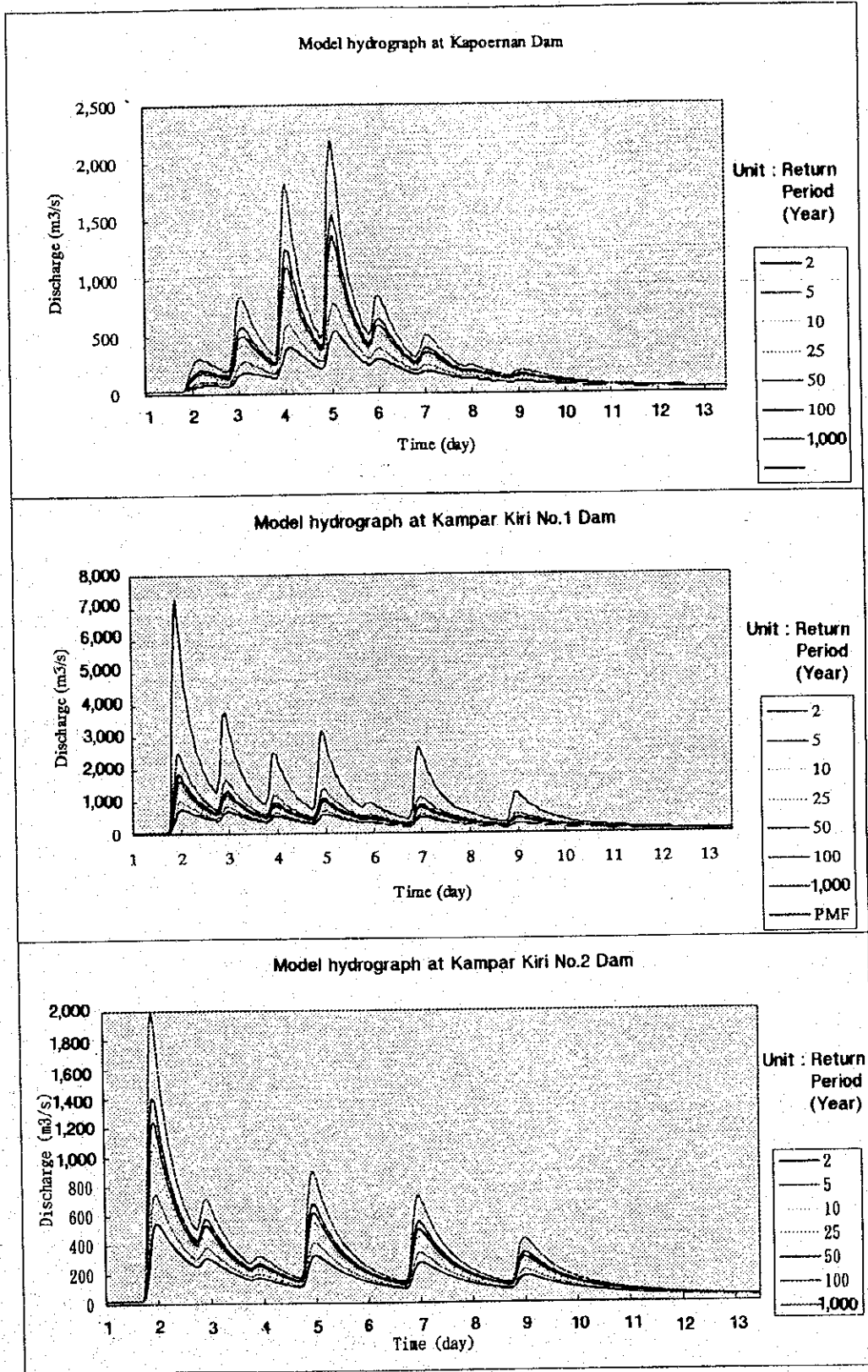


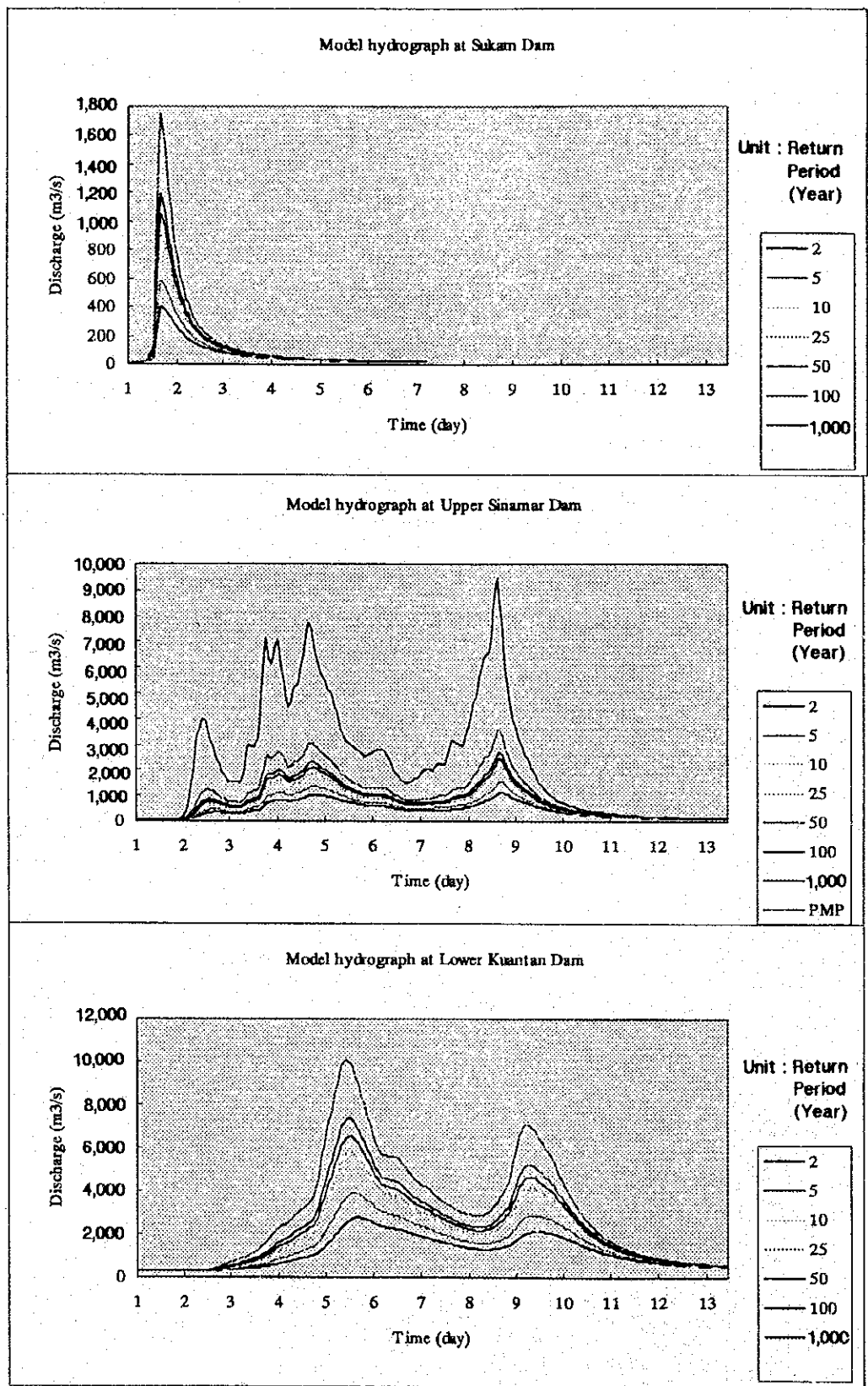
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Fig. I.4.4 PEAK DISCHARGES AT REFERENCE POINT AND MAXIMUM RECORDED FLOODS IN INDONESIA



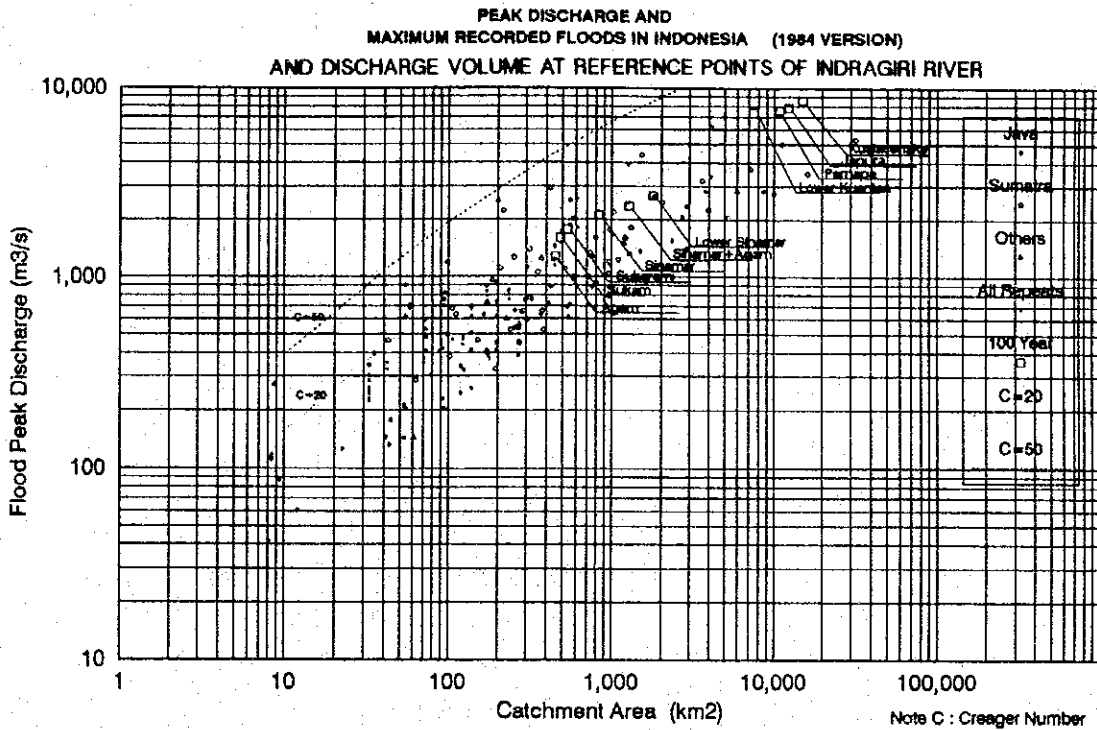
THE STUDY ON  
 KAMPAR-INDRAGIRI RIVER BASIN DEVELOPMENT PROJECT  
 IN THE REPUBLIC OF INDONESIA  
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Fig. I.4.5 MODEL HYDROGRAPH AT DAMSITES (1/2)



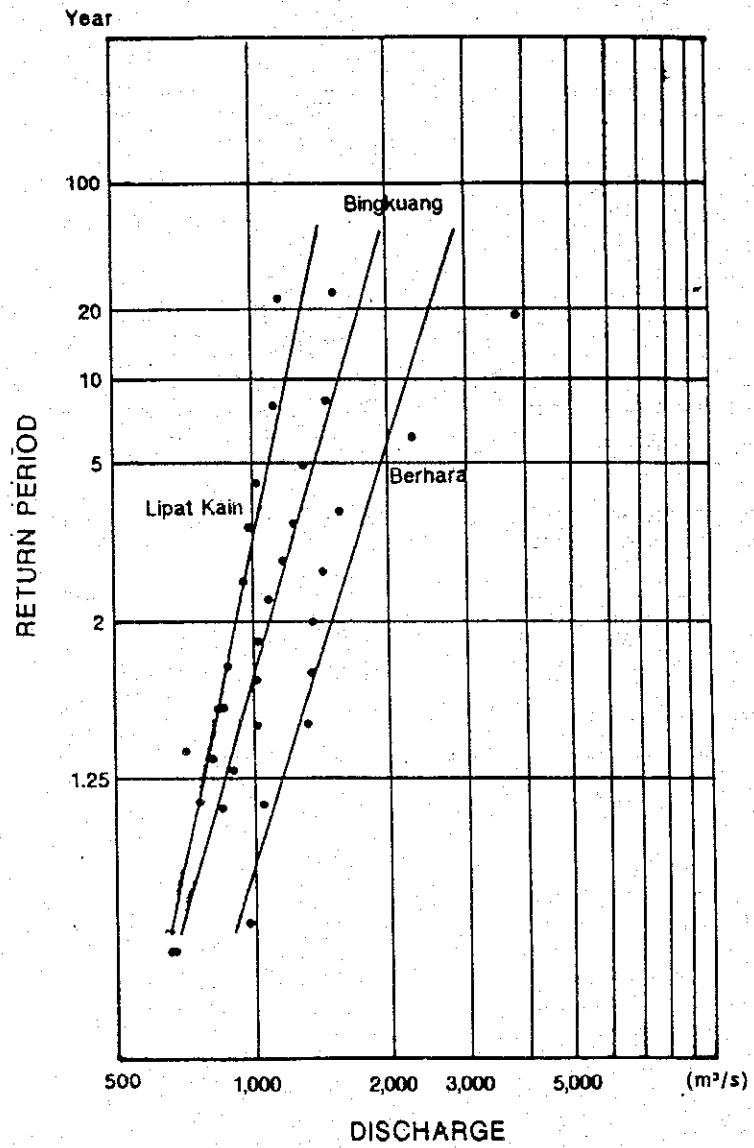
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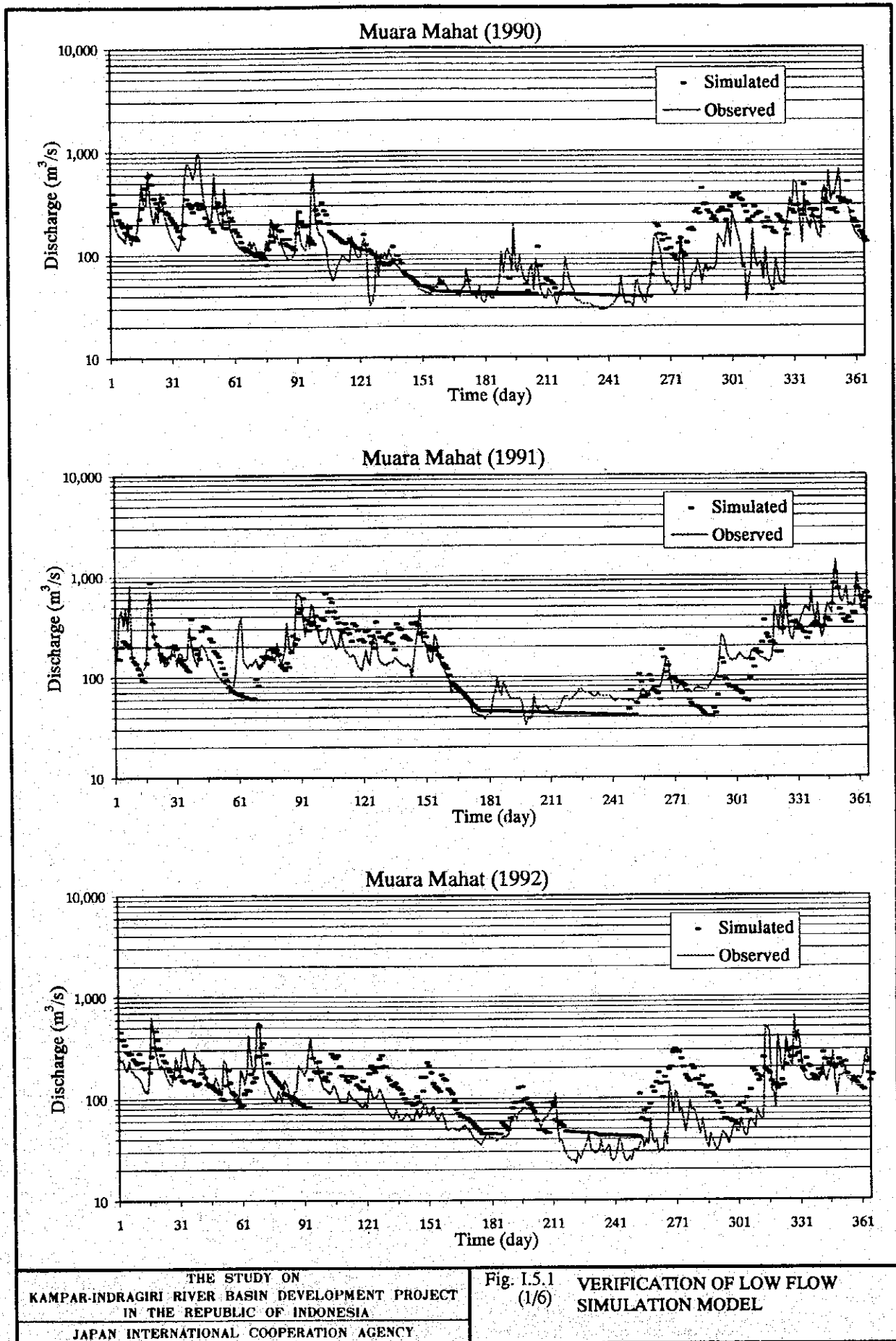
Fig. 1.4.5 (2/2) MODEL HYDROGRAPH AT DAMSITES



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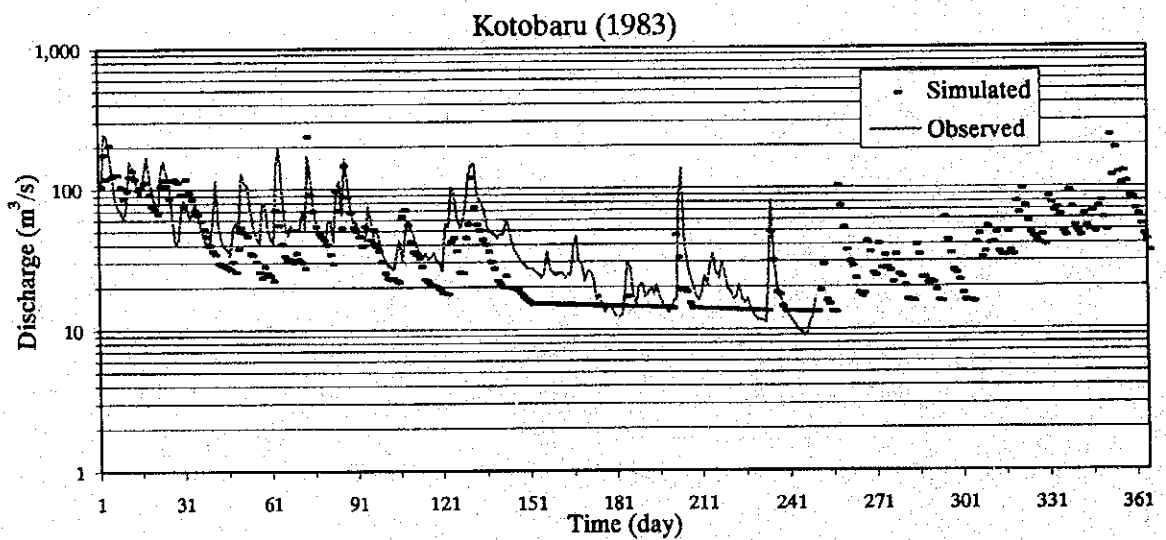
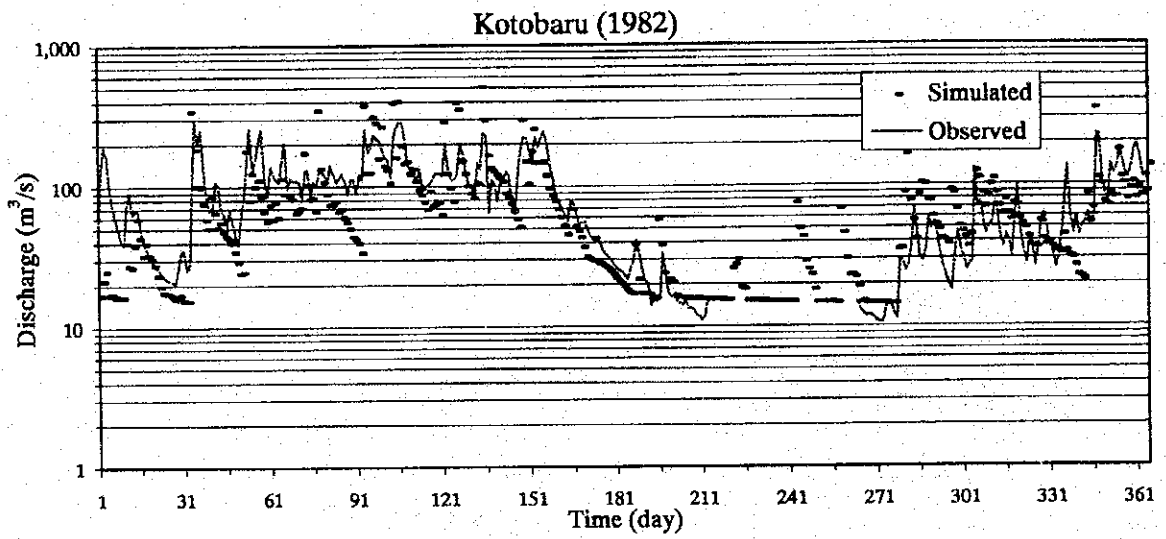
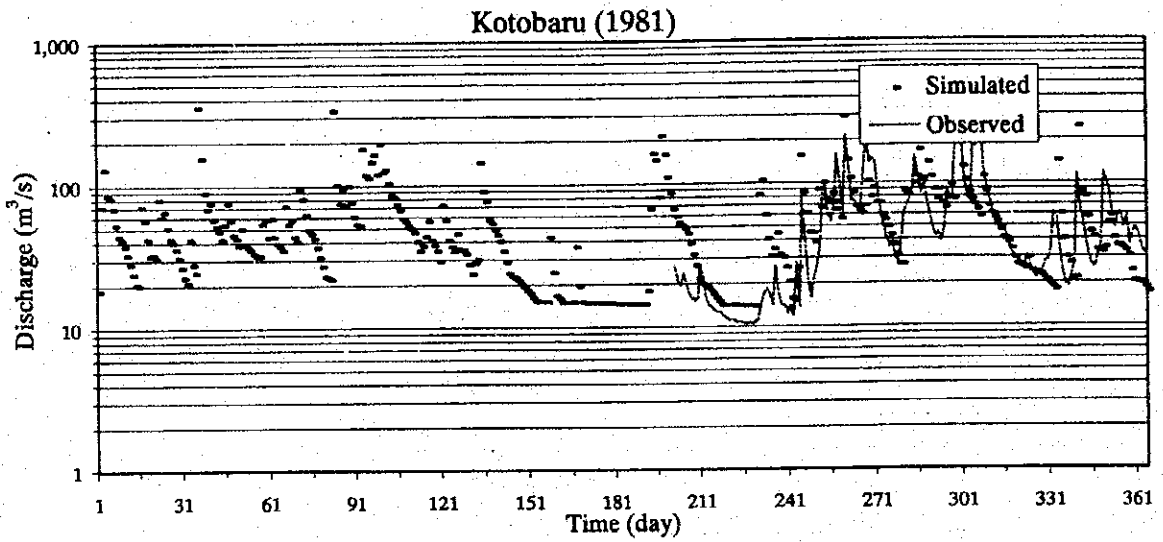
Fig. I.4.6 PEAK DISCHARGES AT DAMSITES  
AND MAXIMUM RECORDED  
FLOODS IN INDONESIA





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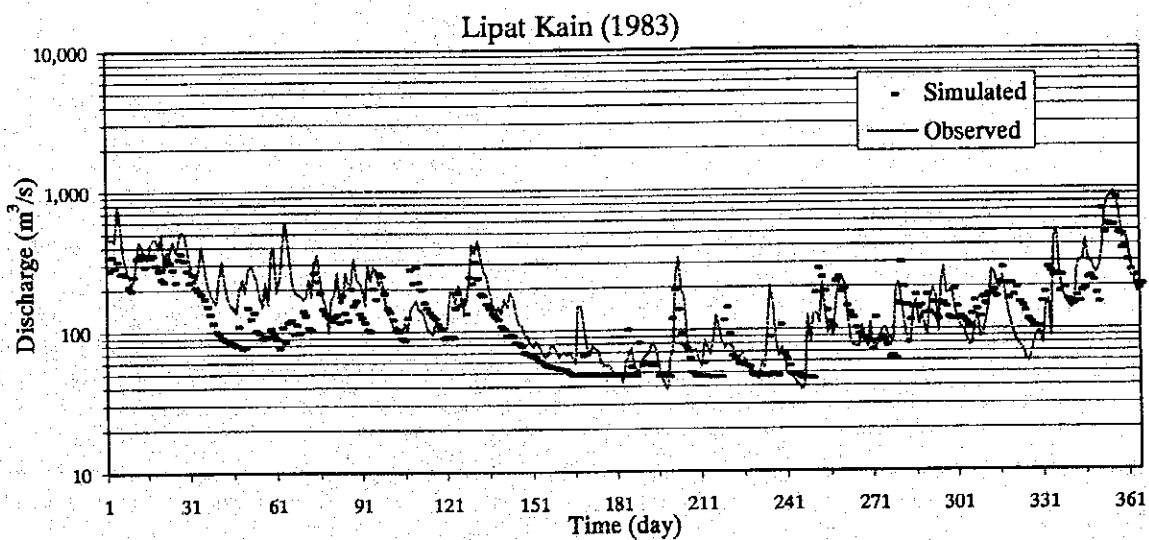
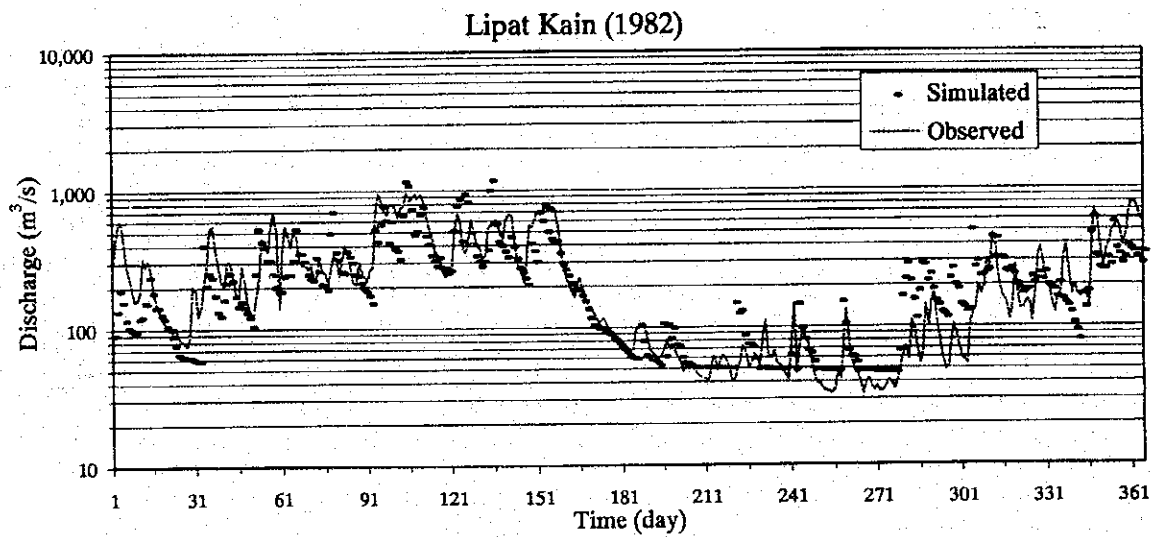
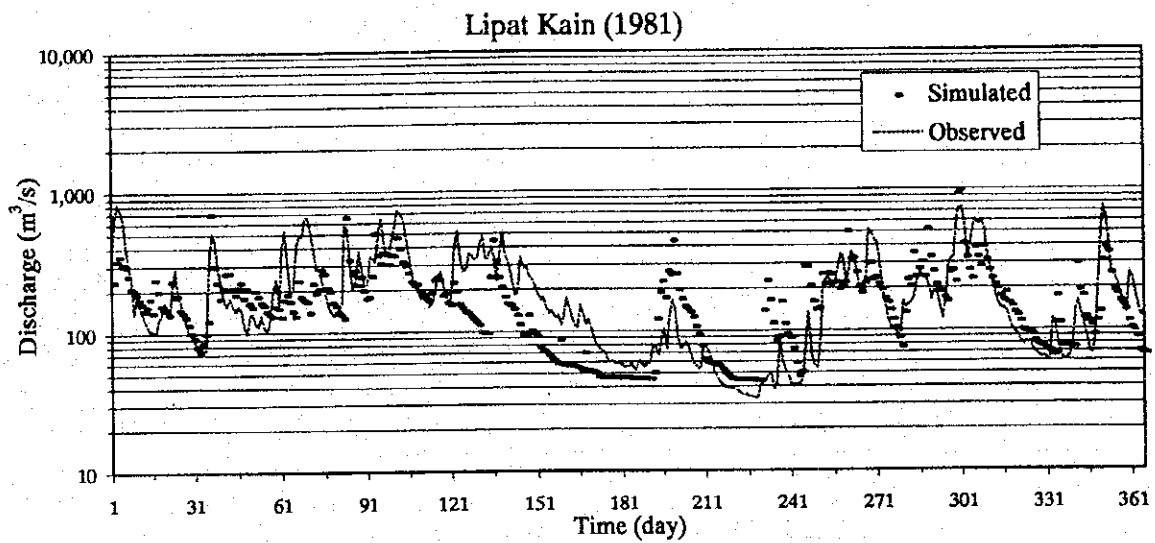
Fig. I.5.1 VERIFICATION OF LOW FLOW SIMULATION MODEL (1/6)



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Fig. 1.5.1  
(2/6)

VERIFICATION OF LOW FLOW  
SIMULATION MODEL

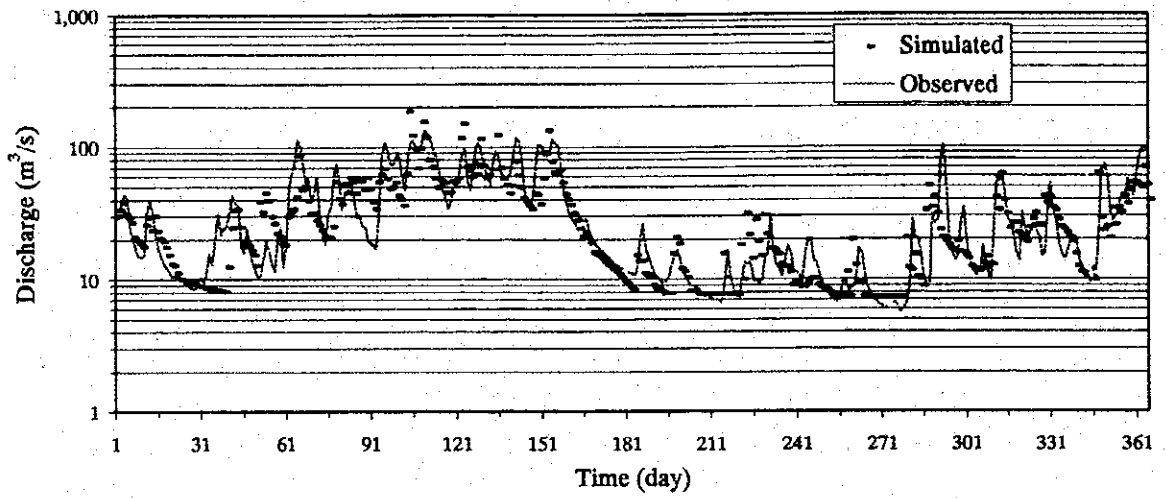


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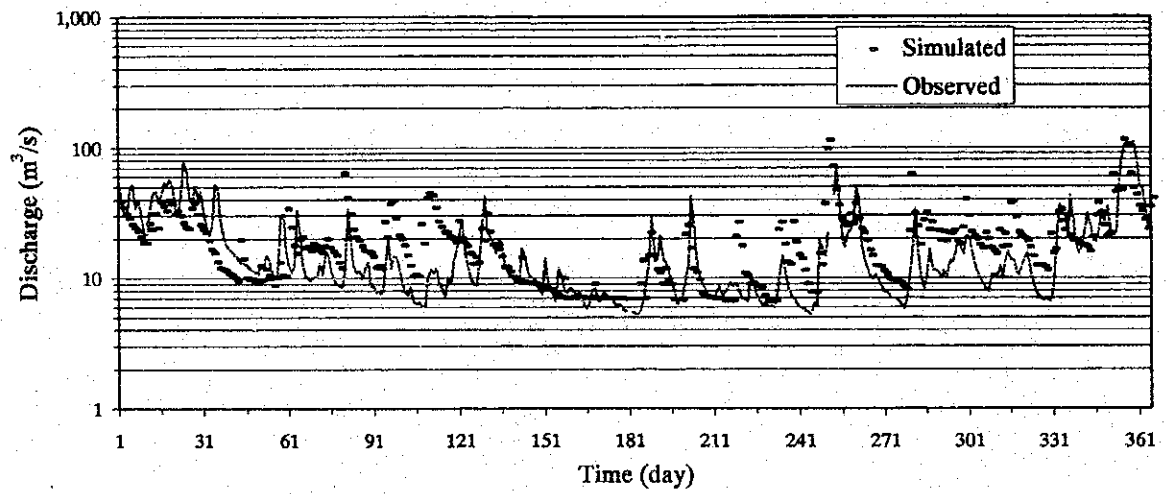
Fig. I.5.1  
(3/6) VERIFICATION OF LOW FLOW  
SIMULATION MODEL



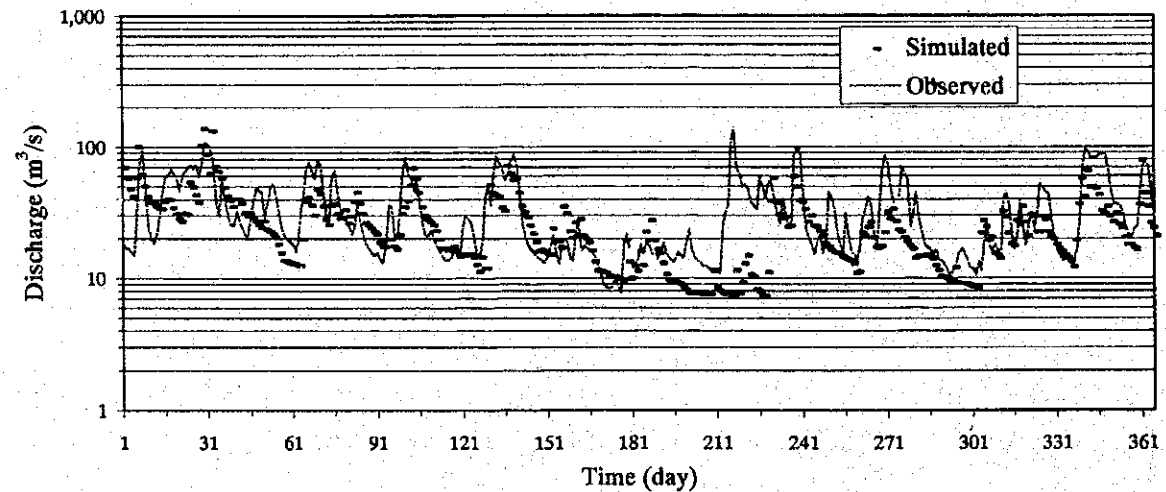
Kebun Durian (1982)



Kebun Durian (1983)



Kebun Durian (1988)

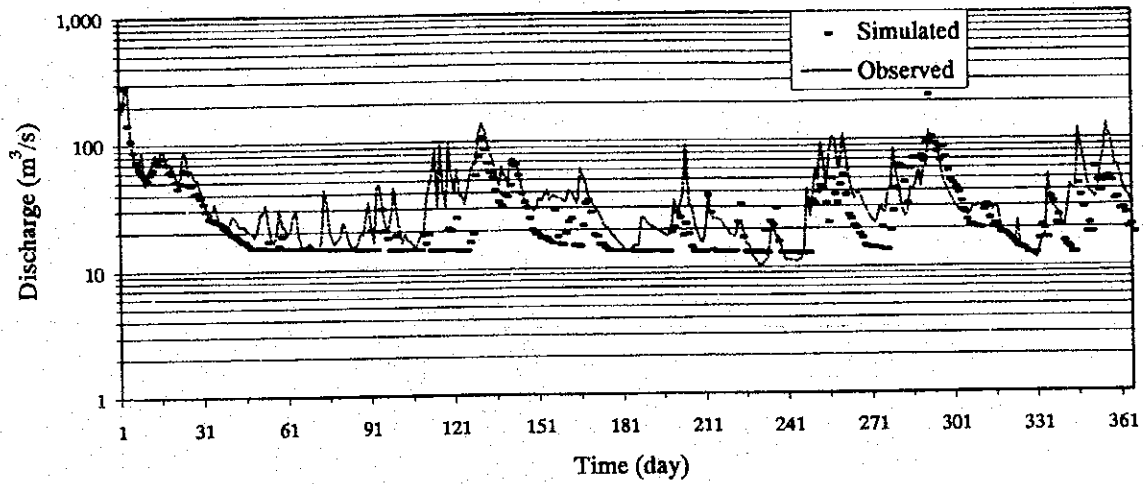


THE STUDY ON  
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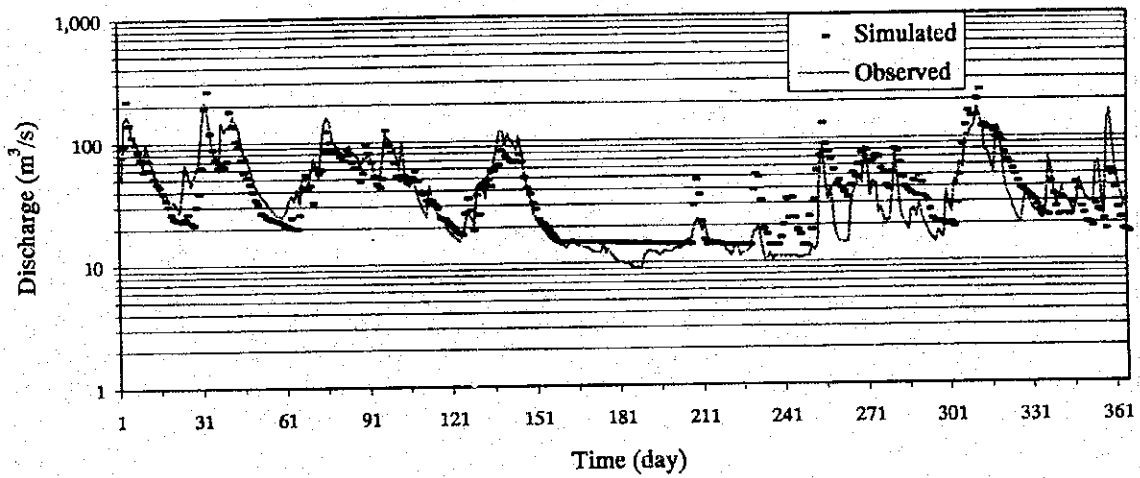
Fig. I.5.1  
(4/6)

VERIFICATION OF LOW FLOW  
SIMULATION MODEL

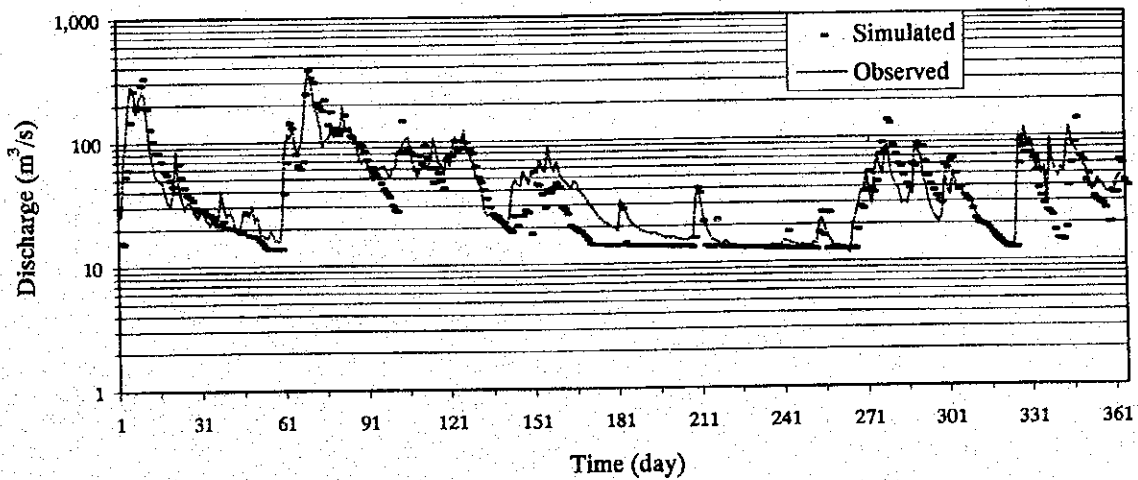
Payakumbuh (1983)



Payakumbuh (1985)



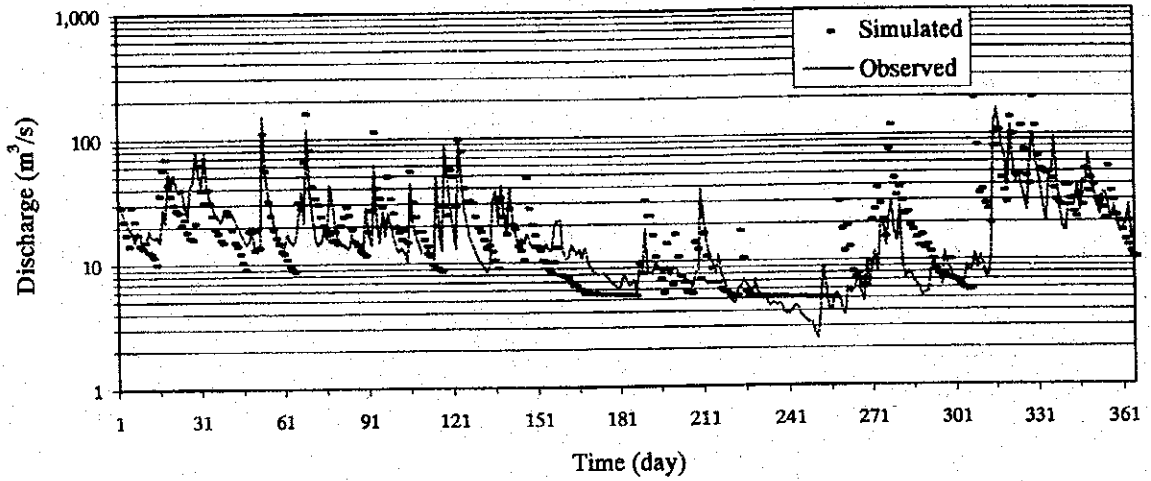
Payakumbuh (1986)



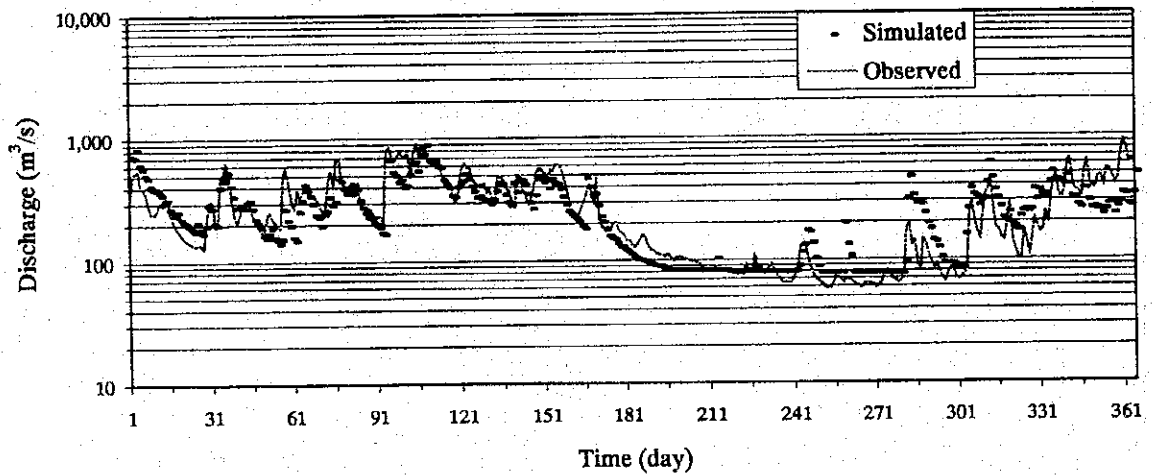
THE STUDY ON  
KAMPAR-INDRAGIRI RIVER BASIN DEVELOPMENT PROJECT  
IN THE REPUBLIC OF INDONESIA  
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Fig. I.5.1  
(5/6) VERIFICATION OF LOW FLOW  
SIMULATION MODEL

Sukam (1992)



Lumbukambacang (1982)

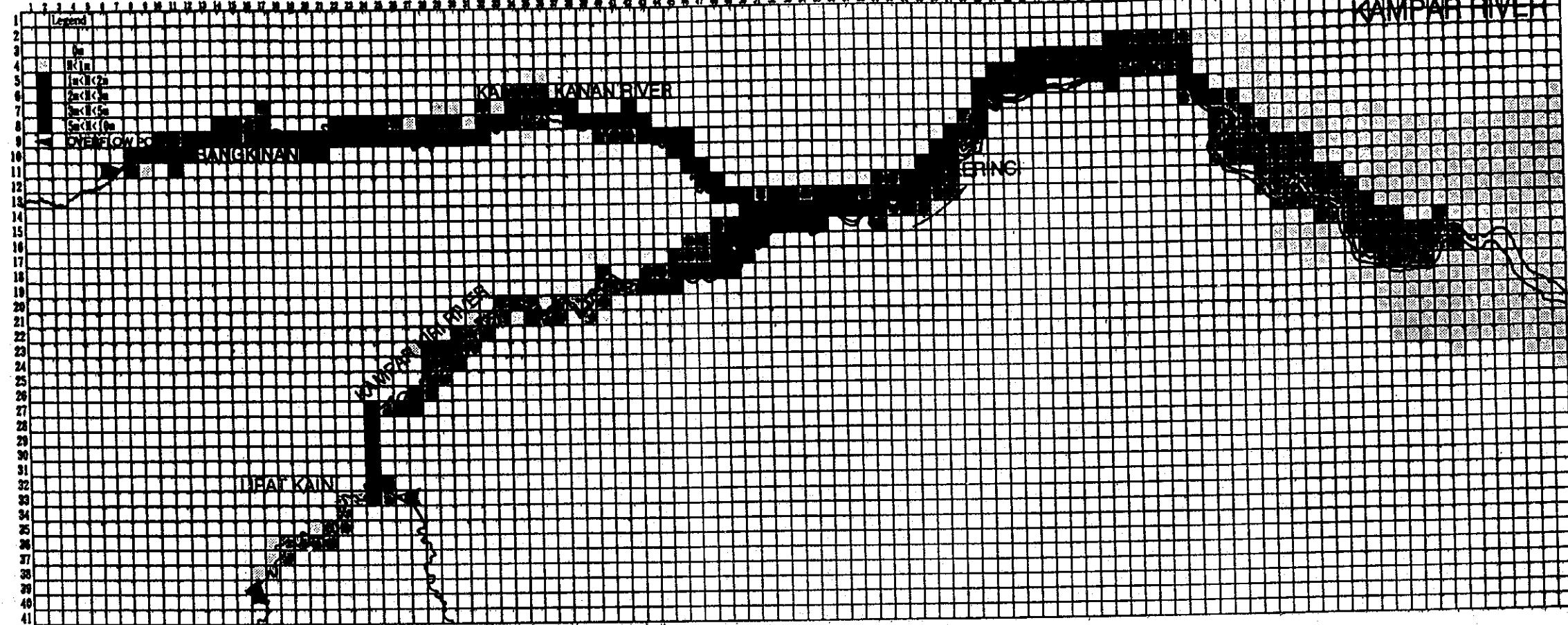


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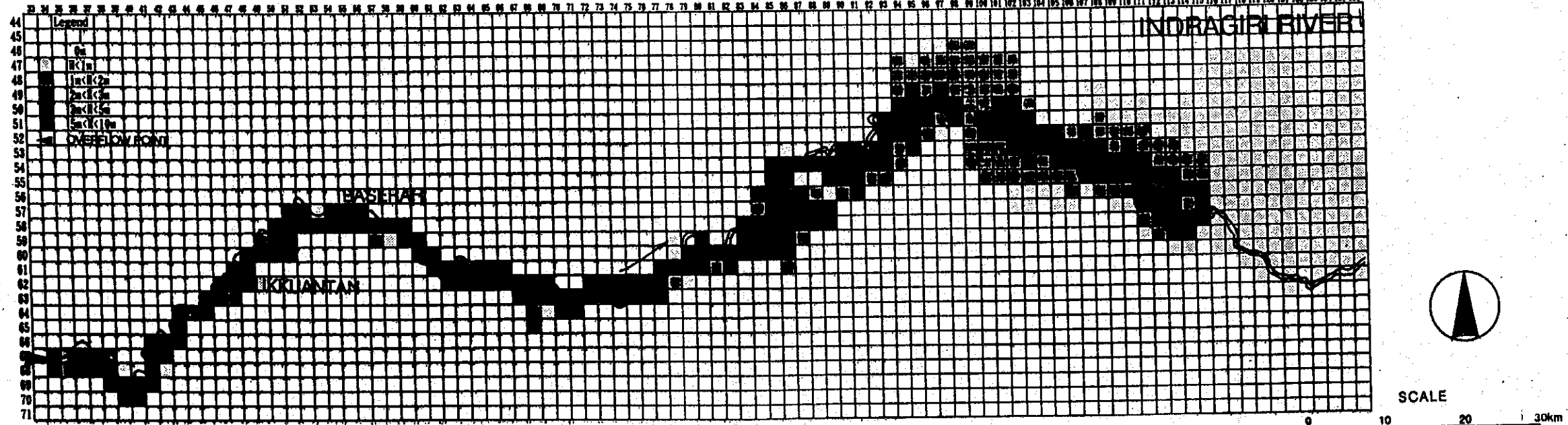
Fig. I.5.1 VERIFICATION OF LOW FLOW  
(6/6) SIMULATION MODEL



Kampar (50-year Return Period)



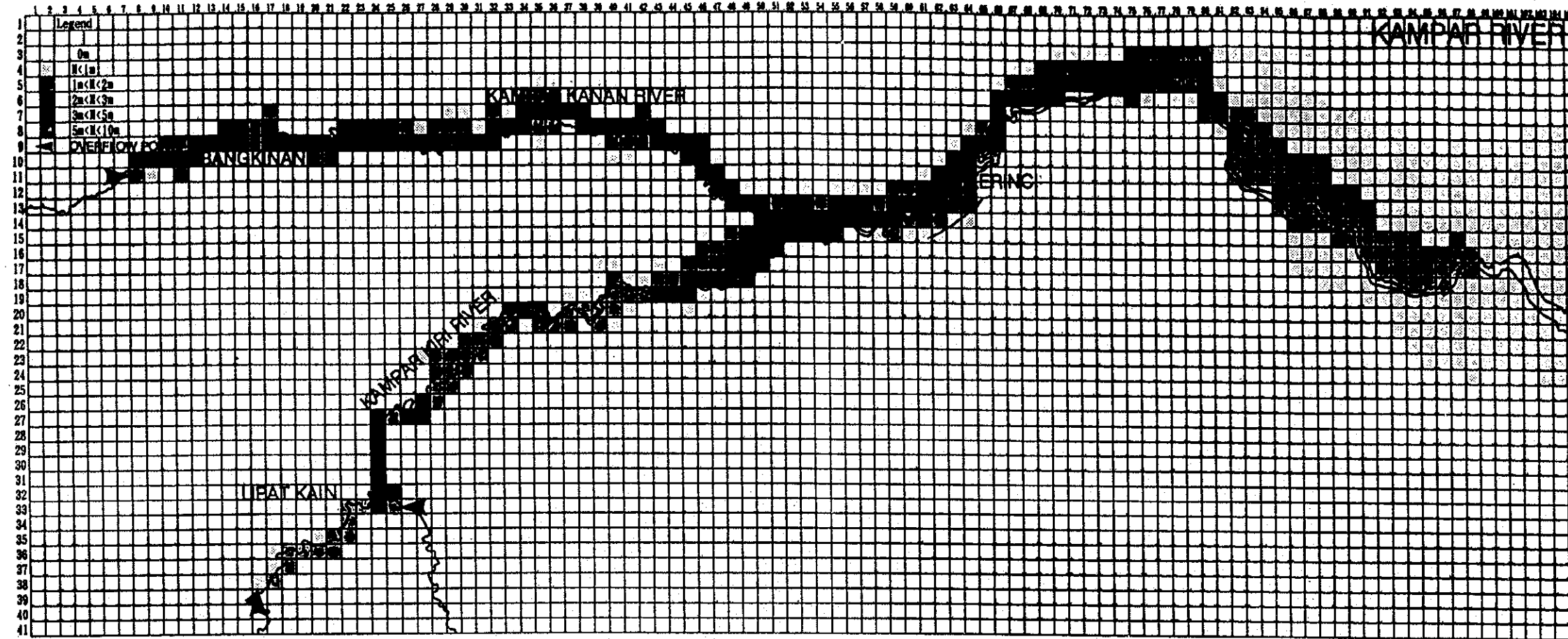
Indragiri (50-year Return Period)



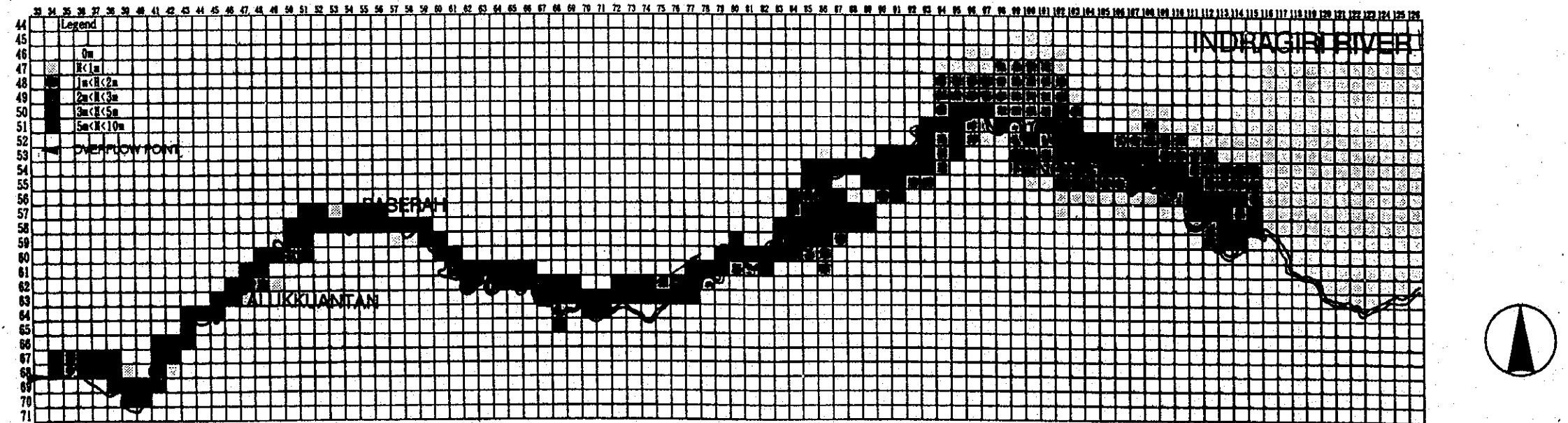
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Fig. I.6.1. MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (1/10)

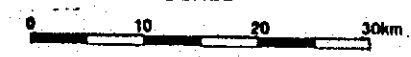
Kampar (25-year Return Period)



Indragiri (25-year Return Period)



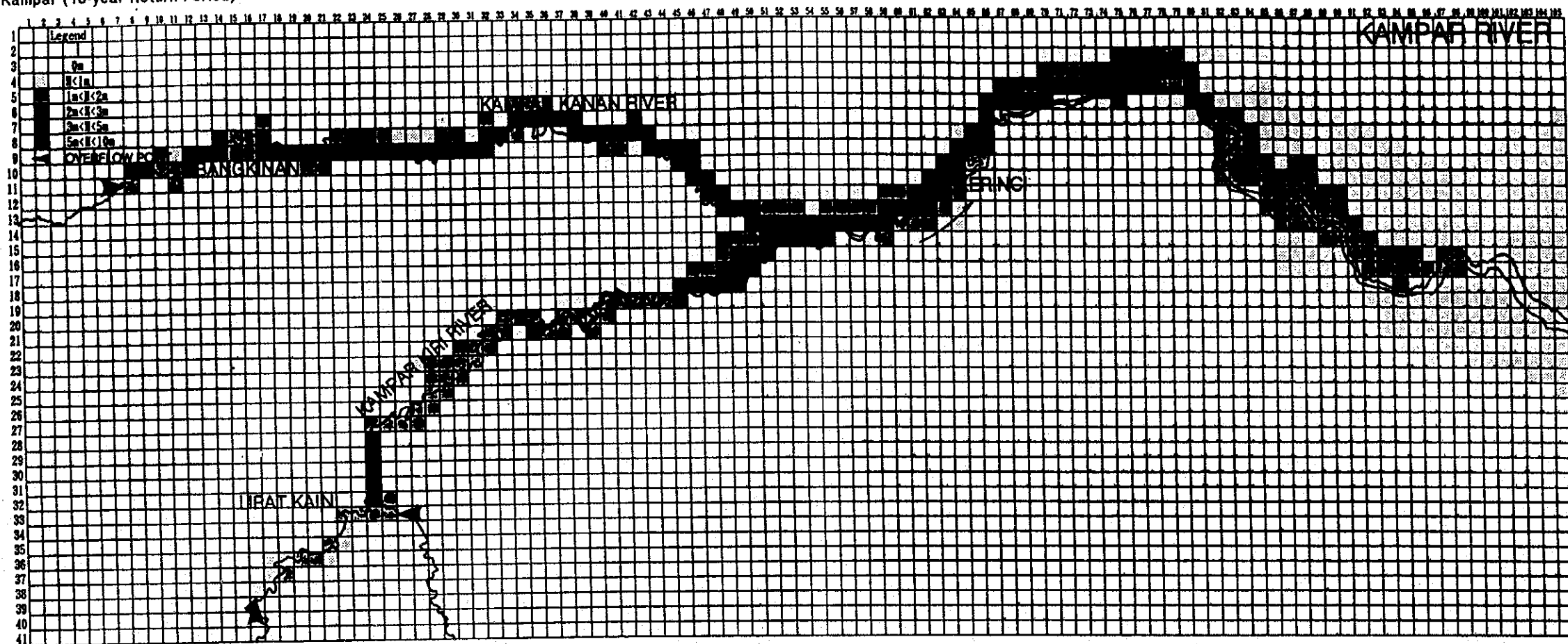
SCALE



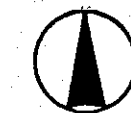
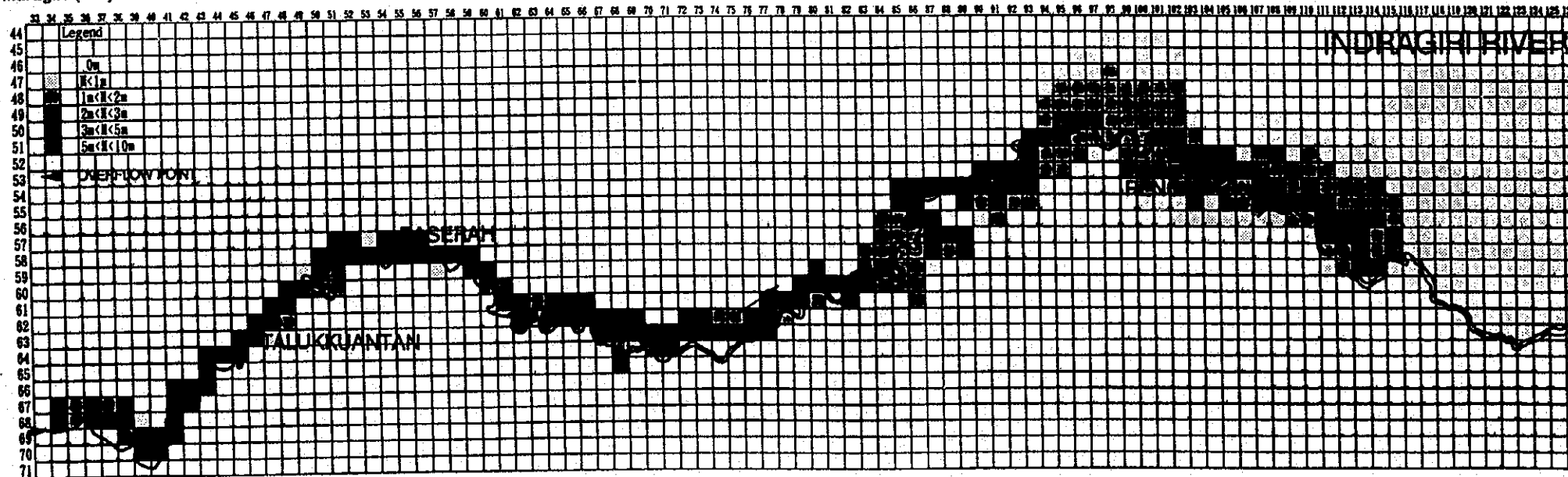
THE STUDY ON  
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Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (2/10)

Kampar (10-year Return Period)



Indragiri (10-year Return Period)



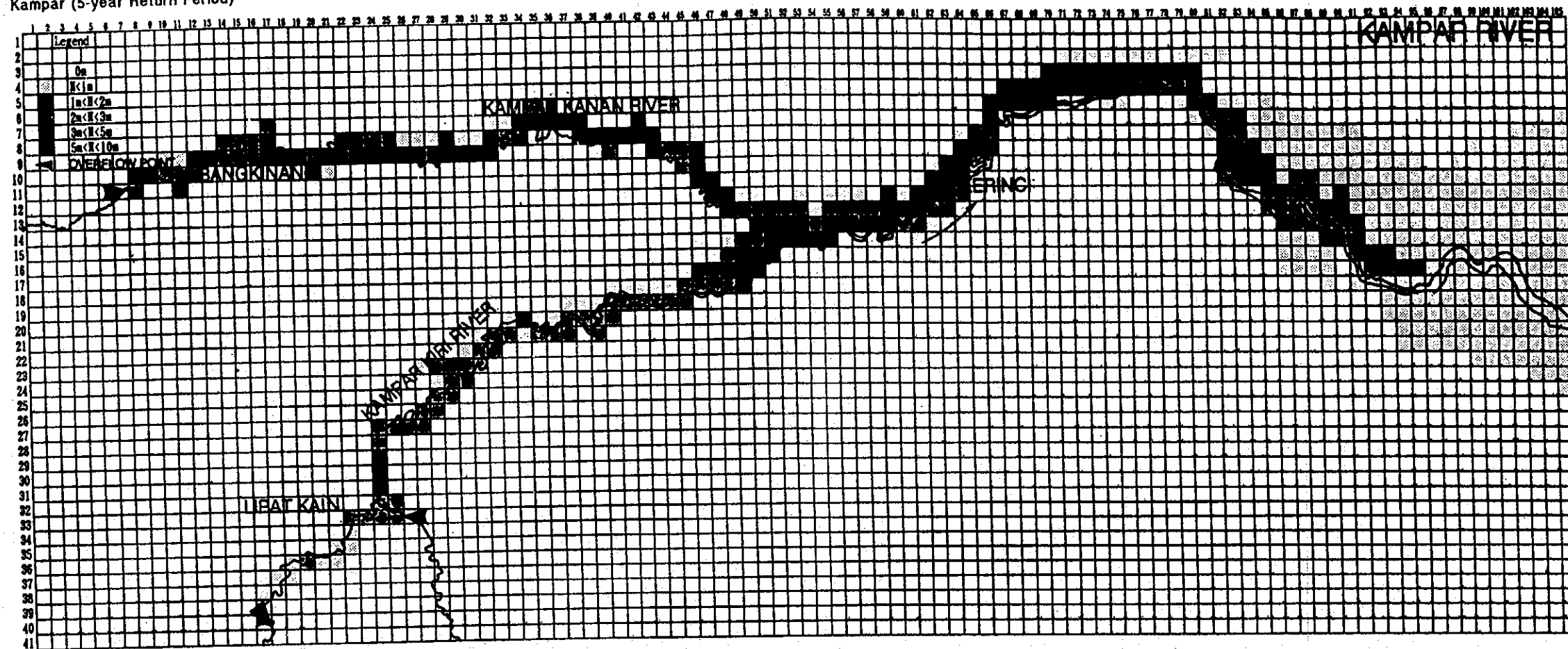
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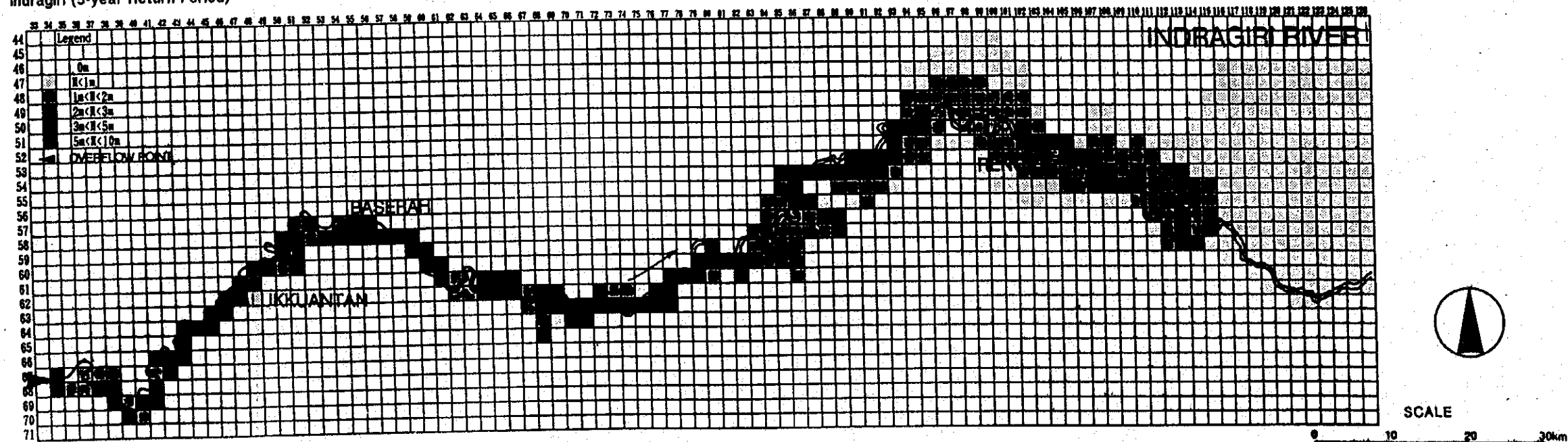
THE STUDY ON  
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Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (3/10)

Kampar (5-year Return Period)



Indragiri (5-year Return Period)

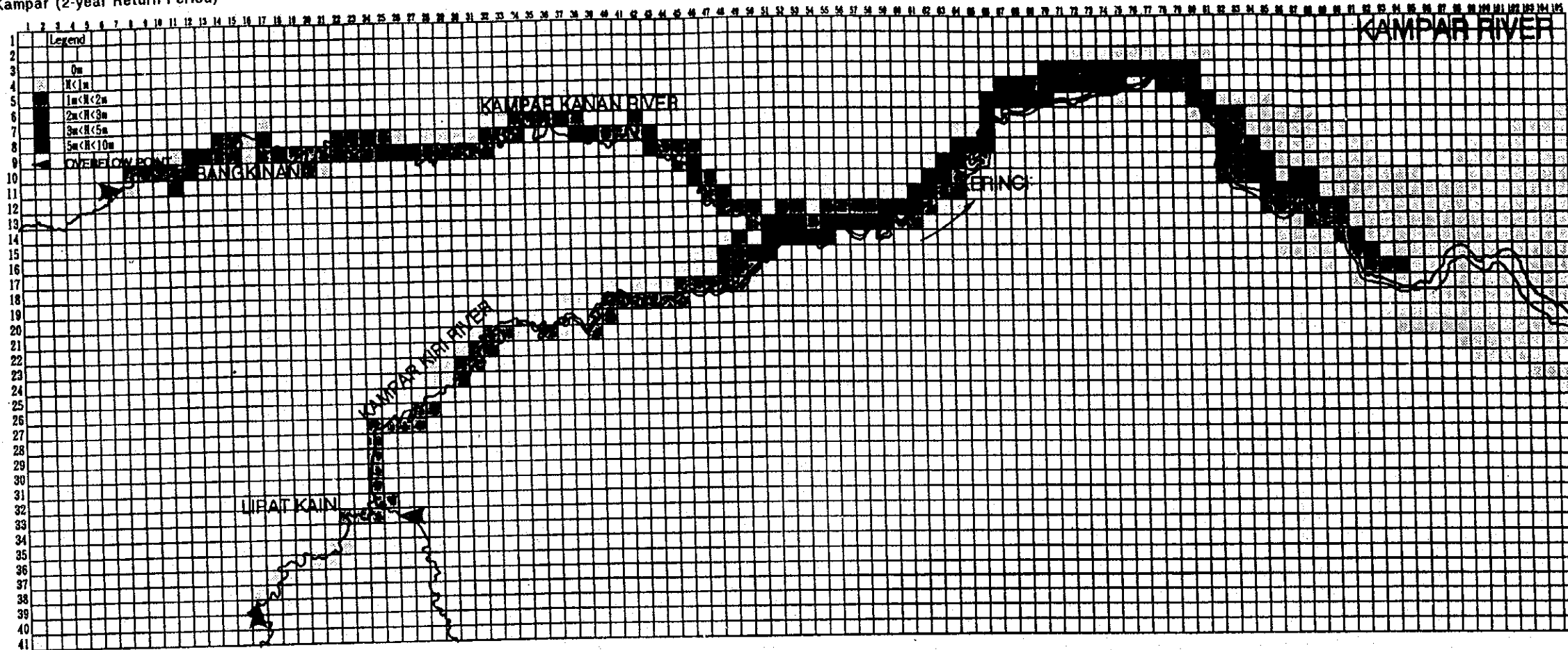


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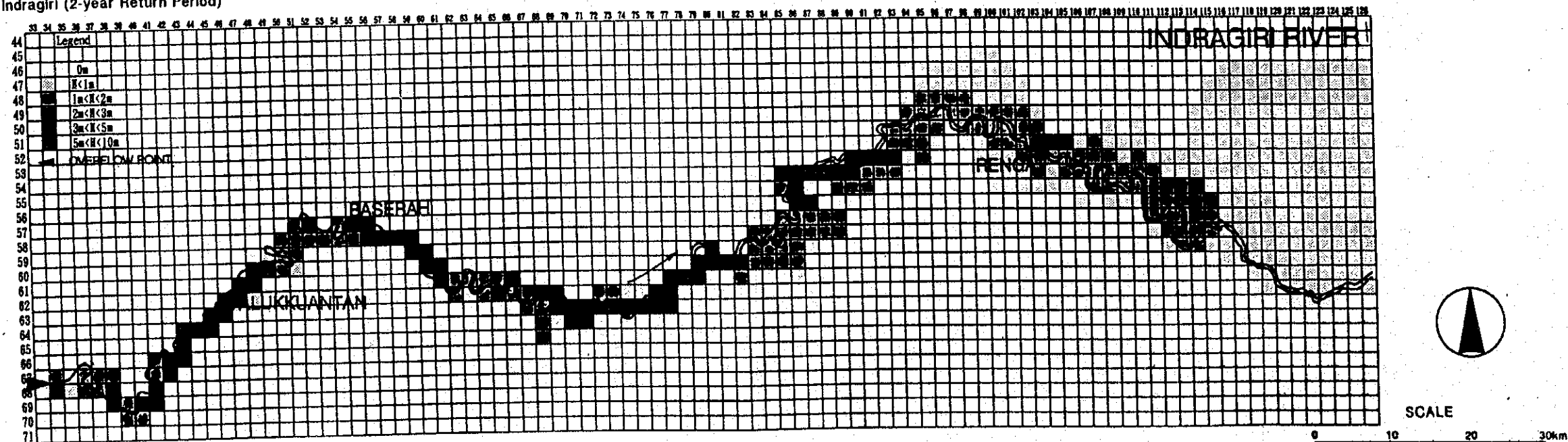
Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (4/10)



Kampar (2-year Return Period)



Indragiri (2-year Return Period)

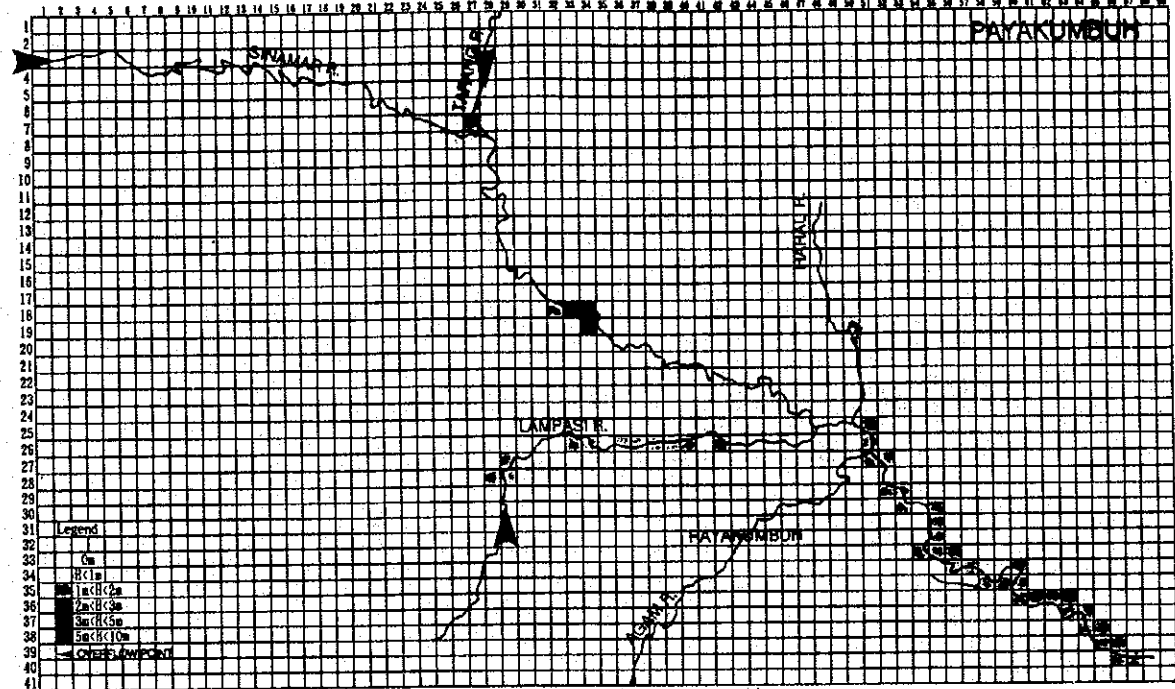


THE STUDY ON  
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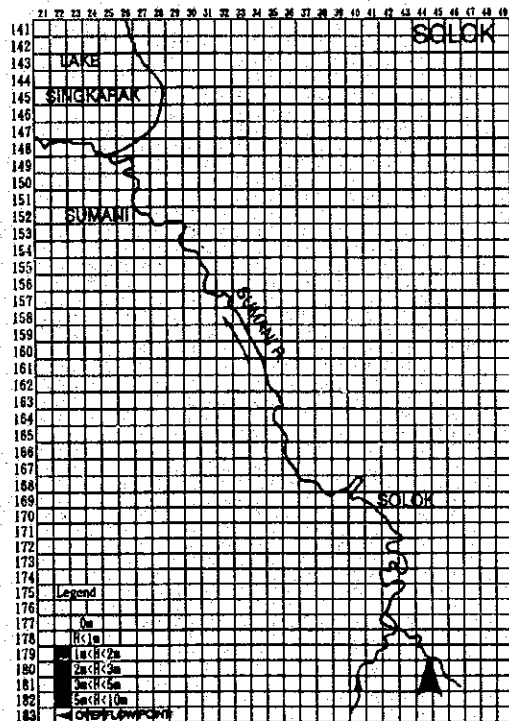
Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (5/10)



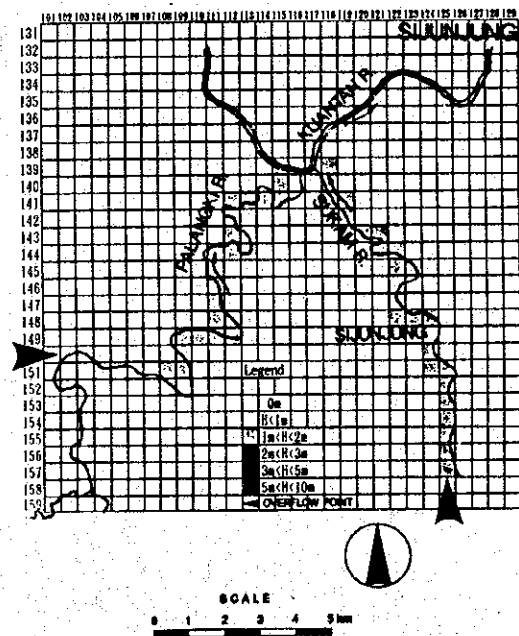
Payakumbuh 2-year Return Period



Solok 2-year Return Period

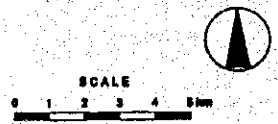
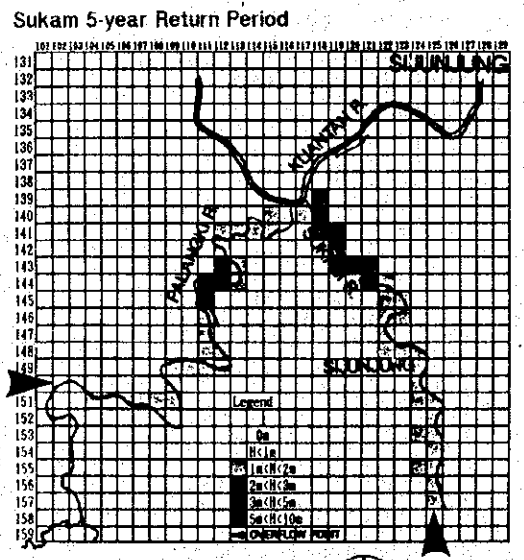
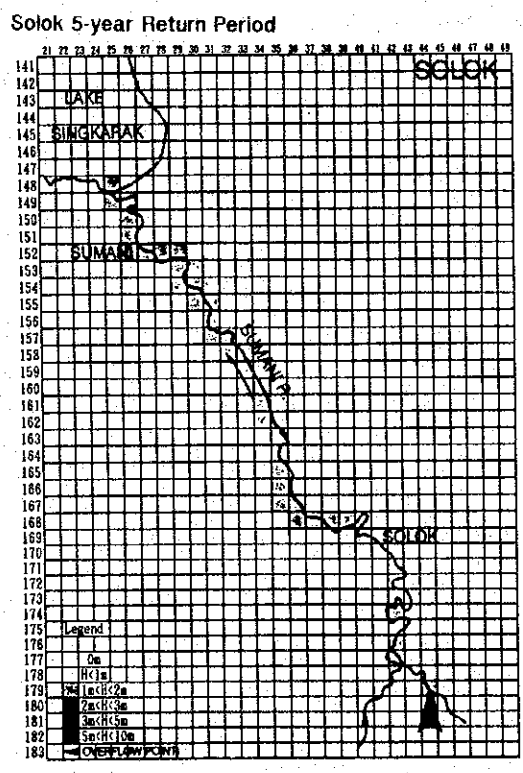
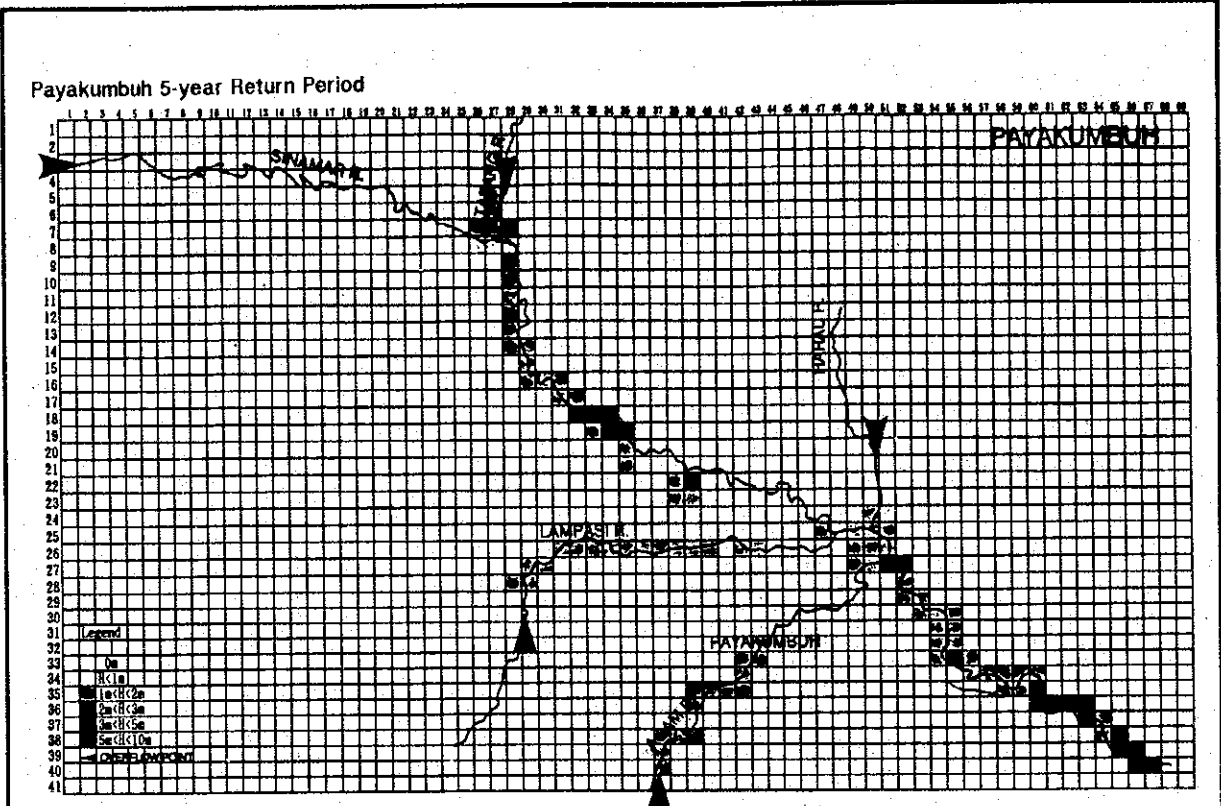


Sukam 2-year Return Period



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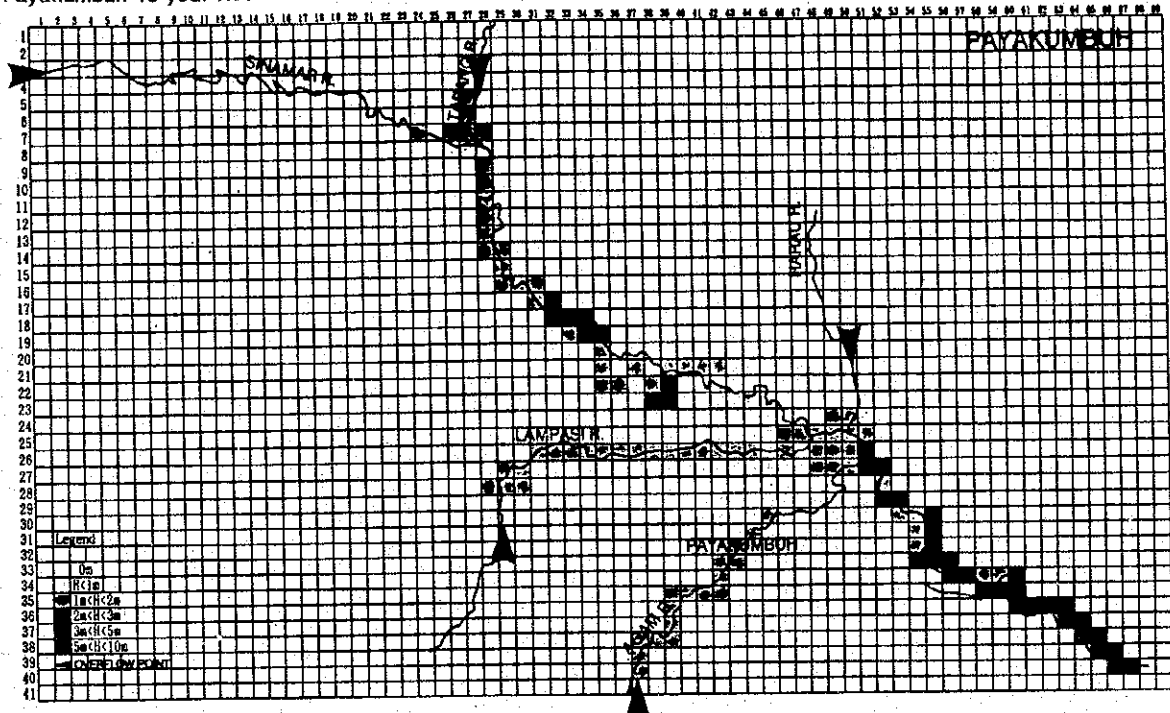
Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (6/10)



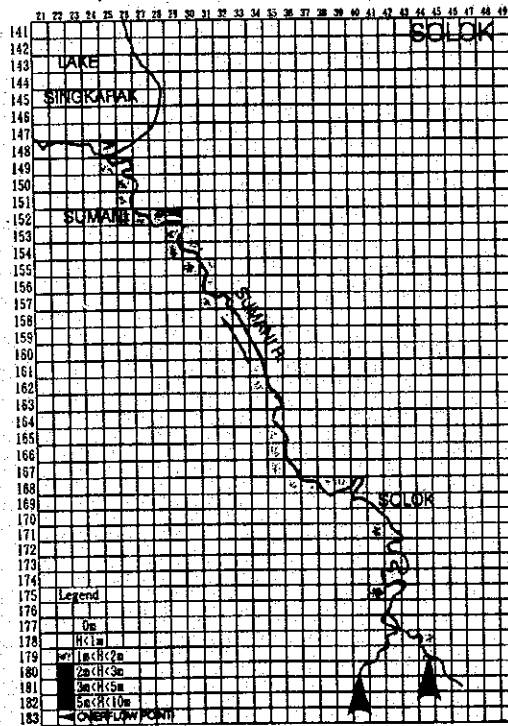
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Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (7/10)

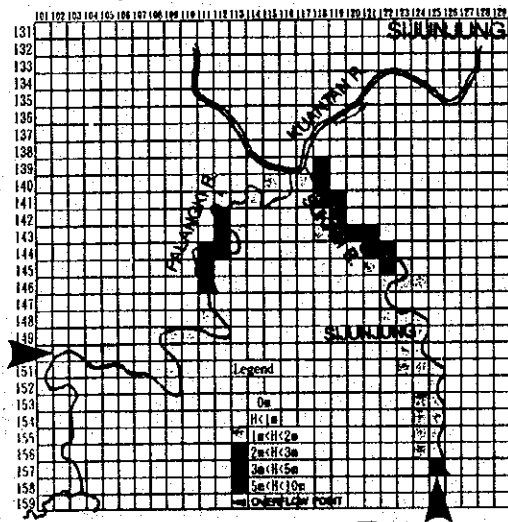
Payakumbuh 10-year Return Period



Solak 10-year Return Period



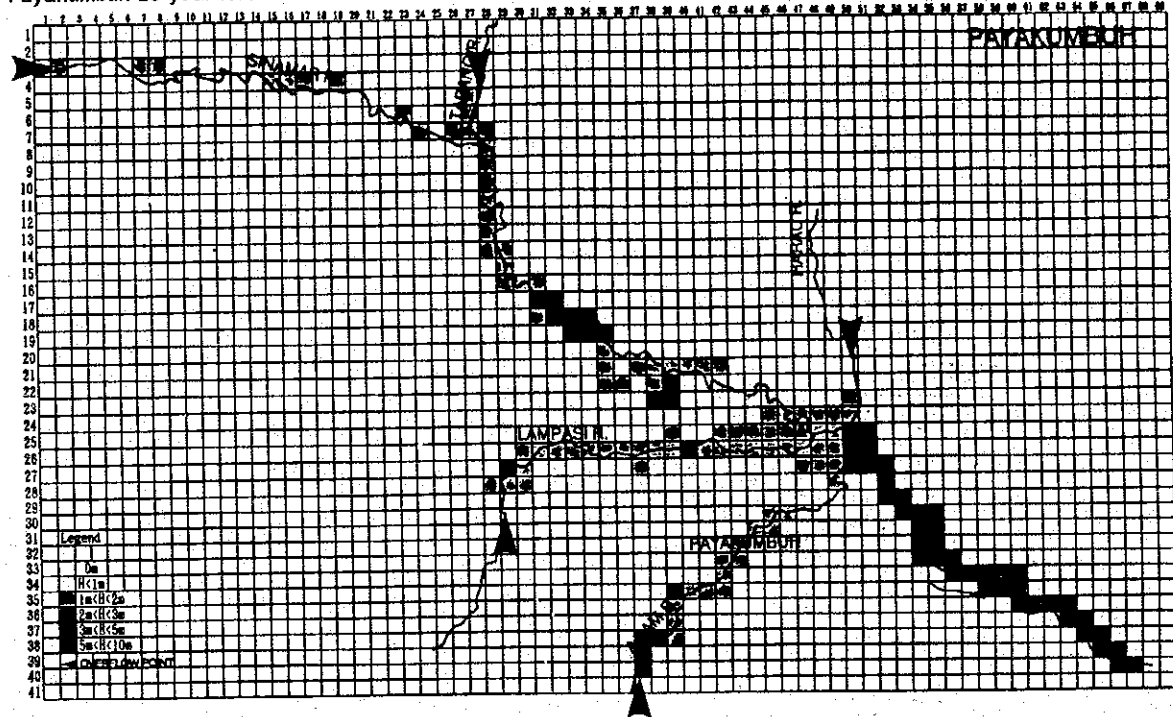
Sukam 10-year Return Period



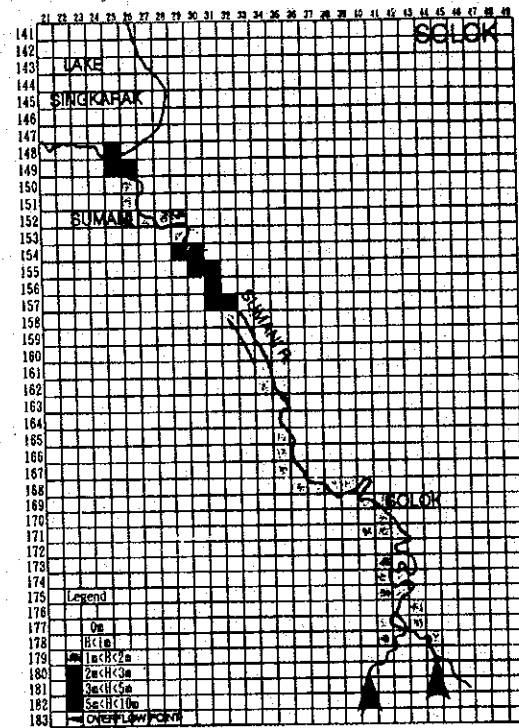
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Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (8/10)

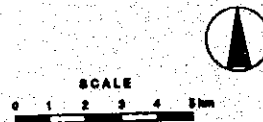
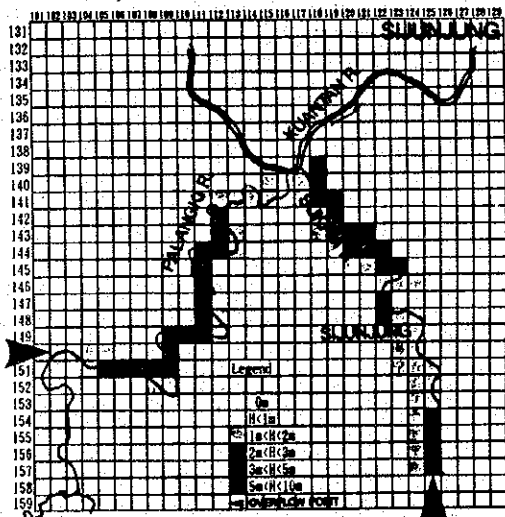
Payakumbuh 25-year Return Period



Solok 25-year Return Period



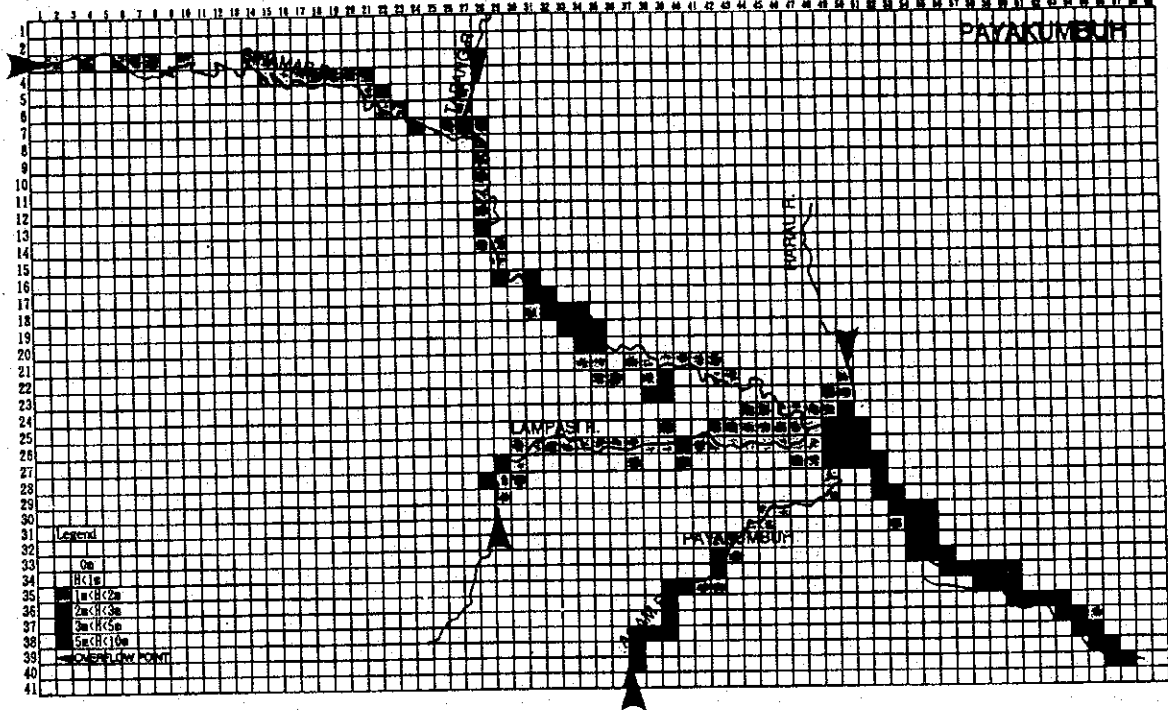
Sukam 25-year Return Period



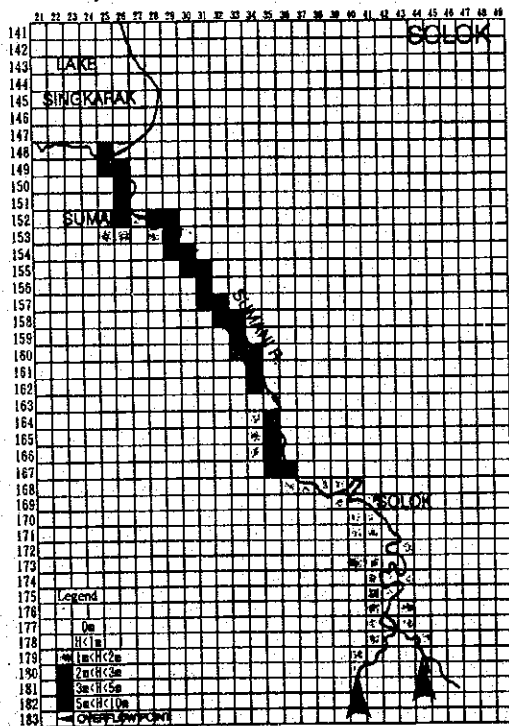
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Fig. I.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (9/10)

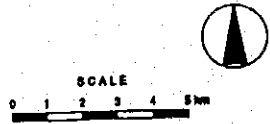
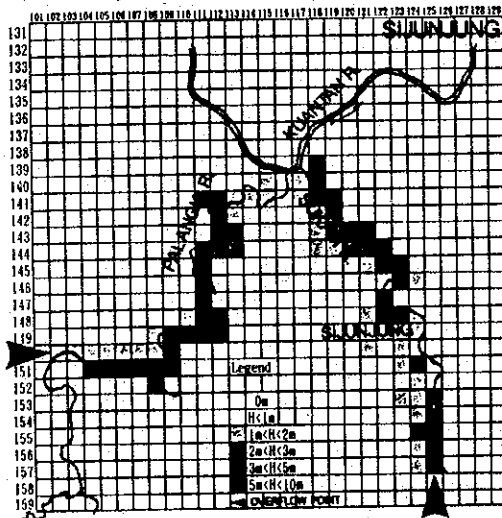
Payakumbuh 50-year Return Period



Solok 50-year Return Period



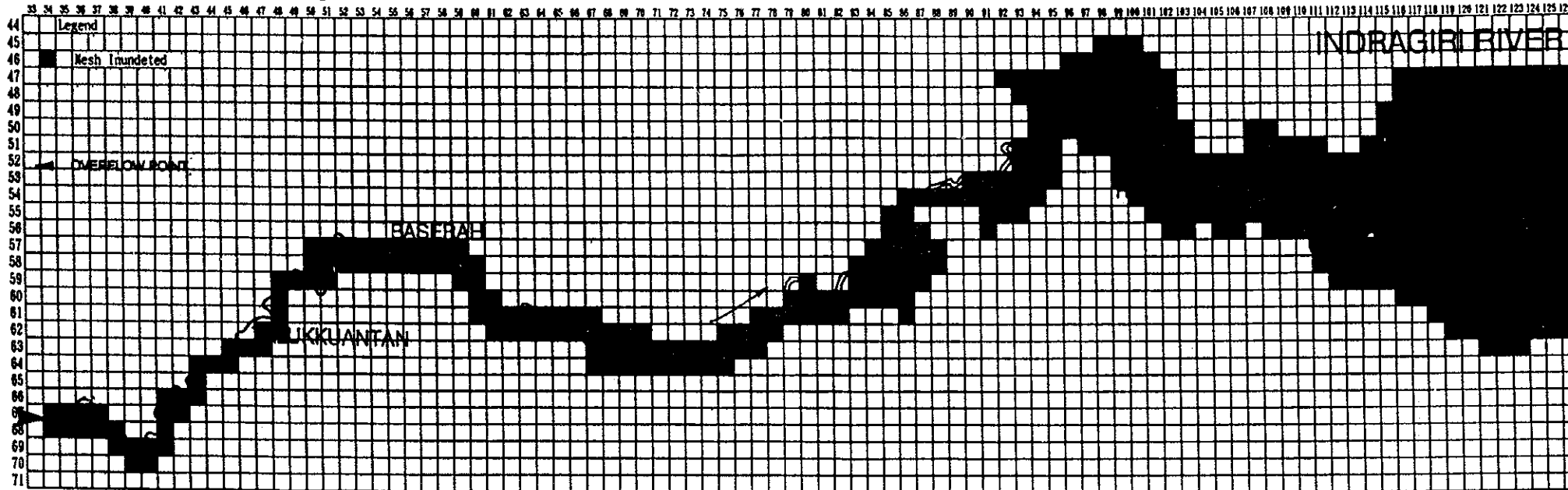
Sukam 50-year Return Period



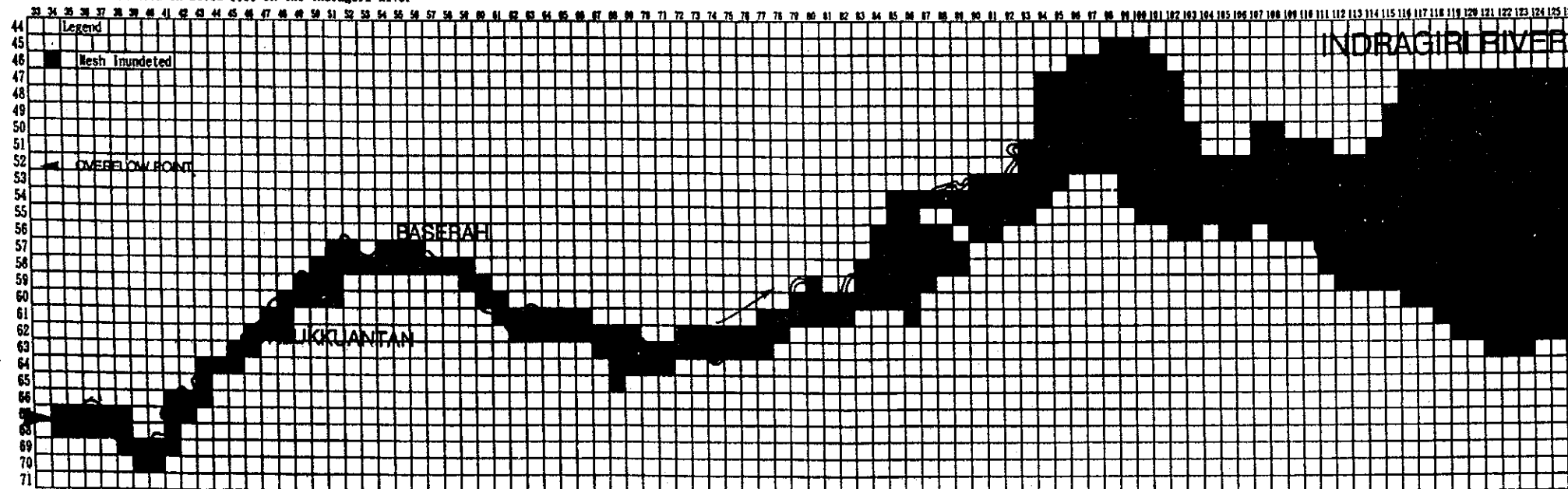
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Fig. 1.6.1 MAXIMUM INUNDATION DEPTH AND INUNDATION AREA (10/10)

Actual Inundation Area on flood 1986 in the Indragiri River



Simulated Inundation Area on flood 1986 in the Indragiri River



SCALE



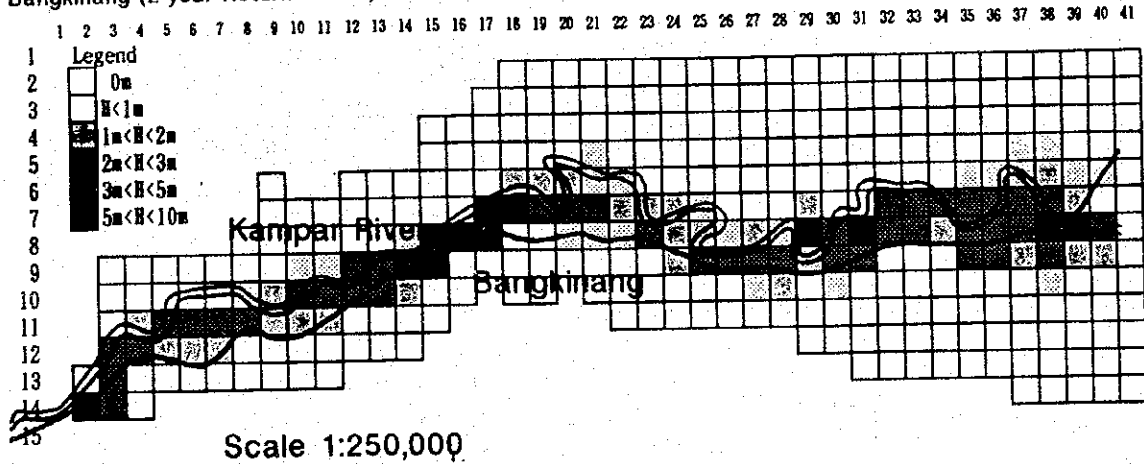
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Fig. I.6.2 ADAPTABILITY OF INUNDATION MODEL

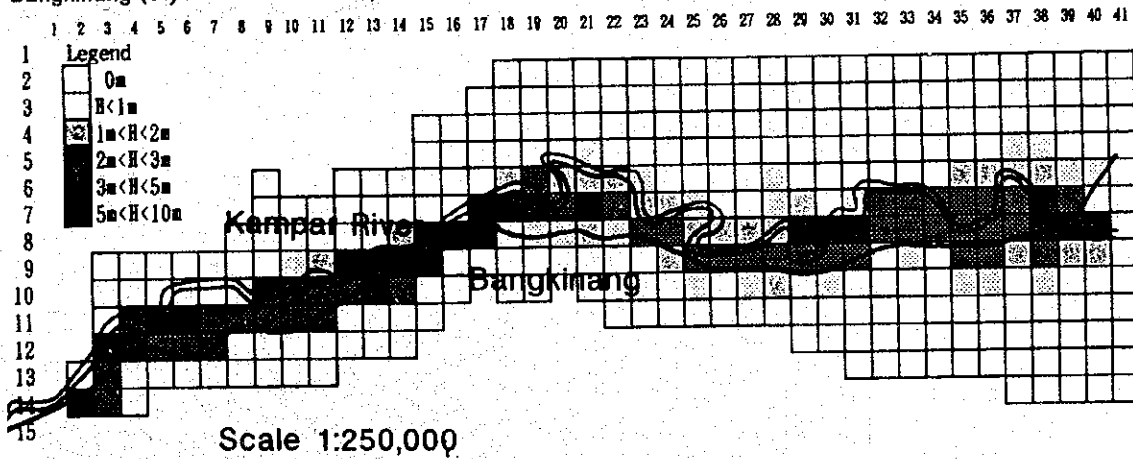




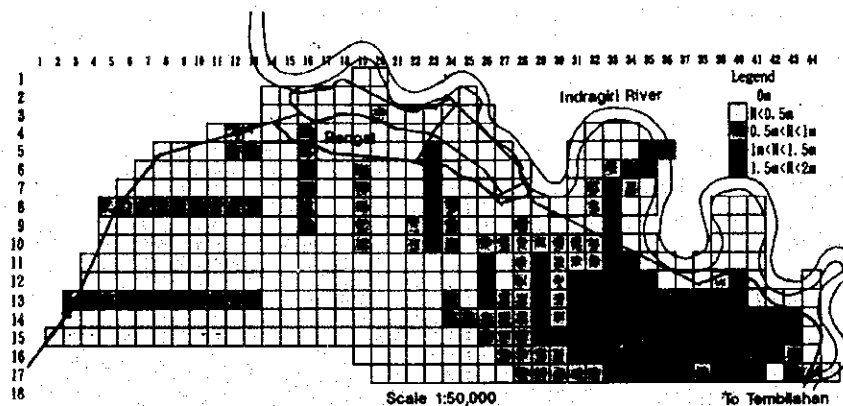
**Bangkinang (2-year Return Period)**



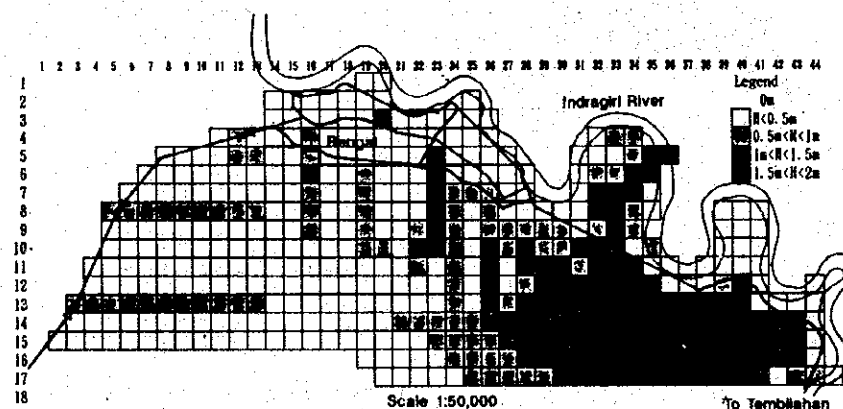
**Bangkinang (5-year Return Period)**



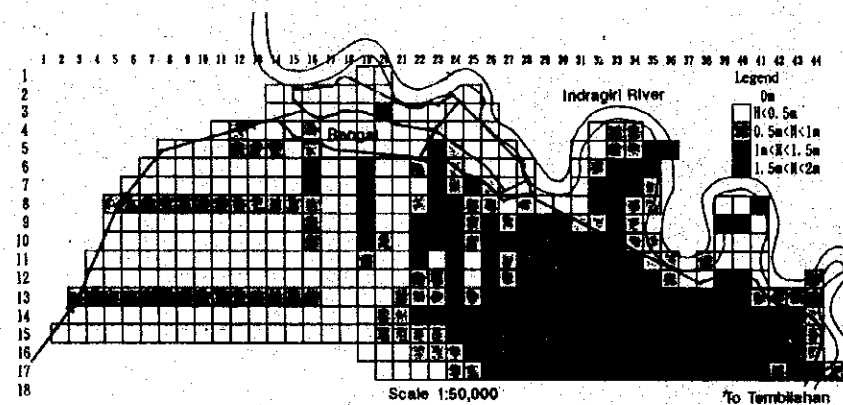
**Rengat (2-year Return Period)**



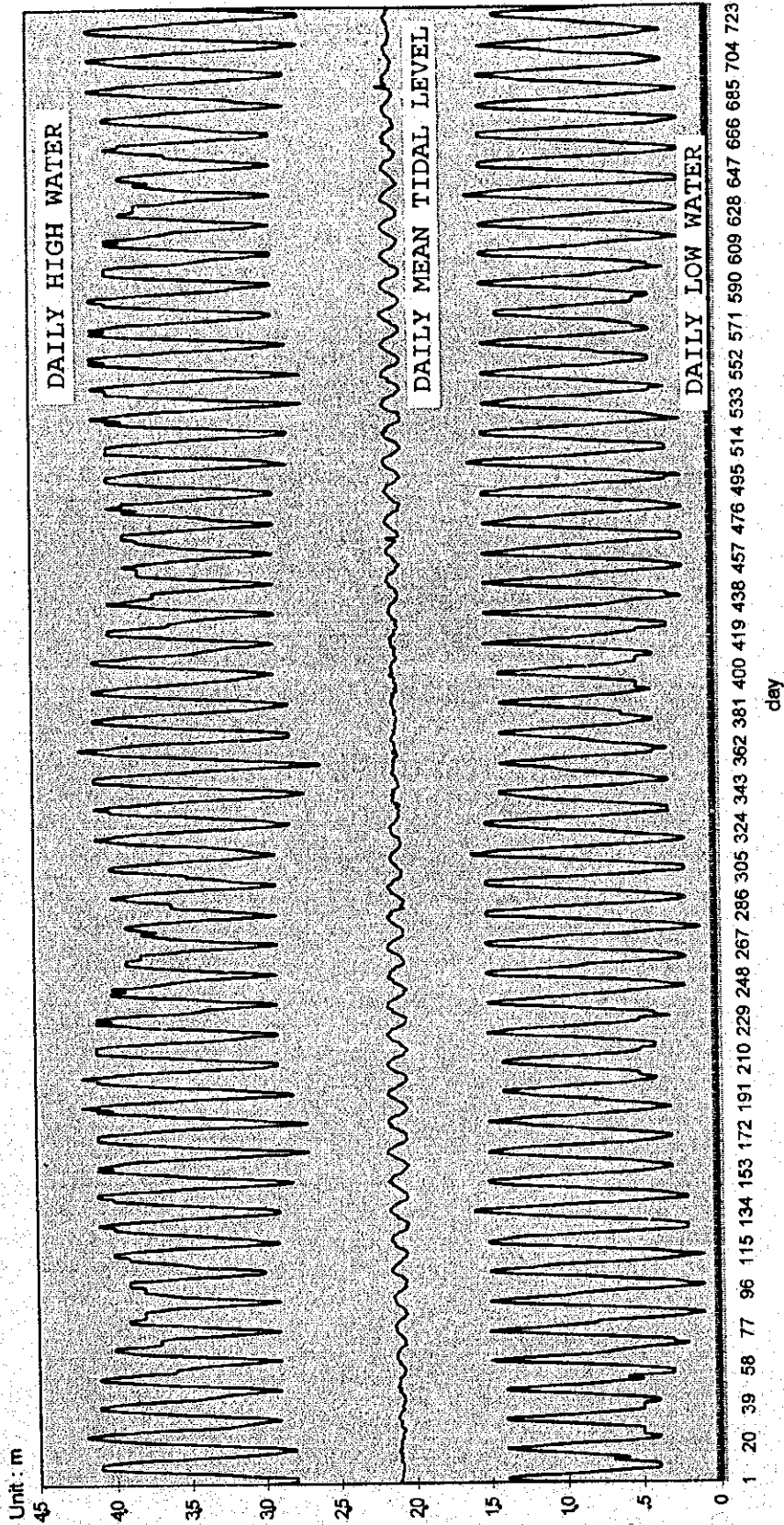
**Rengat (5-year Return Period)**



**Rengat (10-year Return Period)**



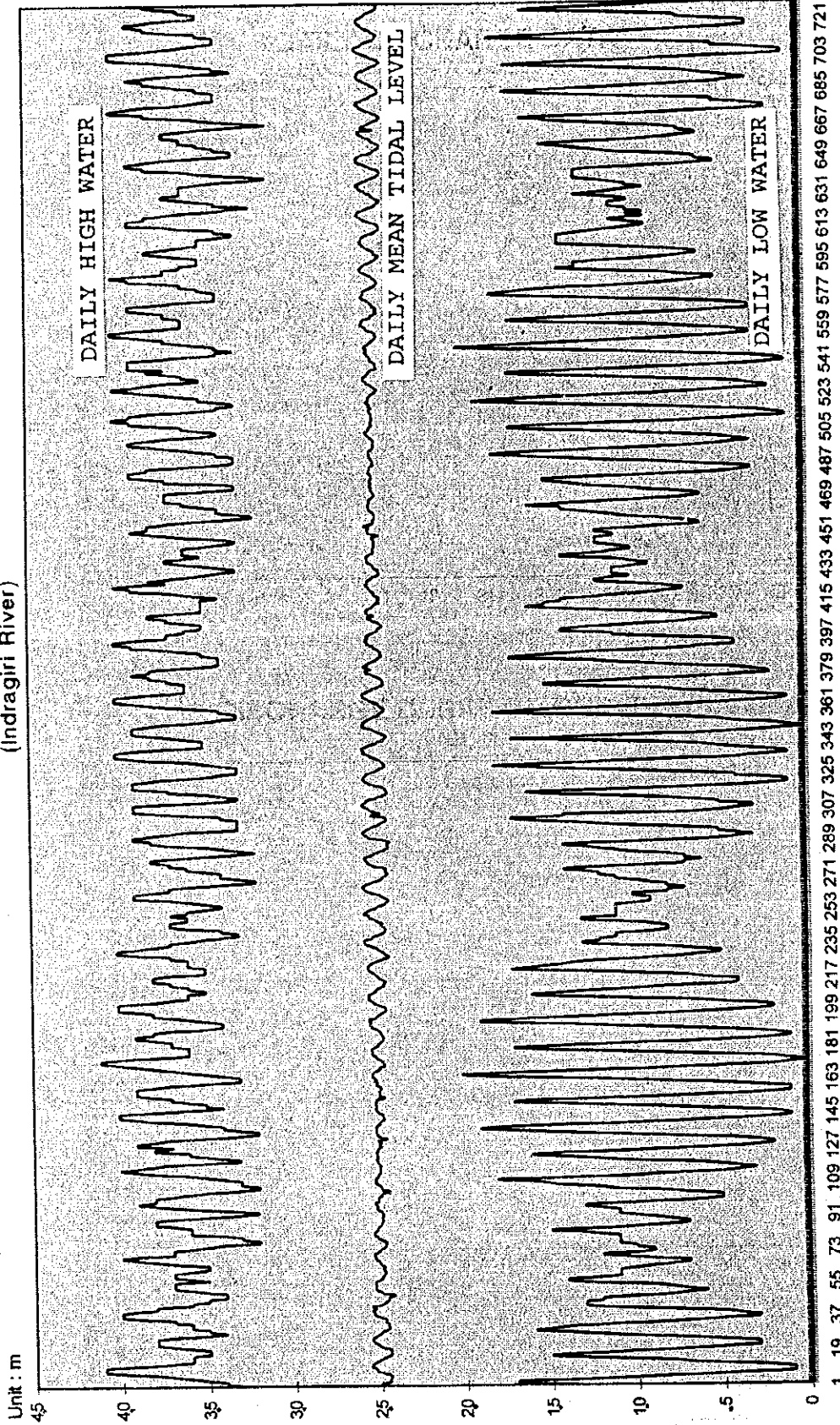
TIDAL WATER LEVEL OF BLANDONG FROM 1983 TO 1994  
(Kampar River)



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Fig. 1.7.1 TIDAL LEVEL RECORDS AT  
KAMPAR AND INDRAGIRI  
RIVER MOUTHS

TIDAL WATER LEVEL OF KUJALA LAJAU FROM 1993 TO 1994  
(Indragiri River)



day

1 19 37 55 73 91 109 127 145 163 181 199 217 235 253 271 289 307 325 343 361 379 397 415 433 451 469 487 505 523 541 559 577 595 613 631 649 667 685 703 721

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Fig. I.7.2 LENGTH OF SALTWATER WEDGE AT KAMPAR AND INDRAGIRI RIVER MOUTHS

## ***II SOCIO-ECONOMY***



**SECTOR II  
SOCIO-ECONOMY**

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## CHAPTER 1 DEVELOPMENT POLICY

### 1.1 National Development Policy

In Indonesia, two national development plans are presently being executed, the Second Long Term Development Plan and the Sixth Five-Year Development Plan.

#### 1.1.1 Second Long Term Development Plan

The 1993 National Guideline (GBHN) states that the Second Long Term Development Plan (PJP II) of 25 years from 1994 to 2019 is a continuing process for enhancing and renewing the First Long Term Development Plan (PJP I). The main objective of PJP II is to create and develop a physically and mentally self-reliant nation. It will be the foundation for the next development plan in promoting peace and welfare all over Indonesia based on *Pancasila* and the 1945 Constitution.

To attain a high standard of development and self-reliance, economic resources shall have to be urgently developed. It is therefore necessary to reach a high economic growth standard in PJP II, higher than what has been reached in PJP I.

Economic growth in PJP II is projected at 7% per annum on average, which will be supported by the population growth rate which is projected to decrease from around 1.7% at the end of PJP I to around 0.9% per annum by the end of PJP II. Changing the job opportunity structure is also going to be tried to make it more balanced and productive. If both of these main objectives are successful, the GNP per capita of the Indonesian people will be four times than what it is at present (US\$650 in 1993), becoming around US\$2,600 at the end of PJP II at the constant price of 1989/90.

#### 1.1.2 Sixth Five-Year Development Plan

The priority of the Sixth Five-Year Development Plan (REPELITA VI) for 1994-1999 is the development of the economic sector in relation to industry, agriculture, human resource quality and other sectors. Economic growth is projected at 6.2% per annum on average. The main source of growth other than investment enhancement comes from the productivity enhancement of all economic sectors. The target growth by sector in REPELITA VI is summarized in the table below.

Sector	Average Growth Rate (%)
(1) Agriculture	3.4
(2) Processing Industry	9.4
(Non-gas Processing)	10.3
(3) Others	6.0
(Leadership Sector)	4.6
National Economy	6.2

Non-gas industrial processing is projected to increase by 10.3% per annum, while other sectors are projected to increase by 6.0% per annum. With the development of such sectors, the share of the industrial sector will increase to around 24.1% and the agricultural sector will decrease to 17.6%. On the other hand, the share of other sectors will decrease to 58.3% and other leading sectors will decrease to 5.6%. At this tendency of economic and population growth, the nominal domestic product per capita of the Indonesian people is projected to increase to around 4.7% per annum at end of REPELITA VI.

## **1.2 Regional Development Policy**

### **1.2.1 Second Long Term Development Plan**

The target of regional development plan in PJP II is a stable, real, dynamic, harmonious and responsible regional autonomy, as well as a more even development distribution along with its outputs in the frame of increasing public prosperity.

The target of economic development is to attain a speedy growth of the gross regional domestic product (GRDP) for the non-oil and -gas sector, which is estimated on annual average at approx. 3.7% for Riau Province and 7.6% for West Sumatra Province. The other targets are to increase the availability and quality of basic economic facilities and infrastructure services, particularly, to create an intermodal transportation system capable of increasing economic accessibility of regional areas, to increase the participation of private sectors and the public in the development so as to support the creation of employment opportunities, and to increase regional contribution to the national economy.

The social development targets are (1) to increase the degree of public health and nutrition which is measured through, among other things, two indicators of social prosperity, i.e., longer life expectancy to 72.7 years for Riau Province) and 72.3 years for West Sumatra Province and the lowering of infant mortality to 2.0% (Riau Province) and 2.1% (West Sumatra Province); (2) to decrease the population growth rate; and, (3) to attain a steady distribution and increase of basic and vocational education quality, as well as to accomplish the implementation of a nine-year compulsory education. The poverty problem is also planned to be eradicated.

### **1.2.2 Sixth Five-Year Development Plan**

The targets of the regional development plan in REPELITA VI are (1) the development of real, dynamic, harmonious and responsible regional autonomy focussing on the development of Region Level II (Regencies: Kabupatens and Kotamadyas); and, (2) the increase of self-reliance and capability of planning and managing development in the region, including operation and maintenance of facilities and infrastructure constructed in line with the increase of regional government capability of utilizing the regional financial source in addition to the increase of regional expenditure efficiency.

The target of growth of the non-oil and -gas industry is set at 7.0% and 6.5% per annum for Riau and West Sumatra provinces, respectively. The growth rate of each sector in non-oil and -gas industry are as follows:

Unit: % per annum

Non-Oil and -Gas Sector	Riau Province	West Sumatra Province
Agriculture	5.4%	3.0%
Construction	7.5%	8.6%
Trade and Transportation	6.4%	7.3%
Services	5.2%	6.8%
Others	1.3%	7.3%
Average	7.0%	6.5%

## CHAPTER 2 POPULATION

### 2.1 Present Population

#### 2.1.1 Population

The present population in Indonesia and the study area is described as below.

##### (1) Indonesia

The total population of Indonesia has increased from 119,208 thousand in 1971 to 179,379 thousand in 1990 with an average growth rate of 2.17% per annum. During the same period, the Island of Kalimantan has shown the highest average growth rate of 3.04%, followed by the Island of Sumatra at 3.00%.

The average annual growth rate of population has decreased from 2.39% during the period from 1971 to 1980, to 1.98% during from 1980 to 1990. The same trend can be observed for each island except Kalimantan, Maluku and Irianjaya where the average growth rate has increased. It is forecasted that the total population of Indonesia will increase to 210,439 thousand in the year 2000 with the average annual growth rate of 1.61% in the period from 1990 to 2000.

Comparing the share by island in Indonesia, population is predominantly occupied by Jawa Island at 59.97% in 1990, but its share shows a decrease compared with 63.83% in 1971. This decrease is assumed to be due mainly by the national policy of transmigration from Jawa Island to other islands. This trend will continue in the future.

The second largest share in 1990 is occupied by Sumatra Island at 20.35%, followed by Sulawesi Island at 6.98% and Nusa Tenggara Island at 5.67%. The shares of the islands of Sumatra, Nusa Tenggara, Kalimantan, Maluku and Irianjaya in 1990 show increase compared with those in 1971. In the future, the share of all islands except Jawa Island is forecasted to increase. (refer to Table II.2.1).

##### (2) Study Area

The total population of the study area has increased from 3,504 thousand in 1982 to 4,411 thousand in 1991 with an average annual growth rate of 2.59%. Average annual growth rate of population of the study area in Riau Province during the same period is 4.09% which is larger than that of the study area in West Sumatra Province of which average growth rate is 1.64%. Especially, population of Pekanbaru City has increased most rapidly with average annual growth rate of 8.31%, while the population of all Kabupatens and Kotamadyas has increased by less than 3%.

Furthermore, the study area in Riau Province shows that average annual growth rate in 1987 to 1991 (4.41%) is higher than in 1982 to 1987 (3.83%). On the contrary, in West Sumatra, the average growth rate of the former period (1.90%) is higher than the latter period (1.31%). From this observation, it can be expected that population of Riau Province will increase at a higher growth rate than West Sumatra Province in the future (refer to Table II.2.2).

### 2.1.2 Population Density

Population density in Indonesia and the study area is described as below.

#### (1) Indonesia

The total area of Indonesia is 1,919,317 km<sup>2</sup>. The population density of Indonesia has increased from 62.1 persons/km<sup>2</sup> in 1971 to 93.5 persons/km<sup>2</sup> in 1990. In the future, the density will increase to 109.6 persons/km<sup>2</sup> in 2000.

Comparing by island, the highest density is shown by Jawa Island at 813.9 persons/km<sup>2</sup>. Second is Nusa Tenggara at 114.9 persons/km<sup>2</sup>, followed by Sumatra Island at 77.1 persons/km<sup>2</sup> and Sulawesi Island at 66.2 persons/km<sup>2</sup>. It is noticed that the population density of Sumatra and Kalimantan islands had increased almost two times from 1971 to 1990 (refer to Table II.2.3).

#### (2) Study Area

The population density of the study area has increased from 41.5 persons/km<sup>2</sup> in 1982 to 52.2 persons/km<sup>2</sup> in 1991. In spite of its higher growth rate of population, population density of Riau Province is lower than that of West Sumatra Province. Population density of the study area is 35.4 persons/km<sup>2</sup> for Riau Province and 90.2 persons/km<sup>2</sup> for West Sumatra Province in 1991 (refer to Table II.2.4).

## 2.2 Population Projection of Study Area

### 2.2.1 Method of Population Projection

The number of future population is the most basic indicator of the socioeconomic condition of the study area. It is an indispensable factor for the confirmation of beneficiaries of flood control and water resources development projects. Furthermore, it is used as basic data for water demand forecast.

Population projection has been carried out for 1994, 1999, 2004, 2009, 2014 and 2019 as the target years for three levels, i.e., low, medium and high.

(1) Control Total

First of all, the population of Riau and West Sumatra provinces were projected by setting the annual average growth rate for each five-year interval during the period from 1994 to 2019 with reference to REPELITA VI.

Secondly, shares of the total population of all Kabupatens and Kotamadyas of the study area for each province were set as control total for each five-year mentioned above on the basis of the past data. These shares are 55% for Riau Province and 62% for West Sumatra Province.

(2) Setting Up of Initial Value

The population projection is composed of two parts. One is the projection of natural increase and the other is the projection of social increase. With regard to the latter, the transmigrants were taken into account. Then the initial value of natural and transmigrants for all Kabupatens and Kotamadyas of the study area were set temporally on the basis of annual average growth rates by taking REPELITA VI and the past data into account.

(3) Comparison of Shares

After setting up the initial value, shares of total population for all Kabupatens and Kotamadyas of the study area in each province were calculated. Then, shares based on the initial value were compared with the control total shares.

(4) Iteration

Unless the calculated shares coincided with the control total shares, calculation of shares were iterated by changing the annual average growth rates for population of natural and transmigrants until the calculated shares coincided with the control total.

(5) Classification of Population into River Basin Area

Administrative boundaries of some Kabupatens and Kotamadyas are not the same as the geographical boundaries of the study area. Therefore, the projected population of such Kabupatens and Kotamadyas were classified into study area and non-study area population. Furthermore, population belonging to the study area were reclassified into population of the Kampar river basin and population of the Indragiri river basin.

(6) Division of Population into Rural and Urban Areas

After the classification of projected population in the study area, population was divided into rural and urban area population. The ratio of rural and urban areas of Kabupatens and Kotamadyas was estimated for each five-year. Then, on the basis of these ratios, rural and urban populations were calculated.

### 2.2.2 Result of Projection

According to the results of population projection of medium level for Kabupatens and Kotamadyas of the study area, it can generally be said that growth rates of Riau Province are bigger than those of West Sumatra Province. Especially, the population of Kodya. Pekanbaru and Kabupaten Indragiri Hulu is predicted to increase with a higher growth rate than in other Kabupatens. In West Sumatra Province, the population of Kodya. Sawahlunto/Sijunjung, Kodya. Solok, and Kodya Bukittinggi is forecasted to increase with a higher growth rate than in other Kotamadyas and Kabupatens (refer to Table II.2.5).

According to the results of population projection of medium level for Kabupatens and Kotamadyas that geographically coincide with the study area as shown in the table below, the total population of the Indragiri river basin is forecasted to be 3,501,000 in 2019. On the other hand, the total population of the Kampar river basin is forecasted to be 2,811,000 in 2019, including Kodya. Pekanbaru.

Unit: person

River Basin	1994	1999	2004	2009	2014	2019
Kampar	1,018,950	1,245,799	1,532,341	1,895,697	2,314,705	2,811,499
Indragiri	2,335,479	2,547,980	2,759,616	3,005,185	3,246,077	3,500,579
Total	3,354,429	3,793,779	4,291,957	4,900,882	5,560,782	6,312,078

The results of projection show that for rural and urban populations of medium level, those in the Indragiri river basin in 2019 as target year were forecast to be 2,716,000 and 785,000, respectively. On the other hand, in the Kampar river basin, rural and urban populations in 2019 are projected at 848,000 and 1,963,000, respectively. This proves that the urban population of Kampar river basin is more than the rural population, while the rural population of Indragiri river basin is more than the urban population, because the urban population of Indragiri river basin includes the urban population of Kodya. Pekanbaru of 1,818,000, which is extremely bigger than the rural population of 54,000.

In this study, the medium level of projection is considered to be the most probable among the three levels and suitable for application to the succeeding study on flood damage and water demand.



## CHAPTER 3 PRESENT ECONOMIC CONDITION

### 3.1 National Economic Condition

#### 3.1.1 Gross Domestic Product

Gross domestic product (GDP) is described as below.

##### (1) GDP

The gross domestic product (GDP) of Indonesia including oil and oil products at 1983 constant market price has increased from Rp. 83,037 billion in 1984 to Rp. 123,181 billion in 1991 with average growth rate of 5.80%. The average growth rate itself has increased from 4.41% (1984-1987) to 6.85% (1987-1991) (refer to Table II.3.1).

Comparing by island, Sulawesi Island shows the most rapid average growth rate at 7.56% from 1984 to 1991, followed by Maluku and Irianjaya at 7.29% and Nusa Tenggara Island at 7.02%

Comparing the share by island in Indonesia, GRDP is predominantly occupied by Jawa Island at 53.6% in 1991, but its share shows an increase compared with 50.2% in 1984. Second largest share is occupied by Sumatra Island at 25.7%, followed by Kalimantan Island at 8.26% and Sulawesi Island at 4.34%.

##### (2) GDP per Capita

GDP per capita of Indonesia at 1983 constant market price has changed from Rp. 556,478 in 1987 to Rp. 743,778 in 1993 with average growth rate of 4.95%. The trend of average growth rate shows a decrease from 5.13% (1987-1990) to 4.77% (1990-1993).

On the other hand, gross national product (GNP) per capita and national income per capita show the same trend as the GDP per capita (refer to Table II.3.2).

##### (3) GDP by Industrial Origin

The GDP encompasses eleven industrial sectors. According to the GDP in 1993 at 1983 constant market price, manufacturing industries have Rp. 29,035 billion (20.80%) which is the biggest among all industries. Following manufacturing industries are agriculture, livestock, forestry and fisheries with Rp. 24,512 billion (17.56%); trade, hotel and restaurants, Rp. 23,113 billion (16.56%); and mining and quarrying, Rp. 19,587 billion (14.03%). These five industries are occupying around 70% of all industries in Indonesia, as summarized in the table below.

Kind of Industry	Amount (Rp. 10 <sup>9</sup> )	Share (%)
Manufacturing Industries	29,035	20.80
Agriculture, Livestock, Forestry & Fisheries	24,512	17.56
Trade, Hotel and Restaurants	23,114	16.56
Mining and Quarrying	19,588	14.03
Others	43,322	31.04
Total	139,571	100.00*

\* Total does not add up to amount indicated due to rounding.

On the contrary, in 1987, the biggest share was occupied by agriculture, livestock, forestry and fisheries as 21.40% followed by mining and quarrying at 17.31%, manufacturing industries at 17.18% and trade, hotel and restaurant at 15.19%. The order of figures for share in 1987 is a little bit different from 1993 (refer to Table II.3.3).

### 3.1.2 Agriculture

#### (1) Production of Foodstuff by Crop

Total harvested area of main foodstuff in Indonesia was 18,699 thousand ha in 1992 of which 65.5% is occupied by paddy at 11,103 thousand ha. Most of the paddy harvested area is occupied by wetland paddy. Following paddy are maize, 3,629 thousand ha (21.4%) and soybean, 1,666 thousand ha (9.8%). The figures are summarized as follows:

Crop	Amount (1,000 ha)	Share (%)
Paddy	11,103	59.3
Maize	3,629	19.4
Soybean	1,666	8.9
Others	2,301	12.3
Total	18,699	100.0*

\* Total does not add up to amount indicated due to rounding.

Total production of main foodstuff in Indonesia was 77,531 thousand tons in 1992 of which 66.8% is occupied by paddy at 48,240 thousand tons. Production of wetland paddy shows a dominant share in total production of paddy. Following paddy are cassava, 16,515 thousand tons (22.9%) and maize, 7,995 thousand tons (11.1%). The figures are summarized as follows:

Crop	Amount (1,000 tons)	Share (%)
Paddy	48,240	62.2
Cassava	16,516	21.3
Maize	7,995	10.3
Others	4,780	6.2
Total	77,531	100.0

The highest yield rate in 1992 is shown by cassava at 12.22 ton/ha followed by sweet potato at 9.44 ton/ha, wetland paddy at 4.63 ton/ha, and so on.

Comparing average annual growth rate from 1989 to 1992, soybean shows the most rapid growth rate at 12.44% followed by maize at 8.89%. On the other hand, the highest yield rate can be observed in dry land paddy at 2.10% (refer to Table II.3.4).

Comparing production by island, most foodstuff is produced in Jawa Island in 1992 at 43,287 thousand tons (58.1% of Indonesia). The second biggest production is in Sumatra Island (refer to Table II.3.5). The figures are summarized as follows:

Unit: 1,000 ton

Particulars	Sumatra	Jawa	Nusa Tenggara	Kalimantan	Sulawesi	Maluk & Irianjaya	Total
Total Foodstuff Production	16,224	43,287	4,679	3,083	6,646	606	74,525
Share (%)	21.8	58.1	6.3	4.1	8.9	0.8	100.0

## (2) Production of Vegetables by Crop

Total production of main products in Indonesia was 2,828 thousand tons in 1991. The largest share was occupied by cabbages at 975 thousand tons (34.5%) followed by potatoes at 526 thousand tons (18.6%), shallots at 509 thousand tons (18.0%), mustard greens at 322 thousand tons (11.4%), and so on. The figures are summarized as follows:

Crops	Amount (1,000 tons)	Share (%)
Cabbages	975	34.5
Potatoes	526	18.6
Shallots	509	18.0
Mustard Green	322	11.4
Others	496	17.5
Total	2,828	100.0

Comparing production by island, most of the vegetables were produced in Jawa Island 1991 at 1,971 thousand tons (69.7%). The second biggest production is in Sumatra Island.

### (3) Production of Estate by Crop

Total production of estate in Indonesia was 10,490 thousand tons in 1992, which is composed of perennial crops at 7,903 thousand tons (75.3%) and annual crops at 2,587 thousand tons (24.7%). The largest share was occupied by coconut at 2,510 thousand tons (23.9%). The second large share was occupied by sugarcane at 2,344 thousand tons (22.3%) followed by crude oil palm at 2,186 thousand tons (20.8%), and so on. The figures are summarized as follows:

Kind of Crop	Amount (1,000 tons)	Share (%)
Perennial	7,903	75.3
Annual	2,587	24.7
Coconut	2,511	23.9
Sugarcane	2,345	22.4
Crude Oil Palm	2,186	20.8
Others	3,448	32.9
Total	10,490	100.0

Comparing average annual growth rate during five years from 1987 to 1992, drastic growth rate was shown by oil palm at 33.47% and cocoa at 30.32% in spite of their small shares. The growth rate of other crops was less than 10%. Especially, palm kernel and rosella showed negative high average growth at minus 22.59% and minus 16.27%, respectively (refer to Table II.3.6).

### 3.1.3 Industry

#### (1) Number of Manufacturing Establishments

The total number of manufacturing establishments in Indonesia was 2,490,000 in 1992 of which household manufacturing industry occupied the most share at 2,351,000 (94.4%) followed by small size establishments at 123,000 (4.9%) and large/medium size establishments at 16,000 (0.7%).

Comparing by industrial origin, wood and wood products including furniture occupied the most share at 1,039,000 (41.7%) followed by food, beverage and tobacco at 876,000 (35.2%) and textiles, clothing and leather at 322,000 (13.0%) (refer to Table II.3.7).

(2) Persons Engaged

The total number of persons engaged in industry in Indonesia was 7,764,000 in 1992. The biggest share was occupied by household manufacturing industry at 3,786,000 (48.8%). Following is large/medium size industries at 2,994,000 (38.6%) and small size industries at 984,000 (12.7%).

Comparing by industrial origin, the most share was occupied by food, beverage and tobacco at 2,436,000 (31.4%), followed by wood and wood products including furniture at 2,122,000 (27.3%) and textiles, clothing and leather at 1,513,000 (11.4%) (refer to Table II.3.7).

(3) Gross Output

The total value of gross outputs at market price in Indonesia was Rp. 96,339 billion in 1992. The share was mostly occupied by large/medium size at Rp. 86,252 billion (89.5%) in spite of its smallest share in the number of establishments at 0.7%. The second biggest share was occupied by households at Rp. 5,894 billion (6.1%) followed by small size at Rp. 4,193 billion (4.4%).

Comparing by industrial origin, the most share was occupied by food, beverage and tobacco as Rp. 22,630 billion (23.5%) which is followed by textiles, clothing and leather at Rp. 17,290 billion (17.9%), chemical, petroleum, coal, rubber and plastic products at Rp. 14,655 billion (15.2%) and fabricated metal products, machinery and equipment at Rp. 14,623 billion (15.2%). The figures are summarized as follows:

Kind of Industry	Amount (Rp. 10 <sup>9</sup> )	Share (%)
Food, Beverage and Tobacco	22,630	23.5
Textiles, Clothing and Leather	17,290	17.9
Plastic Products	14,655	15.2
Fabricated Metal Products, Machinery & Equipment	14,623	15.2
Others	27,141	28.2
Total	96,339	100.0

This proves that distribution of value of products by industrial origin was more diversified than the number of establishments and persons engaged (refer to Table II.3.7).

3.1.4 Finance

Finance is classified into two, government receipts and government expenditures, as described below.

## (1) Government Receipts

Actual government receipts are composed of routine receipts and development ones. Routine receipts have increased from Rp. 15,905 billion in 1984 to Rp. 47,452 billion in 1992 with average annual growth rate of 14.64% during that period. On the other hand, development receipts showed increase from Rp. 3,478 billion in 1984 to Rp. 10,716 billion in 1992 with the average growth rate of 15.10%. In the recent three years, most government receipts are occupied by routine receipts at around 80% (refer to Table II.3.8).

Among the government receipts, routine and development receipts in 1992 are summarized in the table below (refer to Table II.3.9).

Government Receipts		Amount (Rp. 10 <sup>9</sup> )	Share to Total (%)
Routine Receipt	Oil & Gas	15,330	26.35
	Non-Oil & Gas	32,122	55.22
	Income Tax	11,913	20.48
	VAT & Service Tax	10,714	18.42
	Others	9,495	16.32
Development Receipt	Project Aid	10,204	17.54
	Program Aid	512	0.88
Total		58,168	100.00

## (2) Government Expenditures

Actual government expenditures are composed of routine expenditures and development ones. Routine expenditures have increased from Rp. 9,429 billion in 1984 to Rp. 34,031 billion in 1992 with average annual growth rate of 17.40% during that period. On the other hand, development expenditures showed increase from Rp. 9,952 billion in 1984 to Rp. 24,135 billion in 1992 with the average growth rate of 11.71%. In recent years, around 60% of government expenditures has been occupied by routine expenditures and around 40% by development ones (refer to Table II.3.8).

The breakdown of government expenditures is shown in the table below.

Government Expenditures		Amount (Rp. 10 <sup>9</sup> )	Share to Total (%)
Routine Expenditure	Debt Payments	15,217	26.16
	Personnel Expenses	9,466	16.27
	Subsidies to Regions	5,283	9.08
	Others	4,065	6.99
Development Expenditure	Institution	7,858	13.51
	Infrastructure Development	1,225	2.11
	Project Aid	10,204	17.54
	Others	4,848	8.33
Total		58,166	100.00

Finally, it should be noted that the balance of routine works always shows a surplus, increasing from Rp. 6,476 billion in 1984 to Rp. 13,421 billion in 1992. On the contrary, the balance of development works shows a deficit every year, increasing from Rp. 6,474 billion to Rp. 13,419 billion (refer to Table II.3.8).

### 3.1.5 Trade

Trade is classified into exports and imports as described below.

#### (1) Exports

FOB value of exports including petroleum and gas of Indonesia had increased from US\$926 million in 1956 to US\$33,967 million in 1992 showing about 37 times the average growth rate of 10.52% during this period. On the other hand, FOB value of exports excluding petroleum and gas of Indonesia had increased from US\$671 million in 1956 to US\$23,296 million showing about 3.5 times the average growth rate of 10.36% during the period (refer to Table II.3.11).

The exported amounts and growth rates of major commodity groups from 1989 to 1992 are summarized in the tables below (refer to Table II.3.12).

Commodity Groups	Amount (US\$10 <sup>6</sup> )	Share (%)
Mineral fuels, lubricants and related materials	11,273.4	33.19
Manufactured goods classified by materials	8,434.0	24.83
Miscellaneous manufactured articles	5,790.2	17.05

Commodity Groups	Average Annual Growth Rate (%)
Machinery and transport equipment	92.82
Miscellaneous manufactured articles	45.43
Beverage and tobacco	23.92

#### (2) Imports

CIF value of imports including petroleum and gas of Indonesia had increased from US\$860 million in 1956 to US\$27,279 million showing about 32 times the average growth rate of 10.08% during this period. On the other hand, CIF value of imports excluding petroleum and gas of Indonesia had increased from US\$799 million in 1956 to US\$25,164 million showing about 31 times the average growth rate of 10.05% during the period (refer to Table II.3.11).

The imported amounts and growth rates of major commodity groups from 1989 to 1992 are summarized in the tables below (refer to Table II.3.13).

Commodity Groups	Amount (US\$10 <sup>6</sup> )	Share (%)
Machinery and transport equipment	11,700	42.89
Manufactured goods classified by materials	4,668	17.11
Chemicals	3,776	13.84

Commodity Groups	Average Growth Rate (%)
Beverage and tobacco	38.31
Machinery and transport equipment	23.70
Manufactured goods classified by materials	20.95
Miscellaneous manufactured articles	20.03

Finally, it is noted that the balance of trade including petroleum and gas almost always show a surplus increasing from US\$66 million in 1956 to US\$6,687 million in 1992. On the contrary, the balance of trade excluding petroleum and gas shows a deficit almost every year increasing from US\$128 million to US\$1,868 million. This means that the export of petroleum and gas had significantly contributed to the positive trade balance (refer to Table II.3.11).

### 3.2 Economic Condition of Study Area

#### 3.2.1 Gross Regional Domestic Product

Gross regional domestic product (GRDP) in the study area is described as below.

##### (1) GRDP

The GRDP of the study area at 1983 constant market price has increased from Rp. 1,452,430 million in 1986 to Rp. 1,717,397 million in 1990 with average annual growth rate of 4.28%. Average growth rate of the study area in Riau Province during the same period is 9.02%, which is larger than that of the study area in West Sumatra Province of only 1.27%.

Especially, the GRDPs of Kab. Indragiri Hulu and Kodya. Pekanbaru had remarkably increased with average growth rates of 10.74% and 10.07%, respectively, while the average growth rates of almost all Kabupatens and Kotamadyas in West Sumatra are less than 2.5% except Kodya. Sawahlunto which has 5.18%. It is shown very clearly that there are gaps between the two provinces not only in population but also in GRDP (refer to Table II.3.14).

##### (2) GRDP per Capita

GRDP per capita of the study area at 1983 constant market price has changed from Rp. 369,770 in 1986 to Rp. 400,681 in 1990. GRDP per capita of the study area in West Sumatra Province is almost the same as that of Riau Province, but average growth rate in West Sumatra Province (0.28%) is smaller than that of Riau Province (4.79%). Hence, GRDP per capita of the



study area in Riau Province (Rp. 414,450) has become larger than that of West Sumatra Province (Rp. 390,790) in 1990 comparing them with data in 1986.

In Riau Province, the amount of oil products is much, so that there is a big difference between GRDP per capita including oil (Rp. 2,478,492) and GRDP excluding oil (Rp. 486,908) in the provincial total of 1990. Furthermore, it must be considered that GRDP per capita of Kodya. Sawahlunto is extremely large at Rp. 1,585,024 in 1990 because it includes coal products in Ombilin (refer to Table II.3.15).

### (3) GRDP by Industrial Origin

Among the 11 categories of industry, GRDPs of the major categories in 1990 are as summarized in the table below.

Industry	Amount (Rp. 10 <sup>9</sup> )	Share (%)
Agriculture	625	36.4
Trade, Hotel and Restaurant	403	23.5
Manufacturing Industry	150	8.7
Transportation and Communications	138	8.0
Others	401	23.4
Total	1,717	100.0

Industries of Riau Province with more shares than West Sumatra Province with regard to the study area are found in transportation and communications, banking and other financial institutions, ownership of dwelling, and public administration and defense. It means that service industries have considerably large weights in Riau Province. From the viewpoint of industrial structure, Riau Province is in a little bit higher position than West Sumatra Province (refer to Table II.3.16)

### 3.2.2 Agriculture

Agricultural conditions in the study area are described as below.

#### (1) Production of Foodstuff by Crop

The production of foodstuff in the study area in 1991 is summarized in the table below (refer to Table II.3.17). In the study area in Riau Province, the share of wet paddy at 55.6% is less than that of the whole study area but the share of cassava at 18.0% is more. On the contrary, in West Sumatra Province, the share of wet paddy is more than that of the whole study area at 85.5% and that of cassava is only 1.7%.

Crop	Amount (1,000 tons)	Share (%)
Wet paddy	1,455	77.7
Cassava	176	9.4
Dry paddy	93	5.0
Others	148	7.9
Total	1,872	100.0

## (2) Production of Vegetables and Estate

The production of major vegetables in the study area in 1991 is summarized in the table below.

Study Area	Crop	Amount 1,000 tons	Share(%)
Riau Province	Water grass	14.0	34.6
	Vegetable beans	7.4	18.3
	Cucumber	6.6	16.4
West Sumatra Province	Cabbage	30.0	25.6
	Pepper	22.0	19.0
	Potatoe	18.0	15.4

The production of estates in the study area in 1991 is summarized in the table below (refer to Table II.3.18).

Crop	Amount (1,000 tons)	Share (%)
Coconut	233	41.3
Oil Palm	172	30.5
Rubber	114	20.2
Others	45	8.0
Total	564	100.0

Comparing shares by province and by crop, more than 60% of rubber, coconut and palm oil are produced in the study area in Riau Province. Other crops are mostly produced in the study area in West Sumatra Province.

### 3.2.3 Industry

The number of manufacturing establishments in the study area in 1991 is summarized in the table below (refer to Table II.3.19).

Study Area	Kind of Industry	No. of Establishments	Share in Study Area (%)
Riau Province	Chemical and Construction	1,109	27.8
	Food	1,098	27.5
	Metal	682	17.1
	Others	1,107	27.7
	Total of Study Area	3,996	100.0*
	Total of Province	7,687	-
West Sumatra Province	Wood Products incl. Furniture	7,176	26.6
	Food	6,239	23.1
	Chemicals, Petroleum, etc.	4,472	16.6
	Cloth and Leather	3,849	14.3
	Others	5,228	19.4
	Total of Study Area	26,964	100.0
	Total of Province	34,326	-

\* Total may not add up to amount indicated due to rounding.