aspect of environment which influences, health status, on the other hand, health facilities play an important role to influence health status such as Life Expectancy, IMR (Infant Mortality Rate), etc.

Estimate for Life Expectancy at birth in West Sumatra is 44.76 for male, in 1971 and 47.75 for female increasing 48.30 for male and 51.2 for female in 1980. Repelita IV expect that Life Expectancy will increase to 54.3 years for male and 57.5 years for female. The IMR in 1971 for male and female are 0.1538 and 0.1303. In 1980,they decrease into 0.1324 for male and 0.1121 for female. Repelita IV expects that IMR will decrease into 60 per 1,000 life birth. However, health facilities such as number of hospitals and health centres, beds availability and number of health personnels increase year by year.

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Chapter 20

EDUCATION AND TRAINING

THE OBJECTIVE of this study is to give general overview of educational training profile of West Sumatra in relations with the projected needs of human resources, especially in agro-industrial economic activities. The educational training system and facilities is studied from the capacity of these system to accomodate the education and training activities , and not from the physical aspect of the facilities itself.

In achieving the objectives, the conditions and trends of each level of formal educational system were assessed in addition assessement was also made on the conditions of the provision of non-formal education, especially on the institutions which offer job-oriented program

The study dealt with the investigation of the existing education and training system and program. Using these conditions as base line, projection was made up to 1990. Emphasis was given in analyzing those variables which are related to agro-industrial development.

HISTORICAL BACKGROUND

Historically educational system in West Sumatra was not completely designed to meet the requirement of manpower development for economic activities. The educational plan was made mainly on the basis of social demand. As part of national educational system, educational planning in West Sumatra can be regarded as the application of the central government policy in educational activities in the region. Therefore the pattern of educational development in the province should be viewed as part of the development of education at the national level.

In the colonial period, access to education was strictly limited. The primary school was classified in to two categories.

The first category was designated for Dutch children and the children of Indonesian elites. It was oriented toward higher level of education provided by the Dutch government. The second category was primary school designated for native children, and was oriented toward preparation for low level government employee. The secondary education was only reserved for children belonging to the first category. During the colonial period, there were two junior secondary schools in West Sumatra, one in Padang and the other in Bukittinggi, a city of about 80 kilometre from Padang.

The majority of people apparently, were illiterate . There was not any higher education during that time in West Sumatra.

The proclamation of Indonesian independence opened a broader path for people to pursue education. The educational opportunity was open widely for the people in order to catch up with the needs of the people and development . It was stipulated that education should serve all the children of all class of people and prepare them not only for further education but also for life as well. The emphasis of education gradually was shifted the development of the social and moral side at character of the students as against the former emphasis on the mere acquisition of knowledge. However, education had not been planned carerully with a view to serve economic demands for manpower.

The development of the country through a series of five year development plan suggests that education should be planned according to manpower required by the development. It is logical, therefore, that the development of vocational and technical education should get more and more attention, in spite the fact that it is more is expensive to run.

THE EDUCATIONAL AIM AND POLICIES

To get a clear picture of the educational profile, it is necessary to review the educational aim and policies, since the discussion will help to get a sense of direction, what the educational system wants to achieve.

The aim of educational system in Indonesia is based on the Pancasila and the 1945 Constitution. The system is guided by the Basic Outline of State Course. The latter states several basic throughts which give a clear direction for desisional activities in education. The tnoughts among others are: (a) the concepts of life-long education, (b) the intention of expanding educational opportunity, (c) the premise that education should serve the needs of development in the various sectors, (d) the integrated approach of management of various educational institutions, and the expansion of non-formal education.

GENERAL PROFILE OF EDUCATION AND TRAINING

West Sumatra is one of the provinces that could be considered as having a high illiteracy rate[1/]. It was recorded that in 1971 the people who were illiterate comprised of 24.51 per cent. In 1980 the figure dropped to 18.5 per cent (Figure 20.1) while in the same period the figure for the whole Sumatra was only 8.86 per cent, and nationally it was 14.89 per cent[2/].(see Figure 20.2).

Apart from the high illitarcy rate, 12.69 per cent of the population are in the school system. The calculation shows the ratio of students enrolled in higher education, senior secondary, junior secondary and elementary education was 1:4:6:27.

1/ The term illiterate is used to include the persons of ten year of age who are not literate as defined by Central Bureau of Statistics, namely: (a) one who can read and write simple sentences in any letter, (b) the blinds who can read Braille, (c) the handicapped who could read and write before his handicapped prevented him to do so.

2/ Central Bureau of Statistics, Penduduk Sumatra Barat: Hasil Sensus Penduduk 1980, Seri S No.3, 1983.

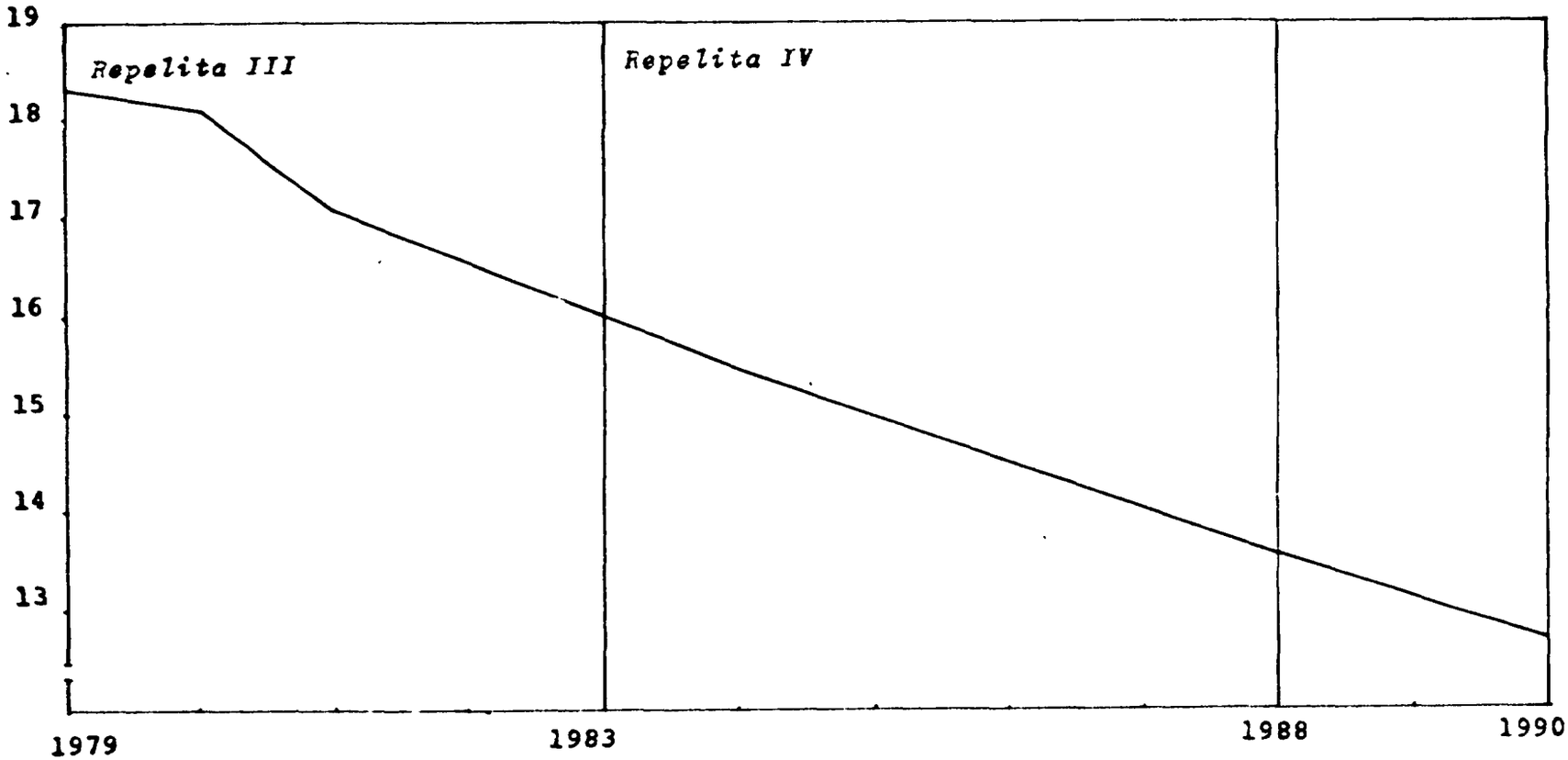

Figure 20.1 WEST SUMATRA: TRENDS AND PROJECTIONS OF ILLITERACY AMONG POPULATION, 1979-1990

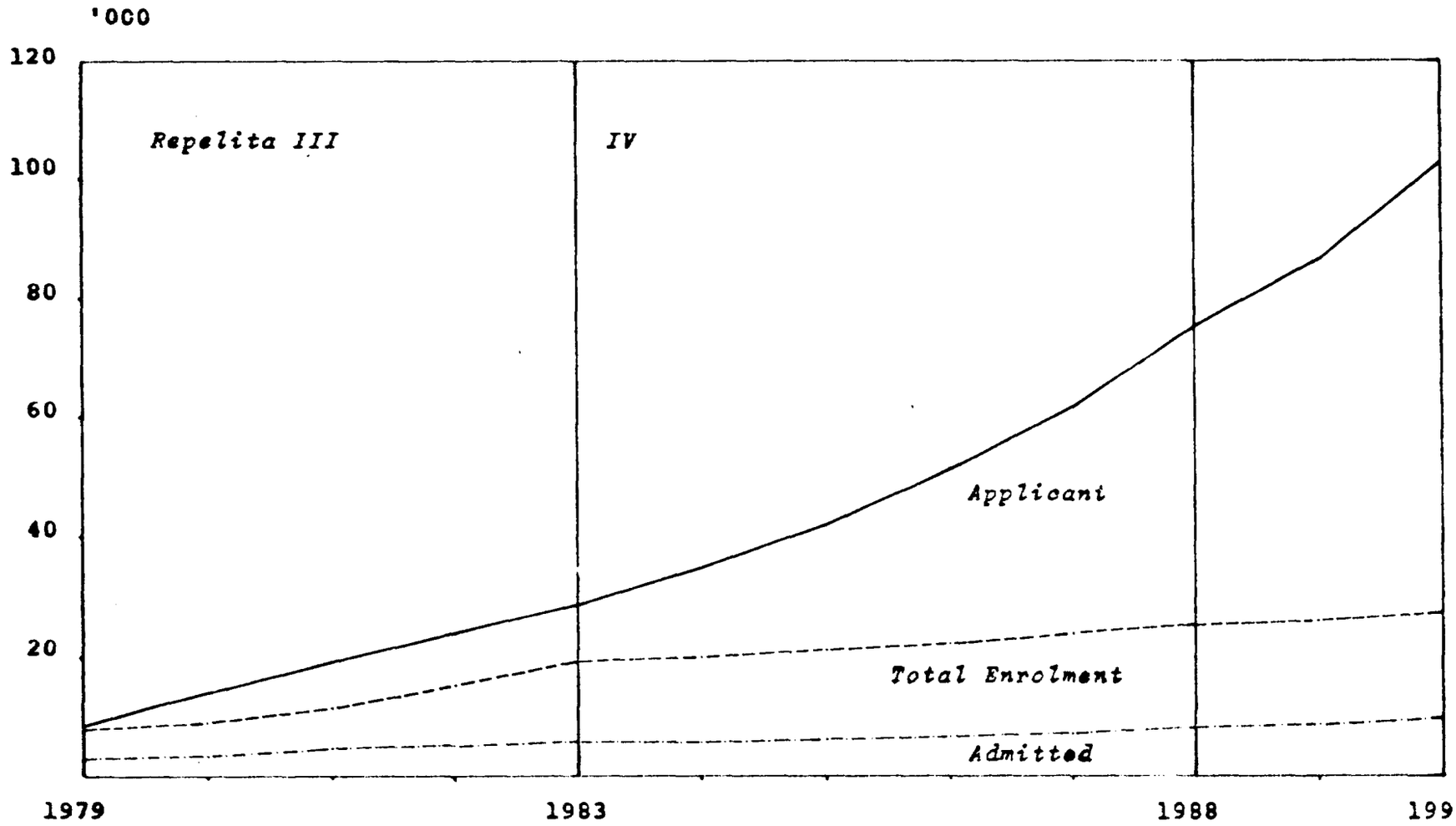

Figure 20.2 WEST SUMATRA: TRENDS AND PROJECTIONS OF APPLICANTS, ADMITTED STUDENTS AND TOTAL ENROLMENT, 1979-1990 (CASE IN THE THREE INSTITUTIONS)

Table 20.1 Number of Students By Educational Level in West Sumatra, 1983/84

Level of Education	Number of Students
Kindergarten	25,700
Primary School	694,448
Primary School for Exceptional children	171
Junior High School	
- General Junior High School	150,713
- Vocational Junior High School	2,729
Senior High School	
- General Junior High School	63,391
- Vocational Junior High School:	
- Commercial/Business	9,202
- Technical (Construction, Electricity, Machinery)	9,974
- Home Economics	425
- Arts	593
- Musics	417
- Agriculture	511
Courses:	
- Junior Civil Service	182
- Senior Civil Service	271
- Elementary School Teacher	139
Higher Education	24,854

Source: The figure is compile from survey done by West Sumatra Five Year Development Plan Task Force, 1983. Unpublished.

The ratio gives an illustration that most of the primary school students did not go to secondary school. Not all students enrolled in the elementary school completed their program. The drop out figure for elementary school nationally was 5.50 per cent[3/].

In 1980 the number of population of the whole West Sumatra was 3,406,800 [4/]. Among them 8.84 per cent used to have experience of some sort of schooling. The figure of those who completed senior high school, academy and University were 2.8 per cent 1.94 per cent, 0.14 per cent, and 0.10 per cent respectively[5/]. It seems that most senior high school graduates did not go to the higher education. Figure 20.2 shows the applicants for higher education and the number of students admitted in higher education institutions. Most of the students who were not admitted to the higher education were trying to find jobs. However, as has been discussed in chapter 5, the jobs are available in West Sumatra especially in the agricultural sectors, where most of the school graduates do not like to work in. Consequently there were many graduates who tried to get white collar jobs in the city or outside West Sumatra province. For detailed explanations see chapter 5.

THE SCHOOL SYSTEM

The existing school system in West Sumatra is described in the followings:

Elementary Education

In 1979/80 the number of the children between 7-12 years

3/ This figure was National figure taken from Central Bureau of Statistics, Tingkat Perkembangan Kesejahteraan Rakyat 1970-1980, as illustration.

4/ See Chapter 5

5/ This figure was calculated based on data provided by Central Bureau of Statistics, Penduduk Sumatra Barat: Hasil Sensus Penduduk 1980, Seri S No.3, 1983.

requiring elementary education was 571,331. Out of this number 499,831 has been accomodated. The participation rate, therefore is, 88 per cent. This figure is provincial figure, but if we look closely at each regency the figures fall in the range between 80 per cent to 96 per cent, with the lowest participation rate of Mentawai islands. The education in Mentawai has not developed as its counterparts in the main island.

In the first five year development plan, the total number of elementary school teacher was 16,927 and the classroom 14,130. The student-teacher ratio was 35 and the student-classroom ratio was 42. It shows that generally the classrooms are crowded, remenbering that the good ratio is 30. Most of the classrooms do not have good equipment. Generally the conditions of the class is poor.

There are various types of elementary education, namely ; (a) government sponsored primary school, (b) completely private school, and (c) private sponsored school but subsidized by the government. The government sponsored schools are dévided into two categories: (a) elementary schools that are administered by the Department of Education and Culture, and (b) Elemetary schools that are administered by Department of Religion. During the third five yaar development plan the total enrolment of Elementary Schools under the administration of Department of Religion seemed declining, while the enrolment of the elementary schools under Department of Education and Culture has been increasing steadily. Traditionally, however, the school sponsored by religion has been preffered by community.

The graduates of elementary school in 1979/80 was 50,543. This figure is expected to increase each year (see Figure 20.3). In the end of the fourth Five Year Development Plan, the graduates will reach approximately 125,000 students.

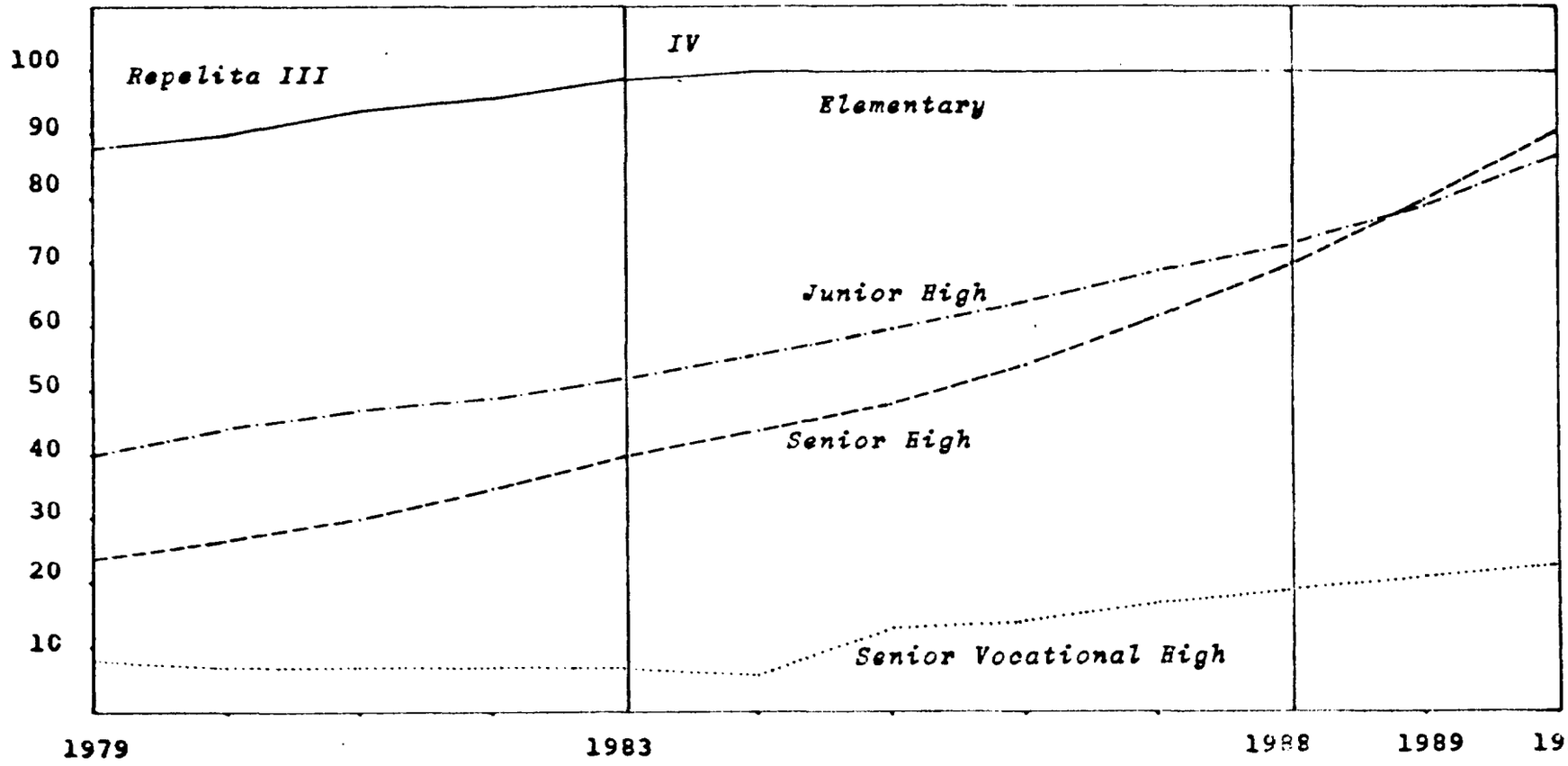

Figure 20.3 WEST SUMATRA: PERCENTAGE OF SCHOOL AGE POPULATION ENROLLED IN ELEMENTARY, JUNIOR HIGH AND SENIOR HIGH SCHOOLS, 1979-1990

The participation rate of elementary school at the end of the third Five Year Development Plan was 96 per cent. The rate was higher than the national rate, and is expected to reach 100 per cent in 1984/85. This expectation is supported by the fact that the government will implement compulsory education in the Fourth Five Year Development Plan.

The problem of the quality of elementary education has not been completely solved. This problem is a complicated one, since the quality itself relates to the problems of the quality of teachers, the quality of facilities, the budget allocated for improving the system, the quantity of students, the curriculum and other system components. However the government has been continually making various effort to improve the quality of education.

The graduates of elementary education understandably do not enter the employement market, since they are still under age. However in rural areas most of them are expected to work in the family business. This becomes potential for disguised unemployement. Fortunately, most of the students graduating from elementary education go to Junior High School, is available almost in every district. In 1982 about 82.0 per cent of the elementary school graduates continued their education in Junior High School.

Secondary Education

The educational ladder in the secondary education is divided into two levels. First is the junior secondary, and second, senior secondary.

a. Junior Secondary Education

There are two types of Junior High or Junior Secondary school. The first type is general Junior High School, which prepares the students to go to the Senior High School, and the Junior Vocational High School. Within the catagory of vocational school

there are various kinds of school, among others are (a) Junior Technical School (ST) and (b) Junior Home Economic School (SKKP). At the beginning the third Five Year Development Plan the total number of Junior Secondary schools were 255 with 107,305 students.

In every district (Kecamatan) in West Sumatra there is, at least, one junior secondary school. The school age for this school is between 13,and 15. Since the government thought that 15 years old is too young to enter work market, some junior vocational schools were integrated into general secondary school, with the exception for some vocational school located in Padang and Pasaman.

The participation rate of junior high school in 1980 was 40 per cent. The graduates from junior secondary school mostly continue their education to Senior Secondary school. In 1980/81 81.90 per cent graduates continued their education in Senior High School. To graduate the student must take comprehensive examination. This examination system is continually reviewed by the government. There is a need to standardized the examination system to keep the quality of junior secondary education controlled. In 1983, graduates from junior secondary schools reached 42,515, and, as has been mentioned before , most of them were admitted to senior secondary school. At the end of the Fourth Five Year Development Plan it is expected that 100 per cent of the junior high school graduates will be admitted continue their study to the next educational ladder.

b. Senior Secondary Education

There are two types of senior secondary school namely general senior high school and vocational senior high school. Senior High School is a school leading to higher education, after 3 year course. Senior Vocational School is designated to produce semi-skilled technicians to meet development needs in human resources.

Since the first Five Year Development Plan the enrolment in senior high school has been increasing every year. The increase has been due to the increase of general senior high school enrolment, but there is a tendency that the enrolment of vocational senior secondary education has been declining. This decline especially happened in the second and third Five Year Development Plan.

In 1983/84 the school-age population for senior secondary level is 225,900 with 40 per cent participation rate (including vocational secondary education). The total number of teachers is 4,231, while the number of classroom 2,859, and the number of the graduates in the same year was 25,673[6/]. About 34.00 per cent of them continue their education to higher education institutions.

In the National census in 1980, it was found many types of occupations have been filled by senior vocational school graduates. But the declining enrolment of vocational schools shows that the interest of young people in the schools is not very high. The development of vocational education faces a dilemma. On one side government wants to increase both the quantity and the quality of vocational school, but on the other side, the studens are not so interested in the vocational school .

The trends and projection of total enrolment of technical and vocational school are as found in Figure 20.4, while the trend and projections of the graduates as described in Figure 20.5.

As has been mentioned the declining enrolment were due

6/ Sumatra Barat Five Year Development Plan Team, 1983 Unpublished. The figure only refered to senior high school within Department of Education and Culture.

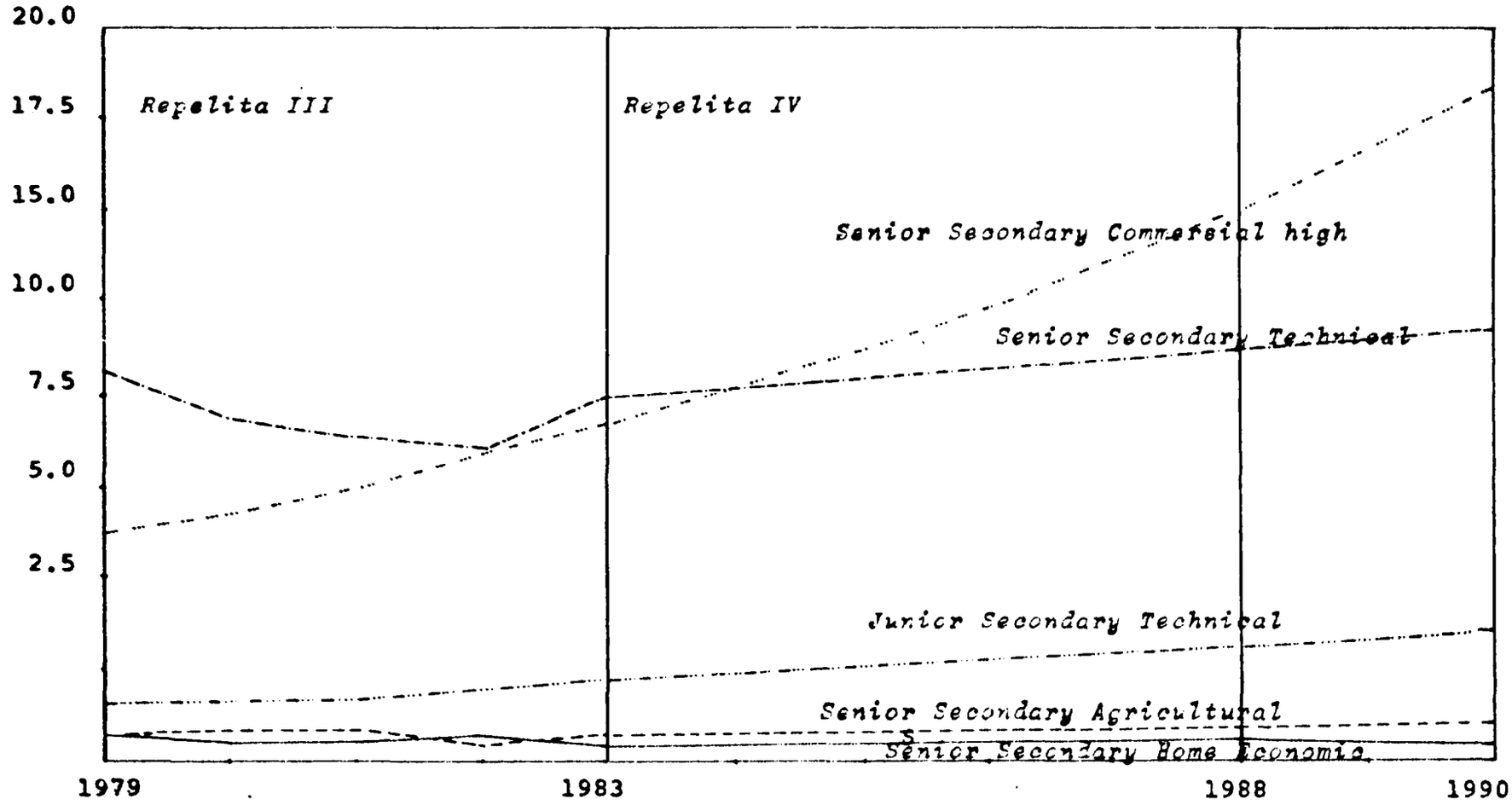

Figure 20.4 WEST SUMATRA: TRENDS AND PROJECTIONS OF THE TOTAL ENROLMENT OF VOCATIONAL SCHOOL, 1979-1990

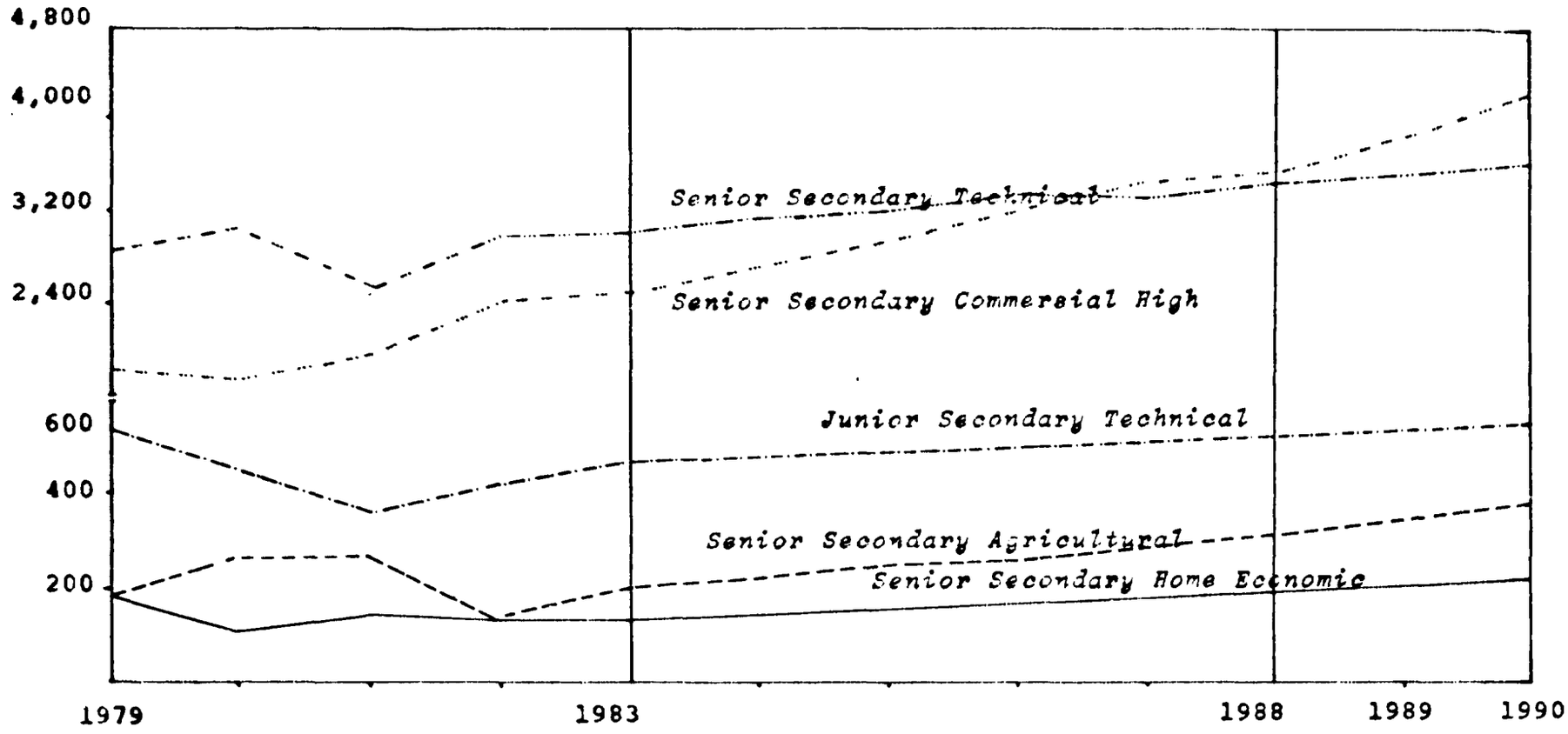

Figure 20.5 WEST SUMATRA: TRENDS AND PROJECTIONS OF THE GRADUATES OF VOCATIONAL SCHOOL, 1979-1990

to the situation where more and more students plan to continue their education, since the vacancies in the employment market is not always bright. In 1982, for instance , there were 2,500 technical high school graduates seeking employment, while in the same year the number of the graduate was 2,596[7/]. Since the source of growth of West Sumatra economic development mainly comes from agricultural sectors, the absorption of manpower with technical school qualifications would be very limited. This is probably one of the factors which caused the interest of entering vocational or tecnical school has been declining, despite of the importance of the school in promoting the development of economic activities nationally. It has been announce by the Minister of Education and Culture that in the coming years, the technical and vocational education will be extended to meet the manpower needs in the Fourth Five Year Development Plan.

Manufacturing sectors will have significant contribution during the Fourth Five Year Development Plan in West Sumatra, will cover approximately 25.40 per cent of the total source of growth[8/]. If the prediction is accurate, there will be a need in expanding technical schools, especially in machinery stream. However the demand for graduates who have construction major will decrease, since in this sector, there will be a decline trends in the coming years.

The problem of technical education lies in fact that the school is very expensive to run. The unit cost of technical education could achieve 10 times as the unit cost of general education due to the high capital and recurrent expenditure required. Because of this requirement, it happens that technical and vocational schools which do not have facilities are run as general senior secondary education.

7/ West Sumatra in Figures, 1982

8/ See Chapter 5

A joint budget between government and private enterprise is one of the alternatives to be considered in financing the vocational and technical schools. With high quality of pre-service education for technician, the employer will spend less money to train the technician. Regretfully, this kind of approach has not been taken seriously.

There are eight public technical senior high schools in West Sumatra, six sponsored by private institutions but subsidized by the government, and three schools completely sponsored by private institutions. Those schools are distributively located in Padang, Bukittinggi, Payakumbuh, Padangpanjang, and Sawahlunto, and the kabupaten of Padang Pariaman, Pesisir Selatan and Sawahlunto. Trends and projections of enrolment of those schools taken together are shown in Figure 20.4, while the trends and projections of its graduates can be seen in Figure 20.5.

Agriculture is the second largest source of economic growth predicted in the Fourth Five Year Devolopment Plan. It should be noted, however, that the young generation who has experiences in schooling tend to avoid being farmers or working in agricultural sector. The manpower supporting the agricultural sectors tends to be those who do not have enough education or elderly people. Additionally the elemnetary school dropouts and graduates still can be expected to enter employment in the agricultural sector.

There were five agricultural senior secondary schools, but one of them has been closed. The remaining four are located in Padang, Padang Mengatas, Sijunjung, and Balai Salasa. The schools are under the administration of the Department of Agriculture. The enrolment of the school is ranging from 190-319, the biggest being in Padang with 319 students enrolled. In average there are about 200 students graduately

from this system[9]. Most of the graduates are appointed as government officials to do the guidance in intensifying or extensifying the agricultural business. They are usually stationed in the districts. There are no data available of the alumni after graduating from the schools.

TRAINING SYSTEM

In preparing the manpower resources, the Department of manpower establishes several training centers in West Sumatra. The purpose of the center is two fold. First, to prepare the unemployed persons regardless of their education for the job available in the community or to create job by themselves, and second, to give in-service training for the employed one. For the latter , joint planning and financing for the planning was set up with private enterprises.

There are several training centers in West Sumatra, located in Padang, Pariaman, Padang-Panjang, Solok, Sawahlunto-Sijunjung, Lubuk Sikaping, Painan and Payakumbuh. Among the seven, at the present time, Padang is the only center that has been operating regularly. The other centers has not operated fully.Some of them are even still in the phase of construction.

The training programs available in Padang training center is tailoring, weaving, construction,automotive, engine mechanics, electronics, husbandry, agriculture, fishing, and typing/ secretarial jobs. The length of training stretches from two weeks to three months according to the nature of packages being offered.

Between 1979-1983 there were 2,566 persons have been trained in the center in the fields of agriculture, animal husbandry, fishing, carpentry, masonary, electronics, blacksmith, tailoring, welding, electricity and weaving[10]. The

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9/ West Sumatra in Figure, 1982

10/ This figure is based on the survey done by the research team.

The available training facilities for farmers and industrial workers should be expanded along with the manpower requirements in the field. The strengthening of Agricultural Faculty Andalas University through the Western Islands University Development Scheme affiliates with University of Kentucky will boost the development of farming and agricultural science, which is strongly needed in enhancing the development of agro-industrial activities. The development will also be supported by Agricultural Research Institute, The Animal Disease Research Institute, and the Food Crop Research Center. For the middle managerial position position the existing agricultural related high schools (Agricultural High School, Animal Science High School, Agricultural Industrial Technology High School) should be improved and modernized 14/.

The training centers which are set up by the Department of Manpower as has been discussed earlier will have significant role to train the labor force needed in the agro-industrial activities.

The other important kind of manpower is profesional. The total number of profesionals in West Sumatra in 1971 was 29,085 15/ . During the las decade these manpower increase by 34.67 % or with the rate of growth of 3.36% yearly. This grwth rate was higher if it is compared with the population growth rate which was 2.21% in 1983. The trend and projection of profesional manpower in West Sumatra can be seen in figure 20.7.

West Sumatra can be considered as province that has a good professional manpower resources. Among 9,559 profesional manpower in the whole Sumatra Island, 39,170 or 42.78%

14/ See discussion on Chapter 13

15/ Central Bureau of Statistics, Population Census, Jakarta, 1971.

biggest number of training participants was in the field of electronics, while training in agriculture, husbandry, and inland fishing were onli given to 124 participants or 4.80 per cent from the total participants.

The training is organized according to the demands from the community, i.e. the number of persons who apply to be trained. The application should be addressed to the Head Office of the Regional Department of Manpower. In addition to the centers the Department of Manpower sets up the training using mobile urits. This kind of training is given with shorter period of time, without sacrificing the quality of the training. Between 1978 to 1982 the number of participants of this training was 3,549 or in average 709 persons a year.16/

The Department of Manpower also runs the training for small enterpreneurs. In five years (1978-1982) the total number of small enterpreneurs having trained was 1,905 persons or in average 381 persons a year.

Since the package of training designed by the centers is flexible, this method of training is suitable for improving the human resources so they can meet the requirement set up by private sectors. It is important to note, however, that the joint planning and financing of the program should be made with the private sectors, so the quality, quantity and the efficiency of such a program can be maximally promoted.

With the projected Gross Regional Domestic Product of 6.38 per cent per annum over the period of 1980-1990, the employment will grew at the annual rate of 1.93 per cent -- by using the employment elasticity of 0.3020. On the basis of this calculation, the total projected employment of West Sumatra in 1990 will be 1.32 million. Table 5.4 has calculated the employment structure by industrial origin.

16/ West Sumatra in Figure, 1982.

By considering the projected growth rate of Gross Regional Domestic Product to the year 1990 at 6.38 per cent per annum, how many professional, technical and related workers; managers and administrators; clerical and related workers; and others occupational classification of employment will be needed for West Sumatra ?

Since the occupational breakdown of the employment figures were made on the basis of one digit classification -- on the basis of the published population census figures -- it became rather difficult to get a more detailed projected occupational structure in West Sumatra.

Projection of employment by occupational groups seem more difficult than projection of employment by industrial activities. The sectoral coefficient of employment elasticities -- which relates the sectoral growth rates of value added and employment -- were geared toward the second rather than the first projection since the calculation of value added has been made on the basis of the industrial origin rather than the occupational structure. However, there seems to be a closed relationship between employment by industrial origin and employment by occupational classification.

The farmers and agricultural workers grew at nearly the same rate as the agricultural sector. In the meantime, professional, technical and related workers; and managers and administrators seems to be closely related to the manufacturing growth rate. Sales workers are associated with the trade sector; production, transport equipment operators and related workers with the transportation and communication sector. By using these assumptions, the projected employment of West Sumatra by occupational classification could be seen from Table 20.2.

Although the total absolute number of farmers and agricultural workers increase from 677.9 thousands to 750.3 thousands, the proportion of the farmers to the total employment of West Sumatra decrease from 62 per cent to 57 per cent. In the meantime the needs for the type of occupations outside farmers seems to

be increased either in absolute or relative number. This is not surprising, since projected economic growth rate of 6.38 per cent to the year 2000 required a more sophisticated works with a more higher tehnical skills.

Table 20.2. West Sumatra : Trends and Projections of Employment by Type of Main Occupation, 1971-1990
('000 persons)

Main Occupation	1971	1980	1990
Professional,technical, and related workers	28.4	38.8	53.8
Managers and administrators	4.0	0.8	1.1
Clerical and related workers	24.2	29.4	39.2
Sales workers	75.1	131.2	170.8
Service workers	16.6	23.7	31.6
Farmers and agricultural workers	603.2	677.9	750.3
Production,transport equipment operators and related workers	87.2	177.5	226.8
Others	48.4	5.2	48.3
Not Stated	-	7.4	-
Total	887.1	1,091.9	1,321.9

Source : Table 5.1.

However, since more than half of the employment opportunities in West Sumatra in 1990 will still as farmers and other agricultural related workers, the focus of training activities should be oriented toward this trend.

Projection of employment by occupational groups seems more difficult than projection of employment by industrial activities. The techniques of employment elasticity mostly geared

toward the second rather than the first projection since the calculation of value added has been made on the basis of the industrial origin than the occupational structure. However, there seems to be a closed relationship between employment in the industrial origin and the occupational classification. The agricultural based industries will require the improvement of the quality as well as the quantity of the farmer and agricultural workers. Since there is a movement of labor force with net migration rate of -3.60 per cent per 1,000 population, it is important to attract young people to work in the agro-industrial sector. This can be done by modernizing agriculture and improving the farm and industrial related management and shifting the traditional family farm owner system into modern manufacturing system.

The available tranining facilities for farmer and industrial workers should be expanded along with the manpower requirements in the field. The strengthening of Agricultural Faculty Andalas University through the Western Islands University Development Scheme affiliates with University of Kentucky will boost the development of farming and agricultural science, which is strongly need in enhancing the development of agro-industrial activities. The development will also be suppoerted by Agricultural Research Institute, The Animal Disease Research Institute, and the Food Crop Research Center. For the middle managerial position the existing agricultural related high schools (Agricultural High School, Animal Science High School, Agricultural Industrial Technology High School) should be improved and modernized. 17/

The training centers which are set up by the Department of Manpower as has been discussed earlier will have significant role to train the labor force needed in the agro-industrial activities.

The other important kind of manpower is professional. The total number of profesionals in West Sumatra in 1971 was 28.4 thousand. During the last decade thes manpower increase by

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17/ See discussion on Chapter 13.

3,52 per cent per annum. This growth rate was higher if it is compared with the population growth rate which was 2.12 per cent. The trend and projection of profesional manpower in West Sumatra can be seen from Table 20.2.

Since the First Five Year Development Plan, a large number of educational facilities has been continuously provided by national and local government as well as by private educational agency. These facilities enable West Sumatra produces more profesionals. Despite the large number of professionals, the job opportunity that is likely most available in West Sumatra is in the agricultural field. The agricultural, however, seems not be able to absorb the profesionals except in the higher education and research institutions. In general professional manpower who are graduated from higher education system do not like to live in the villages, even though they are from the farmer family. Many professionals work as civil servant, especially in the higher education instructions or in the government projects.

The rapid expansion of education seems to affect the increase of the availability of professional manpower. In the Pelita IV, the estimation of professional manpower growth rate is 3.36 per cent yearly. The increase of professional manpower also means the increase of job-seekers in the urban areas.

HIGHER EDUCATION

The number of higher educational institution (University, Institute and Academy) in West Sumatra is 14. Among them, five institutions belonging to the government, namely University of Andalas, Institute of Teacher Training and Education (IKIP) Padang, the Institute of Islamic Religion (IAIN), the Acade-

my of Home Affairs (APDN), and the Academy of Indonesia Arts. Bung Hatta University is the only major private university in West Sumatra. Most of other private higher educational institutions are academy, such as academy of accounting, foreign language, management, tourism and cooperative science.

The total number of students enrolled in higher educational institutions in 1983 was 22,239. The Institute of Teacher Training and Education has the biggest students (32.06 per cent). This institute serves as the supplier of teachers for West Sumatra Province, Riau, Jambi and Bengkulu. The Faculty of Technical Education of this Institute serves as the supplier for technical teacher for senior technical high schools throughout Indonesia. The second largest in terms of the number of student is the University of Andalas with the enrolment of 6,060 in 1983 or covering 27.25 per cent of the total West Sumatra Higher education students. The third place is held by Bung Hatta University with 2.675 students 18/.

Judging from the number of senior high school graduates being admitted every year in higher education, the higher education system in West Sumatra needs to be expanded. It is only one-third of senior secondary school estimates in 1983 who were admitted to higher education system in West Sumatra. The proportion will decrease each year since the number of senior secondary school graduates will steadily increase, while the capacity of the higher education remains the same.

Many of the senior secondary school graduates continue their education outside West Sumatra, so that it will contribute to accelerate outmigration. To reduce the out-

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18/ This figure is taken from unpublished documents prepared by team on the Fourth Five Year Development Plan of West Sumatra, 1983.

migration and at the same time promote the preparation for higher qualifications of manpower, it is recommended to set up training centers which have higher education level. However, this kind of training center will be expensive to run, except if it is done by joint effort between government and consortium of private sectors who are going to employ the graduates.

The private sectors which need to employ graduates from higher education are very limited. They can easily meet their need by recruiting graduates from Java, since there is no transportation and communication problem between the islands.

CONCLUSION

The educational system in West Sumatra are growing rapidly, especially in the elementary level. The participation ratio of elementary education surpassed the ratio at the national level. In secondary school education the participation ratio is also high enough. However, in higher education the participation ratio is considerably lower.

The graduates from elementary education mostly continue their education. The ones who do not continue enter employement, mainly by helping their parents to do the work in the agricultural sector. There is a considerable number of senior secondary graduates who do not continue their education. This workforce can be effectively trained, since they have pre-requisite knowledge that make them trainable. It is recomended that the private sectors develop these human resouces, since they are available in great numbers and, as has been mentioned, they are easily trained.

The provision of manpower training is mostly administered by the Department of Manpower. There are training centers in

almost every city in West Sumatra. However it seems that all centers are not fully utilized yet. The utilization of these centres will reduce the cost in employment training for private sectors, and at the same time will contribute to the government effort to provide manpower in the development.

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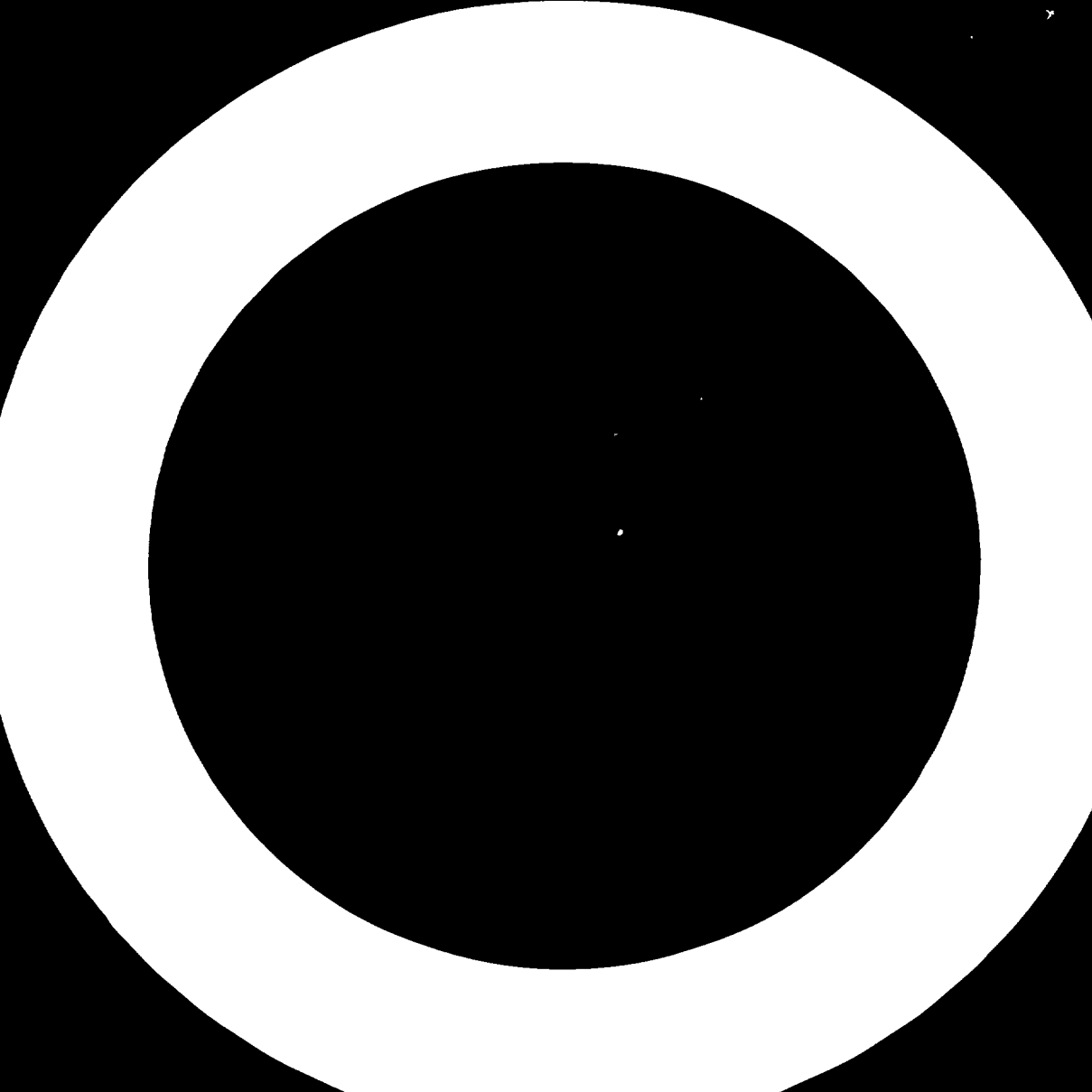
Part V

INVESTMENT REQUIREMENTS



Chapter 21

INVESTMENT REQUIREMENTS : GOVERNMENT FINANCIAL SOURCES AND POLICY

INVESTMENT is one of the main components needed to achieve the economic development of a region. The economic growth rate to be gained will be determined by the investment that can be implemented, either the aggregate one or that one implemented sectorally. The relation between aggregate income and investment changes is also determined by Incremental Capital Output Ratio (ICOR).

The economic growth rate of Sumatera Barat (West Sumatra) in the Fourth Repelita (the fourth five year development plan) is estimated to increase 6.0 per cent in average per year. In the first and second years of the Fifth Repelita (1989-1990) it is estimated to be 7 per cent per year. In accordance with the economic growth mentioned above, a certain amount of investment, either coming from the governmental sector or from non-governmental one, is needed. Therefore both investment sources mentioned above needed to be analyzed and estimated either totally or according to the allocation of each economic sector.

In the economic structure of Indonesia, there are three elements needed to be developed proportionately, namely government, private and cooperatives. Of the three elements, the bigger role is given to private and cooperative sectors, while the government role is only encouraging or supporting by creating favourable atmosphere for this business. By ever increasing the role of the private sector, it means that the investment requirement of this sector will be far increasing in the future. It also means that the source of financing for private sector investment should be accumulated and increased as much as possible. Beside the government sector investment should be directed to the activity supporting the development f private sector, namely by establishing and increasing various facilities needed for developing that private sector.

The analysis in this chapter will try to describe the relation and role of investment in encouraging the increase of the economic growth of West Sumatra, either in the past or in the future time. Therefore in accordance with the estimation of the target of economic growth rate, it will be attempted to calculate the investment needed. A deep analysis will be done upon the government sector investment which will be detailed according to central and regional governments. From this analysis, it will be attempted to formulate policy recommendation to be applied in the future, namely up to 1990.

ECONOMIC GROWTH AND INVESTMENT REQUIREMENT ESTIMATE

The West Sumatra Economic growth in the First, Second and Third Pelita successively increased by the average of 6.1 per cent, 7.2 per cent and 6.8 per cent. At the same time the amount of investment also increased, namely at First Pelita Rp 41.3 billion, the second Rp 272.7 billion and the Third Rp 909.6 billion. While Gross Regional Domestic Products at the same time were Rp 448.5 billion, Rp 1,205.2 billion and Rp 3,504.6 billion.

Based on the above figures there were the figure of ICOR of First Pelita 1.51, that of Second Pelita 3.14 and Third Pelita 3.82. This condition shows that for increasing the level of community income in West Sumatra, the ever increasing amount of investment has been required. This also indicates that in the periods of the three Pelitas the increment of financing resources has been needed. This is proved by the percentage of investment to the increasing GRDP namely in the First Pelita 9.2 per cent, the Second Pelita 22.6 per cent and the Third Pelita 26.0 per cent.

The Indonesian ICOR figures had been estimated to be 3.05 at the end of the Second Pelita and 3.80 at the end of Third Pelita. [1/] Thus the ICOR of West Sumatra is relatively the same

1/ Hendra Esmara, Perencanaan Pembangunan di Indonesia (Regional Development Planning in Indonesia), Lembaga Penelitian Ekonomi Regional, Fakultas Ekonomi Universitas Andalas, Padang, 1982, p. 79.

as that of Indonesia, where the Indonesian average is a bit lower, while the investment comparison with GDP shows the same indication, where the Indonesian average was relatively lower, namely at the end of second Pelita amounting to 21.2 per cent and at the end of Third Pelita 24.6 per cent.[2/]

The Indonesian and West Sumatra economic growth rates have been estimated to increase in the future. In the Fourth Pelita the Indonesian economic growth rate is estimated to increase 5.0 per cent in average and that of West Sumatra 6.0 per cent per year. Both figures are relatively lower than those of Third Pelita which were 6.5 per cent and 7.0 per cent per year. On the contrary the figure of ICOR is predicted to be bigger. It is estimated to be 5.34 in the Fourth Pelita[3/] while in West Sumatra it is estimated to be 4.12.[4/] This increasing is namely caused by the use of technology which is always getting higher that it needs relative bigger capital. But the ICOR figure in West Sumatra will be lower than that of Indonesia. It means that the progress in technology by the use of capital will not be as advanced as that of Indonesia as a whole.

As estimated nationally, the level of inflation at West Sumatra is 8.0 per cent per year in the period of the Fourth Repelita. This figure is far lower than that of the Third Pelita which 14.6 per cent.

The change in the above components will also change pattern of investment increase in West Sumatra. This case can be seen more clearly in the following Table 21.1.

2/ Ibid, p.78.

3/ Republik Indonesia, Rancangan Rencana Pembangunan Lima Tahun Keempat (The Draft of the Fourth Fiver Year Development Plan), 1984/85-1988/89.

4/ Calculated from Propinsi Daerah Tingkat I Sumatera Barat, Rancangan Rencana Pembangunan Lima Tahun Keempat (The Draft of Repelita IV), Book I pp.3.9-3.11 and pp. 7.5-7.6.

Table 21.1. The Estimate of Gross Regional Domestic Product and Requirement of Investment, 1984/85-1990/91 (in billions of rupiahs)

Year	GRDP		Implicit Index (1975=100)	GRDP growth rate	ICOR	Investment Requirement a/
	Current Price	Constant Price				
1984/85	1,096.6	337.1	325.3	5.1	4.03	225.4
1985/86	1,261.0	355.7	354.5	5.5	4.06	261.6
1986/87	1,443.6	377.0	382.9	6.0	4.09	354.2
1987/88	1,643.9	401.2	409.7	6.4	4.12	433.5
1988/89	1,864.5	429.3	434.3	7.0	4.15	541.6
1989/90	2,114.7	459.4	460.3	7.0	4.18	618.8
1990/91	2.398.5	491,5	488.0	7.0	4.21	707.0
Growth Rate	14.2	6.3	7.4	6.3	4.12	24.1

a/ According to current price.

In order to achieve the target of GRDP amount mentioned above, the increasing amount of investment is needed. In 1984/85 the requirement of investment in West Sumatra is about 20.6 per cent of the GRDP amount according to current price. This figure, then, increases to 29.5 per cent in 1990/91. The increment is also reflected in the increment of ICOR figure (Incremental Capital Output Ratio) which increases from 4.03 in 1984/85 to 4.12 in 1990/91.

The economic growth rate in the period of 1983/84-1990/91 is estimated to increase 6.3 per cent in average per year based on constant price in 1975 or 14.2 per cent based on current price. In order to achieve the above mentioned target, the investment should be increased 24.1 per cent per year based on current price. This figure is a bit higher than that of Indonesian investment growth rate namely amounting to 19.1 per cent,[5/]

5/ Republik Indonesia, op.cit., p.

but it is still lower than that of West Sumatra in the Third Pelita, amounting to 19.1 per cent per annum.[6/] In the book of the Fourth Repelita, West Sumatra is estimated to require the investment of Rp 1,836.3 billion. While up to 1990/91 the requirement of investment will reach Rp 3,162.1 billion. It means that in the period of next two years, it needs additional investment of Rp 1,325.8 billion or increasing of 72.2 per cent of than the Fourth Repelita.

In order to meet the requirement of investment mentioned above, all sources of development expenditure should be increased. In general the source of investment can be divided into two kinds namely government investment and private one. The government investment is that which is channelled through the government budget (central government) and regional government budget, while the private or non-government one is that originating out of the government budget, central or regional one. The investment composition from the First Pelita up to Third one shows that the government investment the given fairly big contribution. The share of government investment in the First Pelita was 53.4 per cent, in the Second Pelita 45.4 per cent and the Third Pelita 53.9 per cent. Thus it appears that the share of government investment had become bigger in the periods of the three Pelitas. Yet in the future, it is predicted that the role of government investment will not be as big as those gained in the past. This is caused by the fact that the increase of government budget, which forms the biggest expenditure of regional government of West Sumatra, is predicted to be relatively smaller in the future. The increase of development budget of central government which is relatively smaller will reduce the increase of budget allocation for regions, including West Sumatra.

The development of investment according to sources since the First Pelita is clearly shown by the following Table 21.2.

6/ Propinsi Daerah Tingkat I Sumatera Barat, op. cit.

Table 21.2. The Growth and Estimate of Investment by Sources in West Sumatra (in Rp billions)

Period Year	Government		Non-Government		Total	
	Amount	%	Amount	%	Amount	%
Pelita I a/	22.1	53.5	19.1	46.5	41.3	100.0
Pelita II a/	123.9	45.4	148.8	55.6	272.7	100.0
Pelita III b/	489.9	53.9	419.6	46.1	909.6	100.0
Repelita IV b/	858.4	46.7	977.9	53.3	1,836.3	100.0
1984/85	125.2	55.5	100.2	44.5	225.4	100.0
1985/86	145.4	51.6	136.2	48.4	281.6	100.0
1986/87	168.1	47.5	186.1	52.5	354.2	100.0
1987/88	194.5	44.9	239.0	55.1	433.5	100.0
1988/89	225.2	41.6	316.4	58.4	541.6	100.0
1989/90 c/	261.0	42.2	357.8	57.8	618.8	100.0
1990/91 c/	302.7	42.8	404.5	57.2	707.0	100.0
1984/85-1990/91	1,422.1	45.0	1,740.0	55.0	3,162.1	100.0

Resources : a/ Repelita III of West Sumatra.
b/ Draft of Repelita IV of West Sumatra.
c/ Estimated figure.

Of the figures in Table 21.2 above, it appears that the government investment share has decreased from 54.0 per cent at the Third Pelita to 46.7 per cent at the Fourth Repelita. At the beginning of Repelita IV the share of government investment is still high, namely 55.5 per cent. But in the following years it is continuously decreasing up to 41.6 per cent at the end of Repelita IV in 1988/89. While for the following two years, namely 1989/90 and 1990/91 its share is going up to 42.2 per cent and 42.8 per cent. Due to the decreasing

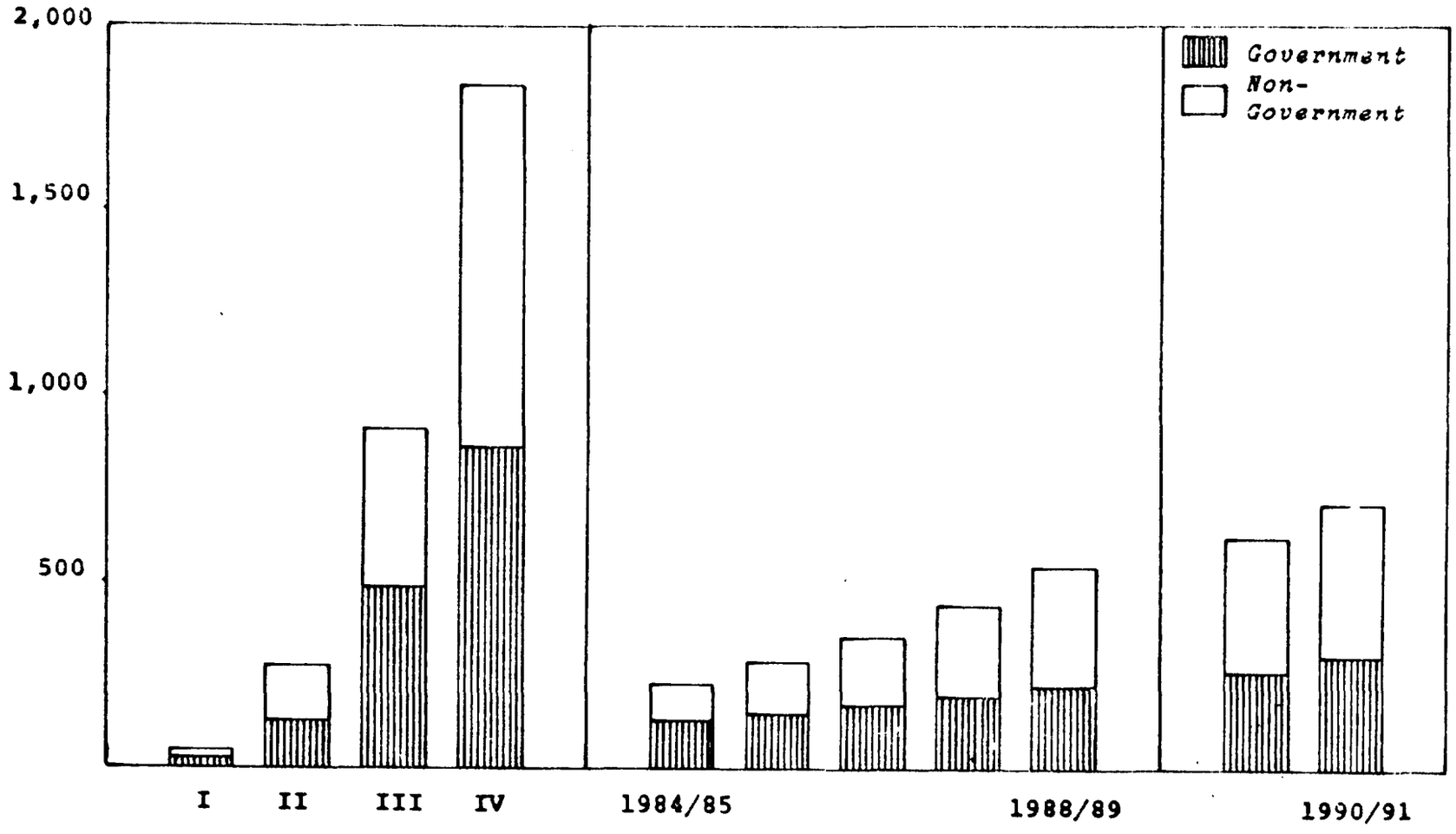


Figure 21.1 WEST SUMATRA: GROWTH AND ESTIMATE OF INVESMENT BY SOURCES

of government investment shown above, in order to meet the requirement of investment in the future, is more expected from non-government sources, namely the community, private (domestic and foreign ones), banking corporation, etc.

FINANCING SOURCES OF GOVERNMENT SECTOR

In accordance with the system of government at regions, the source of development financing of regional government consists of two kinds, namely : (a) The development budget of Central Government allocated to regions, (b) The development budget of the regional government itself (The budget of the first level and the second level of regional governments). The development budget of Central Government allocated for regional government consist of two kinds, namely, the National Pelita project budget (called Sectoral Projects) and the financing source in the form of President's Instruction Aid Program (called Inpres Aid Program).

The investment originating from the sectoral project financing and that for financing the central government developments located at regions are carried out by the central government offices/servoces at the regions. This financing fund is used for the development of socio-economic sectors which are in general focused upon the construction of infrastructures and facilities in the respective sectors.

The central government financing fund in the form of President's Instruction Aid Program is meant to help regional governments to increase development at regions in the frame of realizing the equal dissemination of development and accelarating the regional economic growth rate. As to the types, criteria and targets of these President's Instruction Aid Programs can be detailed as follows :

Types	Criteria	Target	Aim
1. Aid for Second Level of Regional Government (Kabupaten /Kotamadya)	The number of population	The improvement of infra-structures of roads, bridges and irrigation	To increase field and opportunity of employment
2. Primary School Aid	The number of unenrolled primary school age population (7-12 years)	The increasing of enrollment and school facility	To equalize to get educational facilities
3. Health Aid	The number and size of kecamatan (district)	The increasing of facility of health service	To equalize opportunity to get facility of health service
4. Road Improvement Aid	Isolated areas	The increasing of roads and bridges	To open the isolated areas and to increase production
5. Greening and Reforestation	The size of the critical land	Regreening and Reforestation	To rehabilitate the critical areas
6. Village Aid	The number of villages	The increasing of infra-structures for communication, production, society and marketing	To increase active participation of community in developing their village

The investment of regional government, either the first level (province) or the second level (Kabupaten/Kotamadya), comes from the regional government savings, namely : "The difference between the total amount of regional allocation and the total amount of recurrent budget" and is included in the regional budget.

The source of regional government revenue can be detailed into two main parts, namely, (1) subsidy from the Central Government and (2) original revenue of the region itself. Of the two

sources mentioned above, the subsidy of Central Government forms the far greater part. At the end of the Second Pelita in 1983/84 the share of Central Government subsidy in the budget of West Sumatra Province was about 84.0 per cent and at the end of the Third Pelita increasing to 84.8 per cent. While the share of subsidy in the budget of the governments of second level in West Sumatra in 1980/81 was Rp 5,072.3 million or about 49.4 per cent.[7/] The above condition shows that the regional government's saving depends very much upon the Central Government's subsidy.

By examining the amount of government financing in each source mentioned above, it appears that the greater part of government investment in West Sumatra is originating from the Central Government's budget, either in the form of sectoral projects or in the form of President's Instruction Aid Program. In other words it can be said that most of the investment source of government in West Sumatra is coming from outside. At the First Perlita the investment of Central Government amounted to Rp 18.4 billion, at the Second Pelita Rp 109.3 billion, and the Third Pelita Rp 428.8 billion, Compared with all government in the above mentioned periods, the investment role of Central Government was at the First Pelita 86.0 per cent, at the Second Pelita 84.7 per cent and at the Third Pelita 87.3 per cent. It means that in the three periods of Pelita mentioned above, the investment share of Central Government in West Sumatra had increased. On the other hand, the investment share of regional government had decreased.

The development from the period of the First Pelita up to the end of the Third Pelita shows that the investment of Central Government in West Sumatra had increased fast enough. The total growth rate of the government investment in average at the First Pelita was 34.5 per cent per year, at the Second Pelita going up to 44.2 per cent but the Third Pelita going

7/ Rustian Kamaluddin and Iswandi Iskandar, Potensi dan Disparitas Pembiayaan Pembangunan Daerah Tingkat II Kabupaten dan Kotamadya di Sumatera Barat, (Potential and Disparity of Development Financing of Second Level Region of Regency and Municipality in West Sumatra), Universitas Andalas, Padang, 1982, p. 40.

down to 25.6 %. The condition of such growth rate seemed to be experience by nearly all sources, namely increasing at the Second Pelita and decreasing again at the Third Pelita. To get clearer picture of the growth of government investment by each source, it can be seen in Table 21.3 and supplemented by Figure 21.1.

Since the government investment in West Sumatra mainly originated from Central Government, its development was influenced by the growth of the government Budget (APBN), especially the development fund of Central Government. Therefore in order to measure the magnitude of government investment in West Sumatra regional development, it should be compared with that of government budget. This can be seen in the amount of Gross Domestic Product (GDP) and the population, such as illustrated in Table 21.4.

From the figures of Table 21.4 it appears that the growth rate of government investment nationally is higher than that of West Sumatra. Yet this higher growth rate is also followed by the higher growth rate of GDP and population.

Compared with GDP, the amount of government investment nationally at the end of the First Pelita,of the Second Pelita and the Third Pelita successively were 6.7 per cent, 11.2 per cent and 12.8 per cent. While the same comparison in West Sumatra were 4.4 per cent, 11.3 per cent and 13.0 per cent. The figures mean that the role of government investment in encouraging the increase of community income at this region is higher than the national average. This condition was experienced since the end of the Second Pelita up to the end of the Third Pelita.

Compared with the whole government investment nationally,the percentage of government investment in West Sumatra in 1969/70 was about 1.7 per cent. At the end of the First Pelita it decreased to 1.3 per cent, at the end of the Second Pelita it was 1.5 per cent and at the end of the Third Pelita it decreased again to 1.3 per cent. From these figures it appears that allocation of Central Government investment for West Sumatra has relatively decreased.

Table 21.3. The Financing Source of Government Development by Types in West Sumatra, 1969/70-1983/84
(in Rp millions)

Year	Sectoral Project	Inpres Aid	First-Level Government Budget	Second-Level Government Budget	Total
1969/70	1,531.9	70.0	248.7	74.9	1,925.5
1970/71	1,944.1	234.0	550.0	165.6	2,893.7
1971/72	2,873.6	335.8	273.4	82.3	3,475.1
1972/73	5,592.4	424.5	467.0	140.6	6,624.5
1973/74	4,700.6	779.9	632.3	190.3	6,303.1
Pelita I	16,552.6	1,884.2	2,371.4	653.7	21,421.9
1974/75	5,807.5	1,807.4	1,511.2	515.0	9,641.1
1975/76	13,065.4	3,053.7	2,216.4	1,002.9	19,338.4
1976/77	17,650.4	4,380.4	2,480.4	2,418.4	26,929.6
1977/78	22,243.2	4,890.3	3,439.2	1,166.6	31,739.3
1978/79	22,731.5	5,688.4	3,450.0	1,437.8	39,307.7
Pelita II	87,498.0	21,800.2	13,097.5	6,560.7	128,956.4
1979/80	38,046.0	6,678.0	3,479.0	2,849.0	51,052.0
1980/81	66,269.5	13,014.0	6,067.0	3,822.0	89,172.5
1981/82	68,956.0	25,173.0	8,107.0	4,499.0	106.735.0
1982/83	70,757.0	24,872.0	11,216.0	5,625.0	112,470.0
1983/84	85,535.0	20,363.0	9,912.0	7,056.0	122,866.0
Pelita III	329,563.5	99,273.0	38,781.0	23,851.0	491,468.5
Growth Rate					
Pelita I	32.4	49.4	26.3	26.3	34.5
Pelita II	43.6	48.8	40.4	49.8	44.4
Pelita III	24.4	29.1	23.5	37.5	25.6

Sources : a/ Figures in 1979/80-1983/84, Rencana Pembangunan Lima Tahun Propinsi Daerah Tingkat I Sumatera Barat, (The Five Year Development Plan of West Sumatra Province), Padang, 1983.

b/ The figure of 1969/70-1978/79 (excluding the budger of Second Level Government) : Lembaga Penelitian Ekonomi Regional, Hasil-Hasil Pembangunan Pelita I dan Pelita II dan Pelaksanaan Pelita III di Sumatera Barat, (The Results of the Development of the First and Second Pelita and The Execution of the Third Pelita in West Sumatra (The Inpres figure was revised by excluding Market and Shopping Centre Inpres).

c/ The Budget of Second Level Government, 1974/75-1978/79: Rustian Kamaluddin and Iswandi Iskandar, Potensi Pembiayaan Pembangunan Daerah Tingkat II Kabupaten dan Kotamadya di Sumatera Barat (The Potential and Disparity of Development Financing of Secon Level Region Kabupaten and Kotamadya in West Sumatra).

d/ The Budget of Second Level Government, 1969/70-1973/74: Estimated figures.

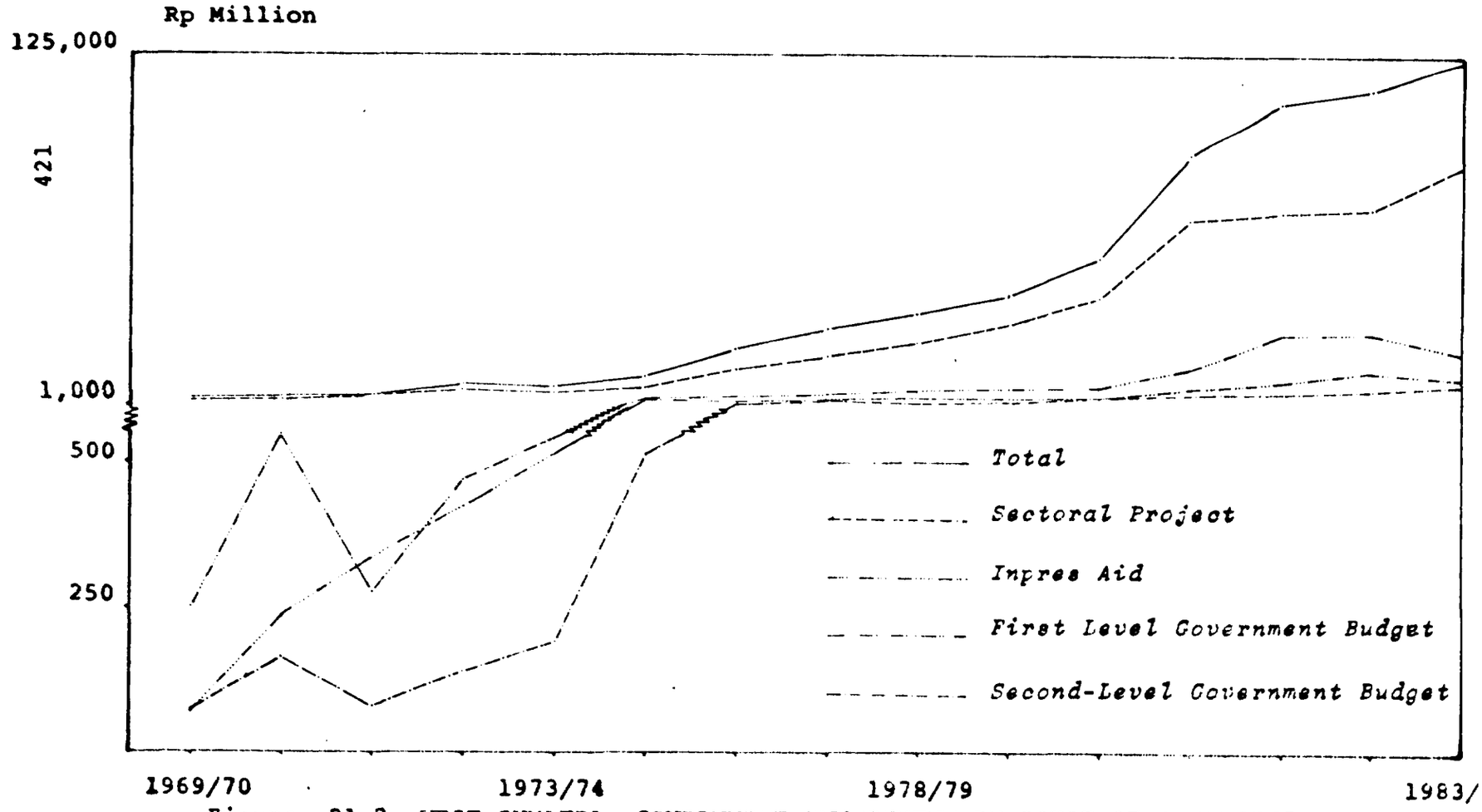


Figure 21.2 WEST SUMATRA: GOVERNMENT INVESTMENT BY SOURE OF FINANCING

Table 21.4. Comparison of Government Investment and GDP and Population in West Sumatra and Indonesia, 1969-1990

Year	Indonesia			West Sumatra		
	GDP (Rp billion)	Investment (Rp billion)	Population ('000)	GDP (Rp.billion)	Investment (Rp billion)	Population ('000)
1969/70	2,718	118	114,977	63	2	2,673
1973/74	6,753	451	126,083	135	6	2.916
1978/79	22,746	2,556	141,403	345	39	3,252
1983/84	72,513	9,290	158,100	949	123	3,626
Repelita IV						
1984/85	83,114	10,459	161,600	1,097	125	3,703
1985/86	95,034	13,171	165,200	1,261	145	3,781
1986/87	107,871	15,472	168,700	1,444	168	3,861
1987/88	121,539	18,115	172,200	1,644	195	3,944
1988/89	135,917	20,524	175,600	1,865	225	4,028
1989/90	152,708	23,623	179,300	2,115	261	4,114
1990/91	171,590	27,190	183,100	2,399	303	4,202
Growth Rate						
Pelita I	25,5	39.8	2.3	20.9	31.6	2.2
Pelita II	27.5	41.5	2.3	20.6	45.4	2.1
Pelita III	26.1	29.5	2.3	22.4	25.8	2.2
1969/70-1983/84	26.4	36.6	2.3	21.4	34.2	2.2

By examining the sources of government investment in the development of West Sumatra where the greater part originated from the Central Government Investment, its growth is also determined by the development of the fund of central government budget The relation is especially found in the investment in the form

of sectoral projects and Inpres aid the found source of which originated from central government budget. By examining the growth rate of central budget, sectoral projects and Inpres aid programs during the period of 1969/70-1983/84, there was an elasticity figure of sectoral project namely 0.91 and Inpres aid 1.03. This figure means that the central government budget increase of 1 per cent appears to cause and increase of allocation of sectoral project investment for West Sumatra 0.91 per cent and allocation of Inpres aid fund 1.03 per cent.

Based on the above description and by observing the estimate of government budget and financing potential that can be obtained in the future, the amount of government investment in the development of West Sumatra in the future can be seen in the following Table 21.5.

Table 21.5. The Estimate of Government Investment Sources by Types, 1983/84-1990/91
(Rp billions)

Year	Sectoral Project	Inpres Aid	First Level Government Savings	Second Level Government Savings	Total
1984/85	73.4[a/]	31.5	13.5[b/]	6.8	125.2
1985/86	84.0	36.8	16.7	7.9	145.4
1986/87	96.1	43.0	20.0	9.0	168.1
1987/88	109.9	50.2	24.0	10.4	194.5
1988/89	125.7	56.7	28.8	12.0	225.2
1989/90	143.8	68.6	34.8	13.8	261.0
1990/91	164.5	80.1	42.2	15.9	302.7
Growth Rate	14.4	16.8	20.9	15.2	15.9

a/ The agreed Project Allocation List (DIP).

b/ The figure of development expenditure in the government budget 1984/85.

Source : Figures of 1984/85-1988/89 from the Draft of The Fourth Five Year Development Plan of West Sumatra Province, and the Estimated Figures of 1989/90-1990/91.

From the above figures it is seen that the amount of government investment will reach Rp 858.4 billion in the period of the Fourth Repelita IV (1984/85-1988/89), while in the period of 1984/85-1990/91 it is estimated to be Rp 1,422.1 billion. Compared with the amount of Rp 491.5 billion in the Third Pelita, there is a rise by 74.6 per cent in the Fourth Repelita and 189.3 per cent in the period of 1984/85-1990/91.

In the period of 1984/85-1990/91 the growth rate of government investment is estimated to rise by the average of 15.9 per cent per year. This figure is relatively bigger than that of the growth rate of government budget in the Fourth Repelita which is 15.1 per cent per year. Yet compared with the growth rate in the Third Pelita amounting to 25.6 per cent, the growth rate in the above mentioned period is far lower. The decrease of the growth rate figure in general will be experienced by all sources of government investment. This is understandable because the growth rate of development expenditure of Central Government in that period will also decrease by 16.6 per cent per year. It is obvious that this decrease will also influence the allocation of central government budget for all the regions including West Sumatra.

In the period of the Fourth Repelita, Rp 489.1 billion or 51.0 per cent of all government investment in this region originated from the investment of sectoral projects. The investment in the form of Inpres aid program is amounting to Rp 220.2 billion or 25.7 per cent, the First Level Regional Government Budget amounting to Rp 103.0 billion or 12.0 per cent, and the Second Level Regional Government budget is Rp 46.1 billion or 5.3 per cent. It means that the role of Central Government investment in the Fourth Repelita will reach 82.7 per cent. While at the First and the Second Pelita, they were 86.0 per cent and 84.7 per cent. Thus it means that the role of Central Government Investment in the period of the Fourth Repelita will relatively be smaller if compared with that of the previous Pelitas. It also means

that the increase of government investment in the First Level Regional Government budget and the Second Level one should be carried out more in the Fourth Repelita, compared with the source of other government investments.

THE PROBLEM AND POLICY OF GOVERNMENT INVESTMENT

By observing the increase of government investments from the period of the First Pelita up to the end of the Third Pelita, it can be said that there has been a fairly high increase in all sources. But looking at the composition where the greater part of the financing sources are originating from outside, namely the Central Government, its increasing effort is more determined by the policy of Central Government. to increase the investment originating from the Regional Government itself will collide with the limitation of potential source of revenue the Regional Government can obtain, whether at the First or Second Level Region. Therefore in order to increase the government investment in the regional development of West Sumatra in the future still much more is needed from the source of Central Government.

The allocation policy of government investment according to sectors is meant to support the realization of economic system based on economic democracy, in which the greater role is given to private business and cooperative. In this case the government role is mainly to encourage the execution of sound system in any business, activities namely by creating infra-structures and facility of economic and social services needed. In addition, the policy of government investment is related to the functions carried out, which can be divided into three kinds, namely : (1) general government, (2) development and (3) social function. In the development function, the direction of investment to the field of infra-structure and facility is needed to support the economic growth of society. In the government function, the investment is also required to support

the smoothness of government duties, either in providing physical facilities of office and mobility or other equipment. While in the social function, investment is also necessary to provide social service facility needed by the community.

In relation to the above duties, the aim of government investment can be grouped into three fields namely the economic field, social field and general field. Each field can also be d vided into several sectors as shown by Table 21.6.

In accordance with the policy and target of regional development of West Sumatra, namely giving priority to the development of economy, the aim and policy of government investment appear to be parallel with the respective policy. Since the First, the Second, and the Third Pelitas, most of government investment in West Sumatra was focused on the field of economy. At the Third Pelita the allocation of investment for the field economy amounted to Rp 302.5 billion or about 61.8 per cent of all investment. For the social field 27.1 per cent was allocated and 11.1 per cent for the the general field. To get clearer picture of the allocation of the investment according to the field and sector in the period of the Third Pelita and the Fourth Repelita, see the Table 21.6, and supplemented by Figure 21.2.

The allocation of investment fund in the field of economy is focused upon two sectors, namely the sector of communication and tourism and that of agriculture and irrigation. The allocation of fund in the sector of communication is linked with the effort to speed up transportation to increase production. The investment in the sector of agriculture is directed to build up irrigation channels and dams in the effort to increase food production, especially rice.

Table 21.6. The Plan of Allocation of Government Investment According to Field/Sector During Repelita IV Compared with Pelita III
(in Rp billion)

Field/Sector	Pelita III		Repelita IV	
	Total	%	Total	%
A. Field of Economy	302.5	61.8	561.4	65.4
1. Agriculture and Irrigation	107.1	21.9	198.2	23.1
2. Industry	1.9	0.4	8.6	1.0
3. Mining and Energy	35.8	7.3	56.7	6.6
4. Communication and Tourism	119.5	24.4	226.6	26.4
5. Trade and Cooperative	16.0	3.2	20.6	2.4
6. Population and Transmigration	15.0	3.1	31.8	3.7
7. Regional, Rural and Urban Development	7.2	1.5	18.9	2.2
B. Social Field	133.1	27.1	201.7	23.5
8. Religion	6.5	[illegible].3	12.0	1.4
9. Education, Young Generation, Divinity and Belief in God	89.5	18.8	120.2	14.0
10. Health, Social Welfare, Women Participation and Family Planning	28.4	5.8	51.5	6.0
11. Housing and Settlement	8.6	1.7	8.0	2.1
C. General Field	54.3	11.1	95.3	11.1
12. Laws	8.5	1.7	14.6	1.7
13. Defense and Security	0.3	1.1	1.7	0.2
14. Information and Communication	3.7	0.8	7.7	0.9
15. Science,Technology and Research	10.1	2.0	18.0	2.2
16. Government Apparatus	22.0	4.5	35.2	4.1
17. Natural Resources and Environment	9.7	2.0	17.2	2.0
Total	491.5	100.0	858.4	100.0

Source : Regional Government of West Sumatra Province, Rancangan Repelita Keempat (The Draft of Fourth Repelita) 1984/85-1988/89 of West Sumatra, Book I, p. 7.11.

In the period of the Fourth Repelita the allocation of government investment is still concentrated upon the field of economy with the priority directed to the sector of infrastructure and agriculture. The share of investment fund in this period is up to 65.4 per cent which means higher compared with that of the Third Pelita. Then the social and general fields get 25.5 per cent and 11.1 per cent of all the existing fund.. In the social field the main attention is paid to the sector of education and health, which each of them gets 14.0 per cent and 6.0 per cent of the existing fund.

By observing the policy pattern of government investment in the period of the Third Pelita and the Fourth Repelita, in the future time, especially up to 1990/91 that pattern is still to be applied. The investment in the economic field, namely in the communication sector, especially land communication is still needed among others in the construction of new roads to open isolated areas which are numerous in West Sumatra. Further on the allocation of investment fund in the sector of agriculture is also necessary to be increased become the target of rice production in West Sumatra will always be rising in the future. One thing that should be given attention is the allocation of investment in the sector of mining and energy. This sector should get attention because the potential in this sector is big enough in West Sumatra.

CONCLUSION AND RECOMMENDATION

In order to reach the target of economic growth in West Sumatra which will rise by 6.0 per cent per year in the period of the Fourth Repelita and in average 6.3 per year in the period of 1983-1990, a fairly big increase of investment is required. The amount of this investment increase is Rp 1,836.3 billion during the period of the Fourth Repelita and up to Rp 3,162.1 billion in the period of 1984/85-1990/91. For this

the growth rate of investment should be raised by the average of 24.1 per cent per year.

In order to meet the need of the above investment the financing sources originating from the government and non-government should be increased. In the period of 1969/70-1983/84 both sources had been successfully raised. Up to the end of the Third Pelita there has been a tendency of ever increasing of the share of the government investment in the development of West Sumatra. Its consecutive share is in The First Pelita 53.5 per cent, the Second Pelita 45.4 per cent and the Third Repelita has decreased that it can only finance about 46.7 per cent of all need of investment in the respective period. In the period of 1984/85-1990/91 this share of government investment will decreased up to 45.0 per cent. It means that the sector of non-government is much more needed to meet the need of investment fund in the future.

The decrease of government investment in the future is especially caused by the projected decrease of the government budget. Further on this will influence the allocation of regional development expenditure, either in the form of sectoral project and Inpres aid program or in the form of development subsidy for the the First Level Regional Government and the Second Level Regional one. The growth rate of government investment in the period of the Fourth Repelita is predicted to rise by the average of 13.7 per cent in the Fourth Repelita and by 15.9 per cent in the period of 1984/85-1990/91. While in the period of the Third Pelita it could reach the growth rate of 25.8 per cent per year.

In order to meet the need of government investment that will increase in the future, the greater part of it is still expected to be fulfilled by the investment of Central Government. In the period of 1984/85-1990/91 the share of the investment of the Central Government is expected to be 87.3 per cent. It also means that the role of the investment of Regional Government is also necessary to be substantially increase in the future

namely by encouraging the stablishment of original regional revenue through the extensification and intensification in collecting the regional tax, regional retribution and other revenues.

The policy of government investment in the future is still directed to the field of economy. The bigger role still ought to be directed to the development of infrastructure of communication and agricultural sector. The investment for the sector of infrastructure ought to be about 26.4 per cent and for agricultural sector about 23.1 per cent. In addition the integrated efforts in the carrying out of development, efficiency in using development fund, and others are to be given more and serious attention and be more intensified in future.

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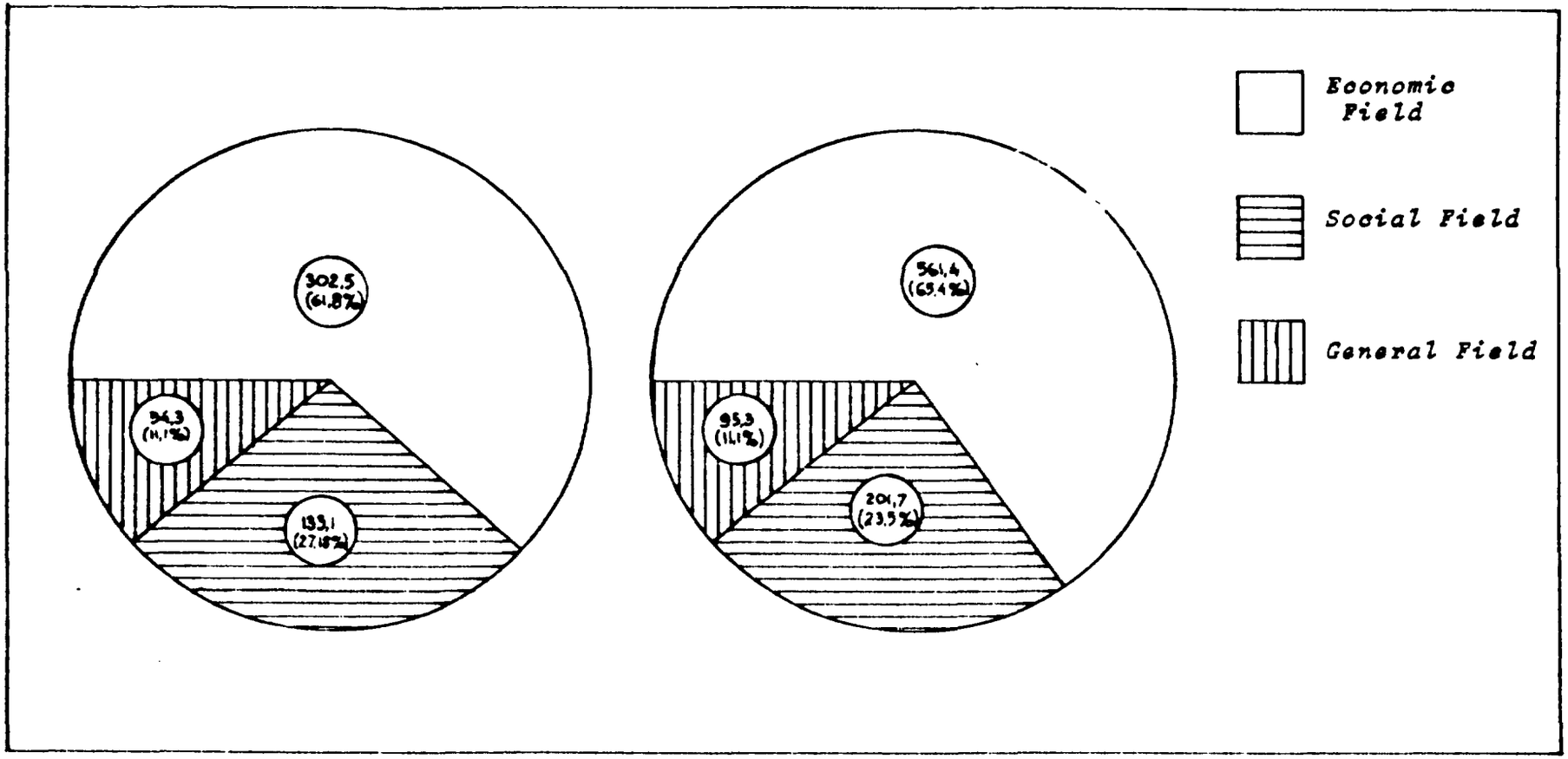

Figure 21. 3 WEST SUMATRA: ALLOCATION OF GOVERNMENT DEVELOPMENT EXPENDITURE BY FIELD OF DEVELOPMENT.

Chapter 22

INVESTMENT REQUIREMENTS : PRIVATE FINANCIAL SOURCES AND PROSPECTS

IN THE NATIONAL/regional system of economy, which is based on democratic principles, private sector should play a big role. Government role is only encouraging and supportig by creating favourable atmosphers for carrying out business. In this case the development of private sector is, aimed among others, at creating harmony between the group of strong capitals and that of the weak.

The role of private investment participate in exploiting economic potentials and developing the economy of a region. But in West Sumatra the private role is still relatively small as shown by the small percentage of private investment in the whole investment. In Chapter 22 it has been mentioned that the role of non-governmental investment in Pelita I was about 46.5 per cent, in Pelita II 55.6 per cent and in Pelita III 46.1 per cent. In absolute figures these amounts consecutively were Rp 19.1 billion, Rp 148.8 billion and Rp 419.6 billion.

The above non-governmental investment consists of or originated from: (1) Household savings, (2) Enterprise savings, (3) Investment credit, and (4) Private Capital Investment. The role of household and enterprise savings which forms the source of investment within "the region itself" is relatively very small. In all non-governmental investment, its roles in Pelita I, II and III were 14.6, 14.6 and 22.6 per cent[1/]. It means that the the greater part of non-go-

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1/ Sumatra Barat, Rancangan Rencana Pembangunan Lima Tahun Keempat (West Sumatra: Draft, Fourth Five-Year Development Plan, 1984/85-1988/89) Book I p.8.3

vernmental investment in West Sumatra came out of "other region" namely in the form of investment credit and private capital investment. This Private Capital Investment mainly originated from crediting in the framework of PMDN (Penanaman Modal Dalam Negeri = Domestic Capital Investment) and PMA (Penanaman Modal Asing = Foreign Capital Investment).

The amount of Gross Regional Domestic Product (GRDP) of West Sumatra at the end of Pelita III in 1983 was Rp 72,513 billion. At the same time there was also an investment of Rp 909.6 billion or 26.0 per cent of GRDP. Of this amount, there was an investment of non-government about 13.2 per cent, 3.1 per cent of which originated from household savings and enterprise savings[2/]. The last two savings were lower than the national figure which was 12.7 per cent of the national product 1983/84[3/].

Due to relatively small amount, the non-governmental investment in West Sumatra in general was only limited to the enterprises of small scale. The types of enterprises financed by this capital investment were just the small part of potentiality of business enterprise that are suitable to be developed. Due to the very limited ability of community savings, the private investment in West Sumatra should be supported by the policy of capital investment either through PMDN or PMA.

By considering the background of the previous problems, this study is aimed:

(1) to analyze the development of private investment and the profile of private capital investment in the province of West Sumatra and the problems encountered since the Pelita I,

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2/ Sumatra Barat, Ibid, p.8.3

3/ Republik Indonesia, Rencana Pembangunan Lima Tahun Ketiga (The Third Five Year Development Plan, 1979/80-1983/84) Book I, p.123.

(2) to estimate the ability and need of private investment in the future time, especially up to 1990
(3) to draw up conclusion and present the policy of capital investment according to type of business, especially related with the economic potential owned and suitable to be developed

DEVOLOPMENT, PROFILE AND PROBLEM OF PRIVATE CAPITAL INVESTMENT

According to the system of democratic economy which is stipulated in the Section 33 of 1945 Constitution it is declared that the community should play an active role in development. But if the development is observed, the community's role or the "world" of private enterprise has been very limited since Pelita I. This is due to the fact that the savings of community is still low to be able to be used as the source of development financing. As mentioned previously, the ability of community savings, originating from household and enterprise savings was only about 3.1 per cent of the amount of GRDP in 1983.

In order to increase the role of private sector in economy and development, the Government has helped by various policies and capital investments, among others are:

(1) issuing the Act No.1 of 1967; the Act No 11 of 1970 concerning. Penanaman Modal Asing=PMA (Foreign Capital Investment)
(2) issuing the Act No 6 of 1968; the Act No 12 of 1970 concerning Penanaman Modal Dalam Negeri = PMDN (Domestic Capital Investment)
(3) giving facility of investment credit ,KIK (Kredit Investasi Kecil = Small Investment Credit) and KMKP (Kredit Modal Kerja Permanan= Permanent Working Capital Credit).

Besides the policy in the field of capital mentioned above,there are also some policies which are expected to encourage the sector of private enterprise. For example by providing facilities and by giving more opportunity in doing business to weak entrepreneurs which is regulated by Keppres (Keputusan Presiden = President Decision) No 14 A of 1980 and Keppres No 18 of 1981.

By the practice of the above policy, the role of private investment in West Sumatra has increased. The growth of private investment can be seen in the following Table 22.1.

Table 22.1 The Growth of Private Investment by Sources in West Sumatra, Pelita I-Pelita III
(in billions of rupiahs)

Year	GRDP	Sources of Investment			Percentage to GRDP
		Households a/	Corporations	Total	
Pelita I	448.5	2.8	16.4	19.2	4.3
Pelita II	1,205.2	21.7	127.2	148.9	12.4
Pelita III	3,504.6	97.8	321.8	419.6	12.0
1979	457.4	9.2	36.7	45.9	10.0
1980	614.0	11.9	38.5	50.4	8.2
1981	673.9	19.5	63.5	83.0	12.3
1982	810.6	27.9	87.3	115.2	14.2
1983	948.7	29.3	95.8	125.1	13.2

a/ Including gotong royong

The growth of private investment in the three periods of Pelitas mentioned above has shown fairly high increase , especially in Pelita II, it increased by 675.5 per cent compared with Pelita I. While in Pelita III it only increased by 181.8 per cent compared with Pelita II. Then the increase achieved at the end of Pelita III was 172.3 per cent compared with Pelita I, by the average growth rate of 28.5 per cent per year.

The increase of investment which was relatively high in Pelita II was caused by some factors, such as:

(a) The realization of KIK Program at the beginning of 1975

(b) The increase of the amount of PMDN such as in Pelita II Rp 49,268 million and in Pelita I Rp 9,581 million.

(c) The increase of the amount of PMA namely Rp 19,956 million, while in Pelita I only Rp 1,340 million.

In addition to the above cases, in the other source of investment, especially investment credit, there has been a fairly high increase.

The role of community investment in Pelita I was about 14.6 per cent of all private investment. In Pelita II it was still about 14.6 per cent, but in Pelita III it increased to 23.3 per cent. This increase might be caused by the increase of the community income that invites the desire to save to be channelled to investment in the community.

The policy of capital through ordinary investment credit and small investment credit (KIK) is the government policy through banking which is meant to provide capital for private business, especially those of weak economy, or those of small capital. In parallel with KIK it is also realized the Kredit Modal Kerja Permanent (KMKP = Permanent Working Capital Credit) which is meant to provide working capital for private enterprises of small capital or weak economy. This means that KMKP is a supplement capital for supporting investment from banking system source.

Investment credit in West Sumatra has been carried out since 1972, while KIK and KMKP have been realized since 1975. Then the giving of credit through PMDN in West Sumatra has begun since 1968 while PMA has begun since 1973.

The growth of private capital investment mentioned above can be seen more clearly in the following Table 22.2, Figure 22.1.

By observing the growth of private capital investment as seen in Table 22.3, it appears there was an increase every year. But the ability of financing was still too limited in order to be able to collect and use the existing potential. Investment credit, KIK and KMKP are banking credit of medium term between three and five years with the maximum limit of Rp 10 millions, So the respective credit are still divided into small units, that it gives less cumulative effect.

Table 22.2 The Trend of Private Capital Investment by Banking System Sources in West Sumatra, 1968-1983 a/
(in Millions of rupiahs)

Year	Investment Credit *	KIK *	KMKP *	PMDN **	PMA **	Total
1969	-	-	-	89	-	89
1970	-	-	-	844	-	844
1971	-	-	-	4,246	-	4,246
1972	2,591	-	-	870	-	3,461
1973	3,259	-	-	3,532	1,340	3,131
1974	3,677	-	-	672	-	4,349
1975	4,617	742	811	3,084	15,080	24,334
1976	5,723	1,446	1,159	40,536	-	48,864
1977	5,079	1,327	1,166	2,979	4,876	15,427
1978	10,219	1,625	1,726	1,997	-	15,567
1979	19,173	2,324	3,132	6,897	-	31,526
1980	24,891	5,489	7,527	19,945	12,685	70,537
1981	36,590	10,267	15,615	8,603	10,400	81,475
1982	63,522	12,170	19,480	187,769 b	-	282,941
1983	95,904	11,930 b	25,339 b	14,600 b	-	147,773

* Outstanding figures

** Yearly figures

a/ Including KMKP as supplement capital for supporting investment from banking system.

b/ Just approved by Government (not yet realized)

Sources: Bank Indonesia Padang, Data Statistik Perbankan Sumatra Barat (Statistical Data of West Sumatra Banks), Quarterly Reports of 1981-1983 (for data of Investment Credit, KIK and KMKP), and Badan Koordinasi Penanaman Modal Daerah Tingkat I Sumatera Barat, Data dan Informasi Penanaman Modal di Sumatera Barat Tahun 1981 (Data and Information of Capital Investment in West Sumatra, 1981), Padang, 1982 (for PMDN and PMA).

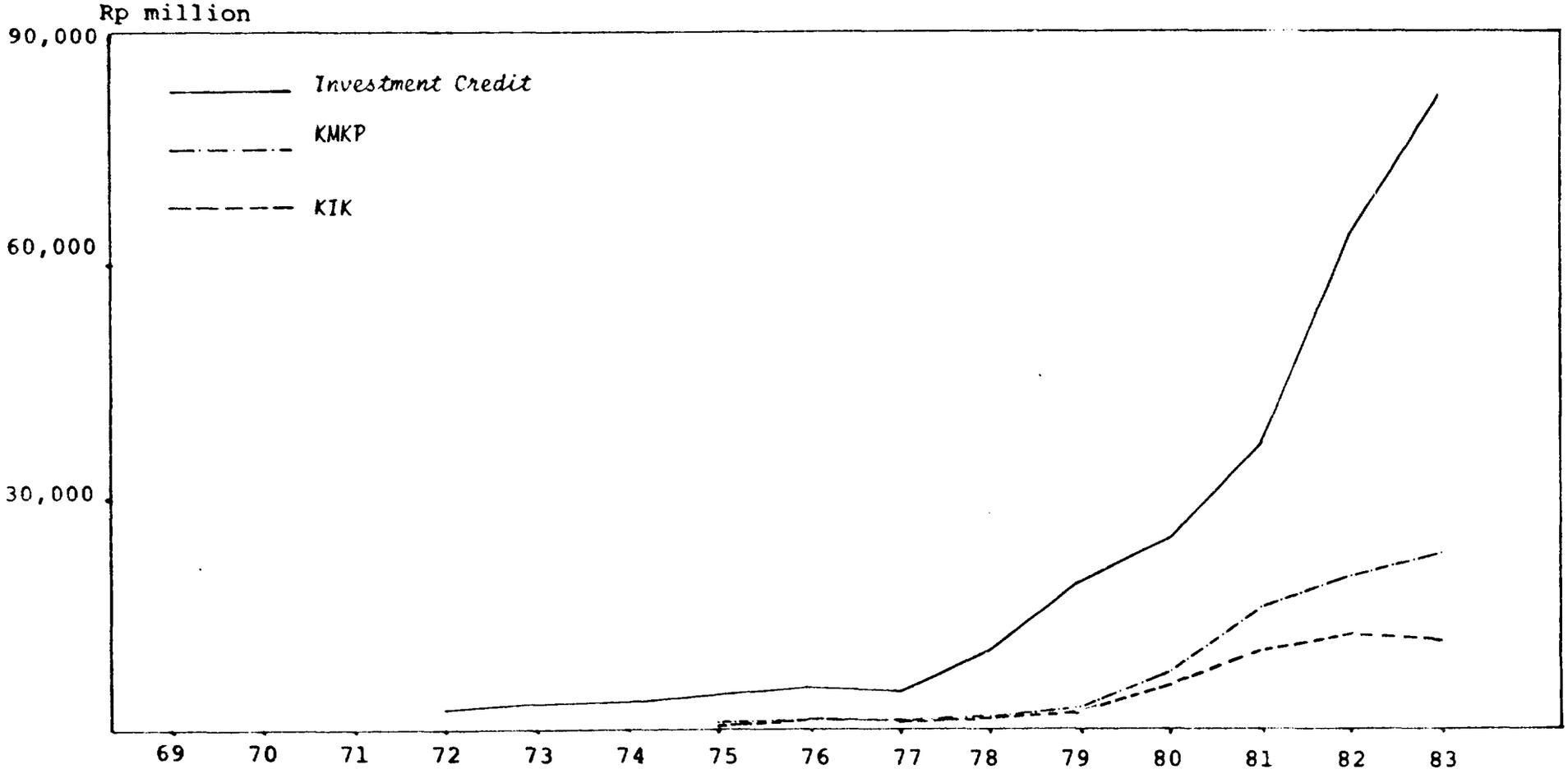

FIGURE 22.1. WEST SUMATRA : PRIVATE CAPITAL INVESTMENT
BY SOURCES OF INCESTMENT CREDIT, KIK AND KMKP

Until 1983 the number of clients of KIK and KMKP were 2,658 and 5,411. It means that the average amount of credit per one client was Rp 4.49 million from KIK and Rp 4.68 million from KMKP.

Detailed according to business sectors, most of investment credit went to the sector of industry and of communication/service. Most of KIK went to the sector of communication/service and of Trade. While KMKP went to sectors of trade , industry and agriculture. Complete description of allocation of investment credit, KIK and KMKP can be seen in the following Tables 22.3, 22.4 and 22.5.

Table 22.3 Allocation of Investment Credit by Sectors in West Sumatra, 1978-1983
(in million of rupiahs)

Year	Agriculture	Industry	Communication/ Service	Others	Total
1978	447	6,610	869	2,302	10,228
1979	616	14,634	2,272	1,651	19,175
1980	1,620	14,441	5,671	3,159	24,891
1981	2,870	20,283	8,853	4,584	36,590
1982	3,847	39,991	10,527	9,158	63,523
1983	4,426	68,318	16,153	7,008	95,904

Source: Bank Indonesia Padang, Data Statistik Perbankan Sumatera Barat (Statistical Data of West Sumatra Banks), Quarterly Reports of 1981-1983.

Table 22.4 Allocation of KIK by Sectors in West Sumatra, 1975-1983
(in Rp Millions)

Year	Agriculture	Industry	Trade	Communication/ Service	Others	Total
1975	88	174	136	174	169	742
1976	176	174	492	456	147	1,446
1977	273	157	319	408	171	1,327
1978	343	254	403	431	194	1,625
1979	398	262	377	932	255	2,324
1980	763	656	1,003	2,573	493	5,489
1981	1,456	990	1,200	5,211	610	10,267
1982	1,983	916	2,632	5,647	992	12,170
1983	1,408	1,153	2,912	5,923	534	11,930

Source: Bank Indonesia Padang, Data Statistik Perbankan Sumatera Barat (Statistical Data of West Sumatra Banks), Quarterly Reports of 1981-1983.

Table 22.5 Allocation of KMKP by Sectors In West Sumatra, 1975-1983 (In millions of rup

Year	Agriculture	Industry	Trade	Communication/ Service	Others	Total
1975	24	121	344	118	204	811
1976	79	153	776	87	65	1,159
1977	30	131	939	34	33	1,166
1978	250	190	1,222	23	40	1,726
1979	251	357	2,322	166	85	3,132
1980	466	864	5,698	168	330	7,527
1981	765	1,631	12,187	632	400	15,615
1982	802	1,546	16,141	449	542	19,480
1983	1,134	1,960	20,983	669	592	25,339

Source: Bank Indonesia Padang, Data Statistik Perbankan Sumatera Barat (Statistical Data of West Sumatra Banks), Quarterly Report of 1981-1983.

By observing the allocation of capital investment fund of the three above sources in each field of business, its role or share in Gross Regional Domestic Product (GRDP) can be seen. As to the comparison of the amount of Investment credit, KIK and KMKP with GRDP according to field of business can be seen in the following Table 22.6.

From Table 22.6 above it can be seen that up to the end of 1983, the amount of capital investment from investment credit, KIK and KMKP in West Sumatra was Rp 133,173 million or about 14.0 per cent of the amount of GRDP of the respective year. Further on the allocation of that investment was only limited to several sectors of business. The big ratio of GRDP in the sector of industry was 51.3 per cent of that GRDP. Then it was followed by sector of transportation/communication/service amounting to 19.8 per cent and trade 10.5 per cent. While the sector of agriculture was only about 2.1 per cent of GRDP.

Table 22.6 Total Investments by Sectors and Sources in West Sumatra 1983
(In millions of rupiahs)

Sectors	GRDP	Investment Credit	KIK	KMKP	Total	% of GRDP
Agriculture	324,906	4,426	1,408	1,134	6,968	2.1
Mining	6,858	-	-	-	-	0.0
Industry	139,350	68,318	1,153	1,960	71,431	51.3
Trade	226,866	-	2,912	20,983	23,895	10.5
Transportation/ Communication/ Service	114,964	16,153	5,933	669	22,745	19.8
Others	155,299	7,008	334	592	7,934	5.1
Total	948,717	95,904	11,930	25,339	133,173	14.0

Source: Calculated from Bank Indonesia Padang, Data Statistik Perbankan Sumatera Barat (Statistical Data of West Sumatra Banks), Quarterly Report of 1981-1983.

By observing the growth of investment in each sector during the period of Pelita III (1979-1983), it appears that the big growth rate was found in the sector of trade, then followed by sector of communication/service. The detailed figures can be seen in the following Table 22.7

Table 22.7 The Annual Growth Rate of Investment Credit, KIK and KMKP by Sector, 1979-1983. (in percentage).

	Investment Credit	KIK	KMKP	Total
Agriculture	63.7	37.1	45.8	53.2
Industry	49.0	44.8	53.1	47.1
Trade	-	66.7	73.4	72.5
Communication/ Service	63.3	58.8	41.3	61.2
Others	43.5	20.3	62.5	41.3
Total	40.5	48.3	64.2	47.3

Source: Calculated from Bank Indonesia Padang, Data Statistik Perbankan Sumatera Barat (Statistical Data of West Sumatra Banks), Quarterly Report of 1981-1983.

The high growth rate of investment in the sectors of trade, agriculture and communication/service was especially caused by the fact that these sectors relatively did not need high technology. In addition they gave profit far quicker than the other sectors do. This was also in accordance with the level of business skill and ability of the entrepreneurs which were in general still low and limited.

PROFILE OF CAPITAL INVESTMENT

The activity of capital investment in the form of PMDN and PMA are quite significant in specding up and supporting the economic growth in West Sumatra. The growth of the amount of investment used since 1969-1983 is shown by the following Table 22.8, and supplemented by Figure 22.2.

Table 22.8 The Growth of Capital Investment of PMDN and PMA in West Sumatra 1969-1983
(in Rp Millions)

Year	Number of Project			Investment			Total (Rp million)
	PMDN	PMA	Total	PMDN	P M A		
					(US $ 000)	(Rp million)	
1969	2	-	2	88.8	-	-	88,8
1970	3	-	3	843.9	-	-	843.9
1971	12	-	12	4,246.4	-	-	4,246.4
1972	7	-	7	870.0		-	870.0
1973	4	2	6	3,531.6	2,000	1,340.0	4,871.6
1974	3	-	3	672.3	-	-	672.3
1975	3	2	5	3,084.3	23.200	15,080.0	18,164.3
1976	3	-	3	40,535.6	-	-	40,535.6
1977	4	4	8	2,979.2	7,501	4,875.7	7,854.9
1978	4	-	4	1,997.1	-	-	1,997.1
1979	6	-	6	6,896.8	-	-	6,896.8
1980	2	1	3	19,944.5	19,515	12,684.8	32,629.3
1981	4	1	5	8,603.5	16,000	10,400.0	19,003.5
1982*	7	-	7	187,769.0	-	-	187,769.0
1983*	3	-	3	14,600.0	-	-	14,600.0
Total	67	10	77	296,703.0	68,216	44,340.0	341,043.5

* Approved figures, i.e., the amount approved by the government, not yet realized. Data Resource: Biro Pusat Statistik, Indikator Ekonomi (Economic Indicator), 1983 p.45.

Source: Badan Koordinasi Penanaman Modal Daerah Tingkat I Sumatera Barat, Data dan Informasi Penanaman Modal di Sumatera Barat Tahun 1981 (Data and Information of Capital Investment in West Sumatra, 1981, Padang 1982.

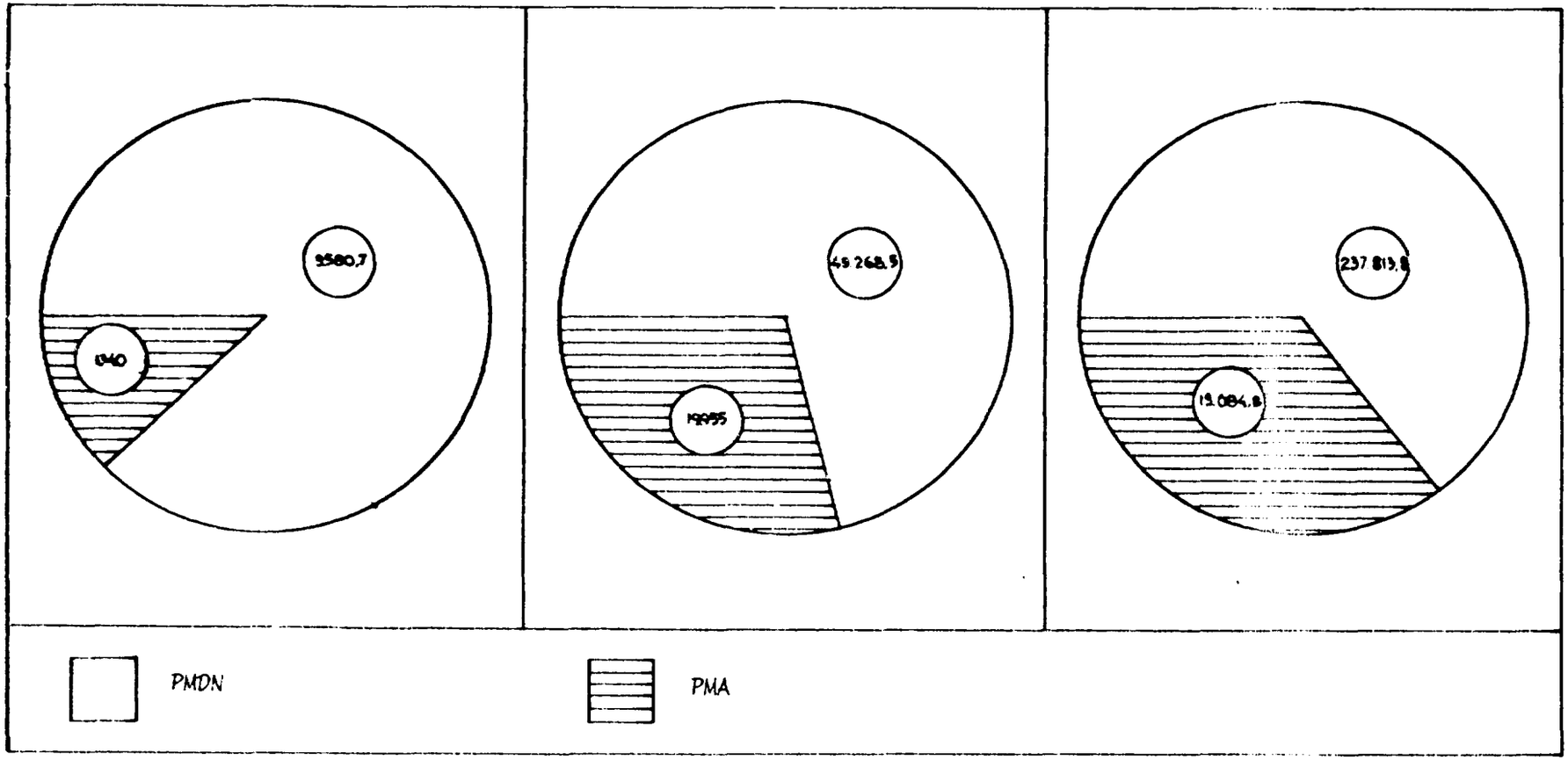

FIGURE 22.2. WEST SUMATRA : GROWTH OF CAPITAL INVESTMENT, 1969-1983

By observing the realization of investment during the period of 1969-1981,the profile of capital investment in West Sumatra was directed to two sectors, namely industry and forestry. The Investment in the sector of industry was 83.5 per cent and that in the sector of forestry was 11.2 per cent of total amount of investment. It means that only 5.3 per cent were used in other sectors. The following Table 22.9 shows them clearly

Table 22.9 Capital Investment of PMDN and PMA by Sectors in West Sumatra 1969-1981

(in millions of rupiahs)

	PMDN	PMA	Total
Industry	82,896.8	32,899.1	115,795.9
Forestry	5,423.9	10,141.3	15,565.2
Tourism	762.8	-	762.8
Plantation	2,649.8	1,300.0	3,949.8
Transportation	538,5	-	538.5
Housing	450.0	-	450.0
Animal Husbandry	1,363.2	-	1,363.2
Infra-structure	249.0	-	249.0
Total	94,334.0	44,340.4	138,674.4

*Only from 1969 up to 1981 of the realized figures detailed accourding to field of business, while of the approved data (1982 and 1983) is not yet.

Source: Badan Koordinasi Penanaman Modal Tingkat I Sumatera Barat, Data dan Informasi Penanaman Modal di Sumatera Barat Tahun 1981 (Data and Information of Capital Investment in West Sumatra, 1981), Padang, 1982.

Based on the number of projects, the capital investment in the form of PMDN was 85.1 per cent and PMA 14.9 per cent, while that of investment amount of PMDN was 68.0 per cent and PMA 32 per cent. Thus, it can be concluded that the value of PMA in average was bigger than PMDN in average . The average value of PMA Project reached Rp 4,434 million, while that of PMDN only Rp 1,655 million.

The value of investment in the sector of industry, either by PMA or by PMDN, was relatively for greater than that

in other sectors . Its average value in PMDN was Rp 2,240 million, while in PMA Rp 8,225 million. The other sectors which were also big were forestry by PMA fund, plantation and animal husbandry financed by PMDN fund. While the investment in other business sector out of the previously mentioned ones had far smaller value.

The PMDN investment in the sector of industry was greatly used in PT Semen Padang (51.9 per cent). The amount of its investment was Rp 42,987 million for three projects. The firs investment was done in 1971 with the value of Rp 1,786 million, in 1973 Rp 2,051 million, and in 1976 Rp 39,150 million. The investment in 1976 was meant to enlarge the cement factory, namely the construction of Indarung factory II.

By observing the pattern of PMDN investment in this sector of industry, it can be concluded that except in the cement factory, the value of investment in other sector of industry was relatively very small. Fairly big investments were in crumb-rubber factory, essential oils, rattan processing, coconut oil, zinc factory, plastic bag, cold storage and textile.

The PMDN investment in the sector of forestry was all directed to logging industry and saw-mills. But since 1981 after the Government has forbidden to export logs, all these industries have changed into saw-mills, either for domestic consumption or for export.

The PMDN investment in the sector of plantation was in Cassiavera Plantation by PT Rempah Sari and Cassava Root Plantation by PT Peniko. The PMDN investment in the sector of animal husbandry was used in the factory of poultry-food.

PMA investment in West Sumatra which has begun since

1973 were in ten projects with the value of Rp 44,340 million[4/]. There were 4 projects in the sector of industry with the value of 32,399 million, 4 in the forestry with the value of Rp 10,141 million and two in the plantation with the value of 1,300 million.

The PMA in that sector of industry is also found in cassiavera processing industry, saw-mills, plywood, and textile. The industry of cassiavera processing is a joint company between PT Zanzibar and Mising Trading Co (USA) with the amount of investment of Rp 162.5 million (US $ 250,000). The Industry of log processing is carried out by the joint company between PT Pagai Forest Products corporation and PT Minas Lumber with the investment of US $ 16,000,000. The plywood industry is done by PT Rimba Bungus in corporation with Sung Kiyong Limited of South Korea with the value of US $ 4,343,000. While textile industry is undertaken by PT Sumatex Subur in corporation with A.Cr Switzerland (India) with the investment amounting to Rp 30,021,000. From the above figures, it can be seen that the greater part (59.3 per cent) of PMA in the sector of industry is used in textile industry.

Investment in the sector of forestry originated from the Philippine, amounting to US $ 4,251,000. Hongkong company US $ 10,351,000 (two projects); USA enterprise US $ 1,000,000. All the above investments produced log product for domestic and foreign marketing. Then PMA in plantation is financed by Japan and Dutch amounting to US $ 1,000,000, each.

Of the allocation of PMDN and PMA investment according to sectors and fields of business mentioned above, it can

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4/ In this respect the conversion is with the Rate of Exchange US $ 1 = Rp 650.

be concluded that the profile of private capital investment in West Sumatra is still concentrated in the Agro-Based industry and most of the commodities produced are for export. And most of potential financed by capital investment is only limited to lumber enterprises.

THE PROBLEM OF CAPITAL INVESTMENT IN WEST SUMATRA

The activity of capital investment by the fund of PMDN and PMA in West Sumatra has played a big role in encouraging the growth of the economy in the province of West Sumatra. Table 22.2 shows that the amount of PMDN and PMA investment in Pelita III is Rp 58,929 million. This figure is 13.9 per cent of all investment of non-government which amounts to Rp 419.6 million (see Table 22.2). But if compared with the amount of PMDN and PMA at the other regions, the figure of West Sumatra is relatively still small.

During the period of 1968-1983 the value of PMDN was Rp 235,004 million or only about 1.6 per cent of the figure of all Indonesia PMDN value which amounted to Rp 14,485.747 million[5/]. Then of eight provinces in Sumatra island, West Sumatra was in the fourth rank after South Sumatra Rp891,297 million, North Sumatra Rp 498,065 million, and Aceh Rp370,870 million.

In the realization of PMA, nearly the same condition is also encountered, in which the investment amount in West Sumatra in the period of 1968-1983 was US $ 69.8 million or about 0.8 per cent of PMA value in Indonesia. While in Sumatra island, West Sumatra's position was in the seventh rank, after North Sumatra US $ 1,746.9 million, Aceh

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5/ Biro Pusat Statistik, Indikator Ekonomi (Economic Indicators), Jakarta 1983, p.45

US $ 842.7 million, Riau US $ 101.0 million, South Sumatra US $ 89.0 million, and Lampung US $ 87.4 million[6/].

The lowness of the activity of capital investment in West Sumatra is especially caused by the following problems :

(1) the lack of regional entrepreneurs who possess capital big enough to be in partnership with foreign investors.
(2) the lack of information concerning the potentials existing in this region that can be financed with capital investment, e.g in the mining sector
(3) The shortage of infrastructure and facility such as electric power , clean water, communication, transportation,etc
(4) the dificulty in marketing new products, especially in this region.
(5) the lack of courage of the entrepreneurs to take a risk in carrying out business.

PROSPECT AND POLICY OF CAPITAL INVESTMENT

The role of private sectors is predicted and expected to increase substantially in the future.In order to reach the target of economic growth rate of West Sumatra by 6.0 per cent in the Fourth Repelita and 6.3 per cent in the period of 1984-1990 , it needs an amount of capital investment. In accordance with the above target, the non governmental investment amounts in the Fourth Repelita is estimated to be Rp 1,740.0 billion out of all investment amounting to Rp 3,162.1 billion. Of this amount it is only about 45.0 per cent that can be provided with government investment .

6/ Ibid., p 48.

It means that the private or non-gevernment sector should prepare 55.0 per cent of all investment, which means that this role is far greater than that in Pelita III, amounting to 46.1 per cent (see Chapter 21 concerning Government Investment). It also means that all financing sources from non-government or private sectors should be increased bigger than that in Pelita III.

By observing the results gained in Pelita III and considering some potentials and factors that influence their growth, the estimation of composition of private investment can be seen in the following Table 22.10

Table 22.10 The Estimation of Private Investment by Sources in West Sumatra, 1984-1990 (in billions of rupiahs)

Year	Corporate Investment	Household Investment	Investment Credit *	PMDN/PMA and others	Total
1984	19.8	21.1	28.4	30.9	100.2
1985	23.8	25.4	34.0	53.0	136.2
1986	28.5	30.8	40.8	86.0	186.1
1987	34.2	37.5	49.0	118.3	239.0
1988	41.1	46.0	58.8	171.3	316.4
1989	50.6	56.8	70.5	179.9	357.8
1990	62.3	70.5	84.7	186.8	404.3
Growth rate	21.3	22.3	20.0	35.0	26.2

*/ Here including Investment Credit and KIK

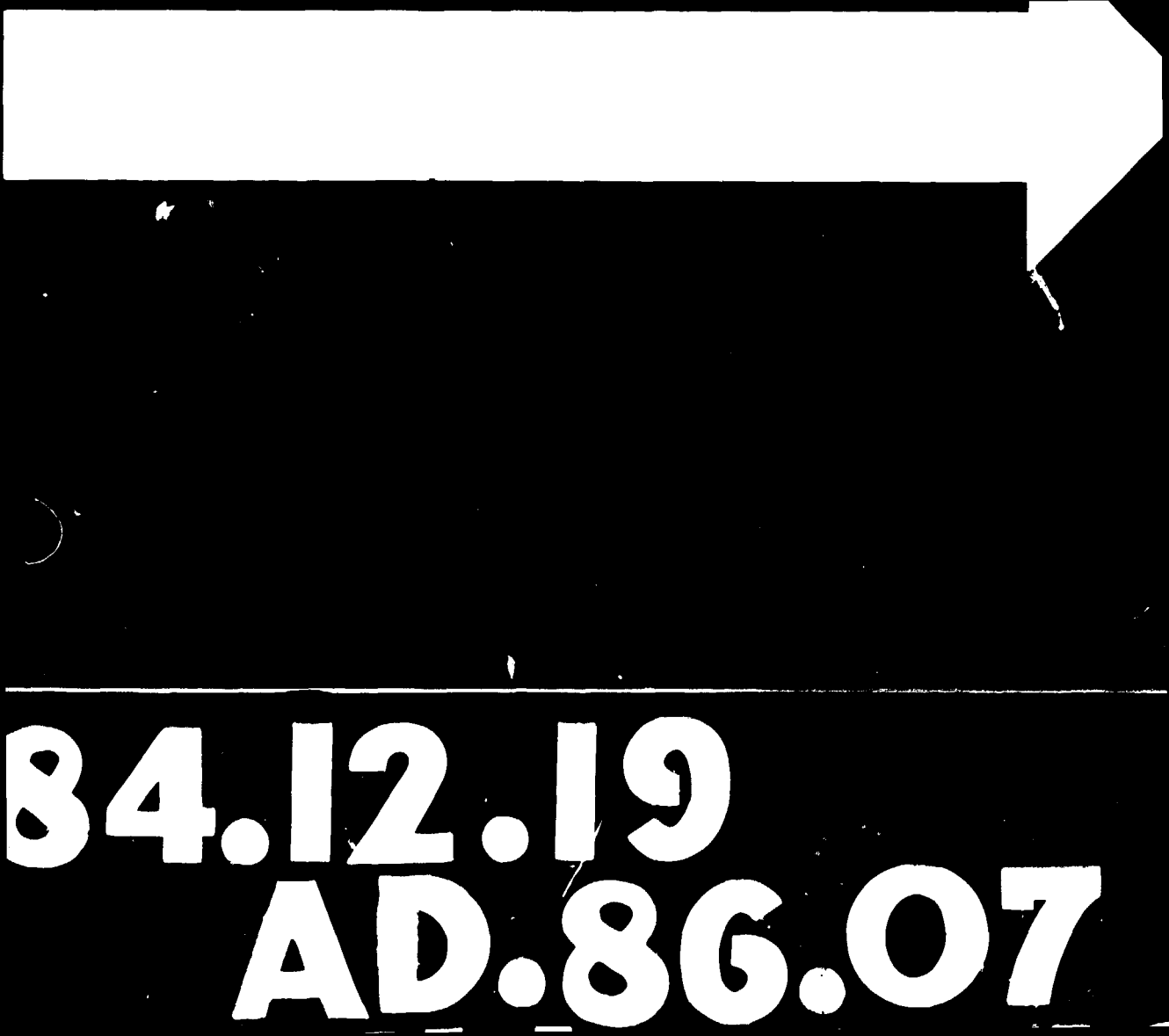
Based on the above estimation, the amount of private investment in 1990 will be Rp 404.3 million. Compared with the amount of GRDP of that year, the share of private investment will reach 16.9 per cent. This figure is higher

compared with the condition at the end of Pelita III of 1983/84 amounting to 13.2 per cent (see Table 22.2). In order to meet that investment amount, the growth rate of private investment should be increased by 26.2 per cent in average per year. This figure is a bit lower than that achieved in Pelita III amounting to 28.5 per cent per year.

The amount of private investment in the period of 1984-1990 will reach Rp 1,740.0 billion or rising by 314.7 per cent compared with Pelita III which amounted to Rp 419.6 billion. In the period of the Fourth Repelita, the amount of that private investment will be Rp 977.9 million, rising by 133.1 per cent from Pelita III.

The private investment with the amount of Rp 1,740.0 billion mentioned above will be gained by community savings about Rp 288.1 billion or 16.6 per cent, enterprise savings about Rp 260.3 billion or 15.0 per cent, and investment credit about Rp 366.2 billion or 21.0 per cent. The three sources will fulfil 52.6 per cent of the requirement of private investment. It means that the remainder of Rp 825.4 billion or 47.4 per cent should be collected from other sources including PMDN and PMA.

In Book I of the Fourth Repelita of West Sumatra it has been estimated that the amount of KIK and KMKP is Rp 572.2 billion. Based on this figure, it is estimated in period of 1984-1990 to reach Rp 800.0 billion. This amount will cover about 25.3 per cent of the investment requirement in that period which is predicted to be Rp 3,162.1 billion (see Chapter 21). It means that the activity of capital investmet from the fund of PMDN and PMA should increased far greater than that has been done in the previous periods. Compared with the period of the Third Pelita, that investment should be raised by 206.6 per cent of that realized amounting to Rp 260.9 billion (see Table 22.7).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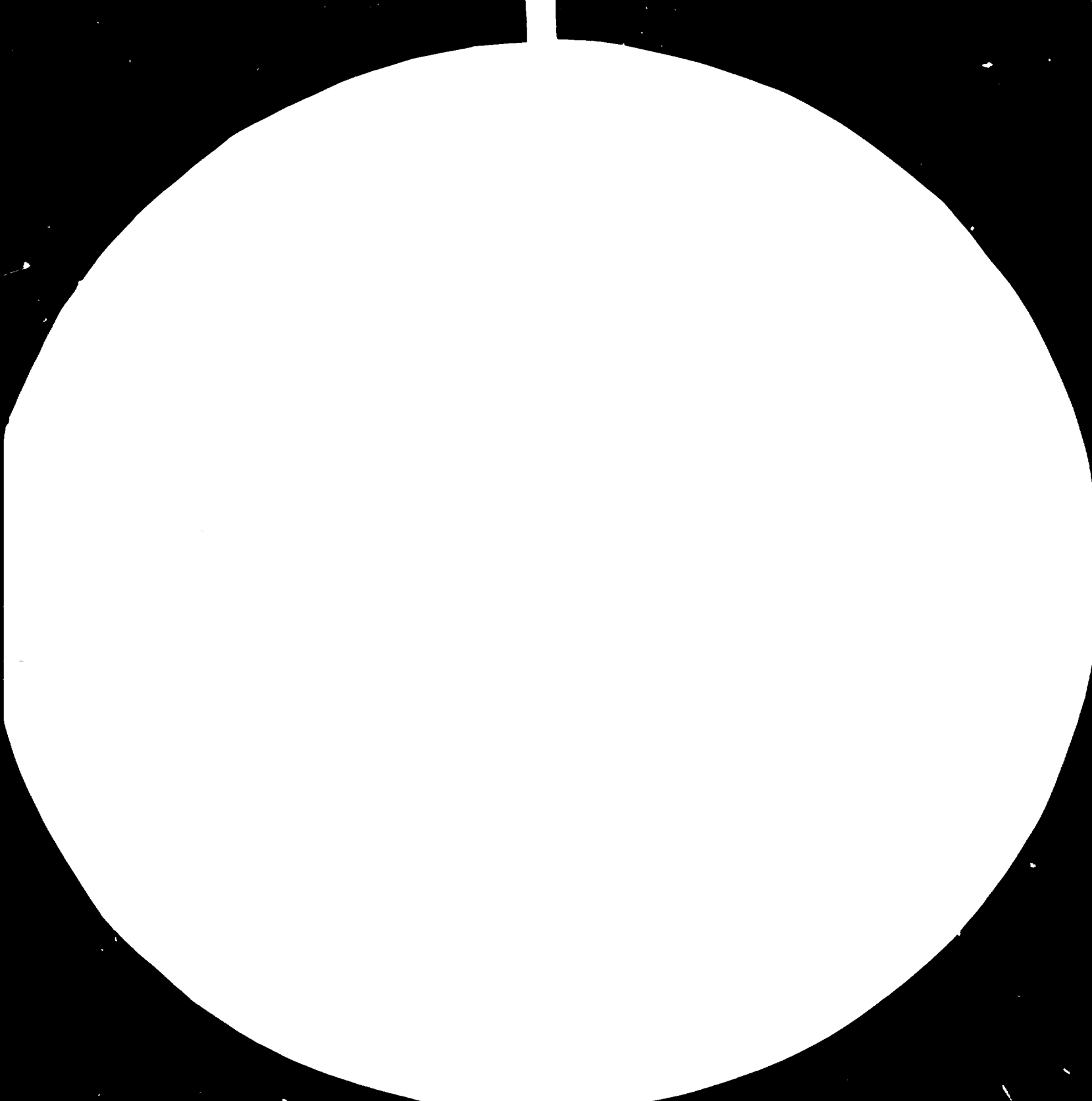

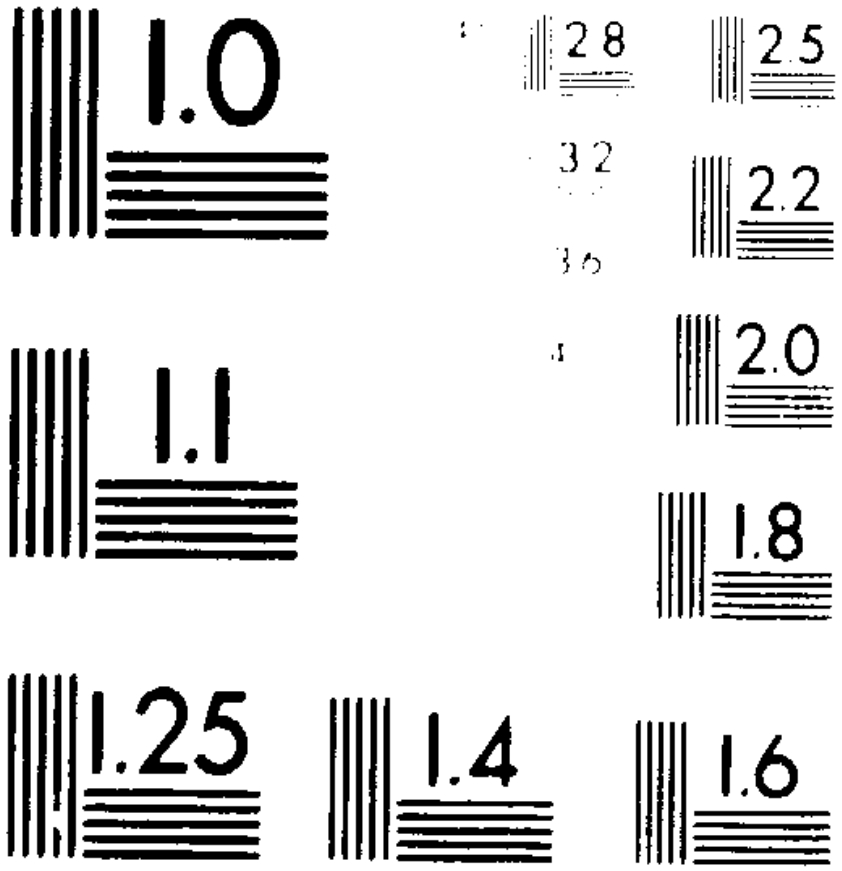

Viewed from the potential of natural resources available the activity of capital investment in the form of PMDN and PMA in West Sumatra has a very big possibility to develop. This fairly big potentials is related with the existence of various raw materials of agricultural products, animal husbandry, fishery, plantation and forestry, which can be used in the activity of industrial sector. Besides,there is also an ample potential in the sector of mining, tourism, etc.

The future activity of capital investment will become more important in relation with the effort to reach the target which has been determined in various sectors of economy. The sectors predicted to rise highly enough in the period of the Fourth Repelita are industry 5.6 per cent, plantation 6.4 per cent, fishery 10.1 per cent, transportation/communication 9.0 per cent, mining 22.9 per cent and animal husbandry 6.4 per cent.

The policy of capital investment in West Sumatra can not be separated from the national policy which has been regulated in Act No 1 of 1967, and The Act No 11 of 1970 concerning Foreign Capital Investment, and the Act No 6 of 1968, and the Act No 12 of 1970 concerning Domestic Capital Investment, In accordance with rules in the previous acts, there are sectors of enterprises or businesses which are given priority to get capital investment, either PMA or PMDN.

Based on priority scale which deserves capital investment, the potentials predicted to be developed and to be given priority to get PMDN and PMA in the province of West Sumatra can be detailed as follows;

	Sector of Business	Location
1. Agricultural Sector		
a. The increase of production	Rice Fruits	Regencies of Solok, Pasaman, Padang-Pariaman, Limapuluh Kota
b. The increase of Animal Husbandry production	Cattle Breeding (cows)	Regencies of Agam, Solok, Pasaman
c. The increase of fish production	Fishing	Mentawai islands
d. The increase of plantation production	Rubber, Cotton, Palm	Regencies Limapuluh Kota Solok, Pasaman, Padang Pariaman.
e. The increase of Forest Production	Collecting/ Processing of Forest product other than wood	Scattered all over West Sumatra
2. Communication and Tourism Sector		
The Increase of Tourism Service	Water sport and recreation	Lake Singkarak, Lake Maninjau Lake Diatas/Dibawah Bungus Bay Karang Tirta Padang.
3. Trade and Cooperatives Sector		
a. The Increase of Foreign Trade	Export Development	Padang Municipality
b. The Increase of Trade	Centre of Trade Promotion	Padang Municipality
c. The Increase of Communication construction	Kontructing service of sea Communication	Around the sea port
4. Housing and Residence		
Housing Program	Housing Flat	Towns

In order to realize the potential of businesses which are given priority to become the activity of capital investment, various policies and measures are needed to create the atmosphere that can attract the attention of investors, either domestic or foreign to invest their capital in West Sumatra.

The necessary policy and measures to be carried out are as follows:

(1) to disseminate information and promotion concerning types of business and profitable potentials of business.
(2) to increase infrastructures and supporting facilities, such as transportation, communication, electric-power, clean water, market places, etc.
(3) to develop regional private enterprises in order to be able to act as business partner or sharer.
(4) to raise and accumulate capital by the regional entrepreneur in order to be able to provide enough capital.

CONCLUSION AND RECOMMENDATION

The role of private investment should be raised in achieving the growth rate of regional economy of West Sumatra. In Pelitas I, II and III, the share of private investment were 46.5 per cent , 55.6 per cent and 46.1 per cent. In the Fourth Repelita the share of the investment is predicted to rise by 53.3 per cent and in the period of 1984-1990 rising to 55.0 per cent of the whole investment requirement. The amount of private or non-government investment in the period of 1984-1990 is predicted to reach Rp 1,740.0 billion or rising by 314.7 per cent compared with that of Pelita III.

The private/non-government investment originating from household savings, enterprise savings and banking credit in

general have been big enough and indicated increasing every year. But that investment is still limited in amount, because it consists of relatively small value. There fore the activity of capital investment in the form of PMDN and PMA is needed especially to finance projects of great scale.

The profile of capital investment in West Sumatra in the past was concentrated upon agro-based industry . The field of businesses financed by PMDN and PMA in this agro-based industry are crumb-rubber, essential oil, cassia-vera oil, tapioca flour and poultry food. In addition, there was also investment in the sector of forestry, which is in general the industry of saw-mill, plywood and wood processing. Although its number of projects was small, the investment in the sector of agro-based industry in average had a big value. The type of industry other than agro-based one which is very big is Cement Industry of PT Semen Padang, then followed by the industry of textile, zinc-roof, etc.

In the future the field of business which will be given priority and has good prospect are plentiful enough. Those that are promising are the sector of fishery (tuna fish catching), sector of agriculture (the processing of rice and fruit), the sector of animal husbandry (cow's meat), the sector of plantation (the industry of rubber, palm and cotton). In the sector of tourism which will be given priority is the development tourism service, especially water-sport and recreation (beach). The other field of bussinesses which have enough potentials are sectors of trade and sector of housing.

In order to develop the activity of capital investment in the province of West Sumatra, it is necessary to take measures and policies that can attract the attention of future investors to invest their capital. For this, it is necessary to develop and establish new infrastructure and supporting facilities such as roads, communication, electric power, clean water, etc. As to the regional entrepreneurs

that will become partners in any enterprises should be equipped with various skills and knowledge to increase their capabilities and skill to run their private enterprises. This can be done by giving them courses, training and guidance concerning management, marketing, administration, technology and others.

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